ABSTRACTS

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Abstracts of The 46th Annual Conference of Research Society for the Study of Diabetes in India

Prof. M.M.S. Ahuja Theme Symposium- Population Specific Characteristics of Diabetes in India

MMS01

Body mass index changes in uncontrolled type 2 diabetes mellitusa report from diabetes speciality clinic

S Paul[1], VK Kolukula[2], S Popuri[3]
1-Apollo Sugar Clinics Limited, Hyderabad, India, 2- Apollo Sugar Clinics Limited, Hyderabad, India, 3- Apollo Sugar Clinics Limited, Hyderabad, India

Background and Aims: To evaluate glycemic control and body mass index (BMI) changes in type 2 diabetes mellitus (T2DM) patients- a report from outpatient Diabetes Speciality health care clinic

Materials and methods: The current study is a single center retrospective data analysis of T2DM patients registered at Apollo Sugar Clinics Limited, India. The data were extracted from electronic medical records (June 2017 to April 2018) of Apollo Sugar Clinic, and as a standard process of Apollo sugar clinics, consent is obtained from every patient after registration. The data in EMR is captured at three stages 1. Pre-doc: patient demographics (age, gender, height and weight, blood pressure), past clinical history, past medication, past glycemic values. 2. Doc: Diagnosis, past treatment-related complaints, prescriptions. 3. Post-doc: diet and exercise counseling, insulin training and patient education. In addition, glycemic data, fasting blood glucose (BG), post-prandial BG and glycated hemoglobin (HbA1c) was also captured. Patients with BMI-18.5-24.9 kg/m2 were grouped to normal, BMI 25- 29.9 kg/m2 to overweight and BMI ≥30 kg/m2 to obese. Descriptive statistics were applied to report the results and appropriate statistical tests were performed to test the significance.

Results: A total of 426 T2DM patients were included in the analysis, among this 56% were males and 44% were females. Mean age was 51 (±12.37) years, BMI 28.4 kg/m2, and HbA1c 8.5%. Of the total patients 107 (25%) were having normal BMI, 180 (42%) overweight BMI and 139 (33%) obese BMI. The majority (61%) of the patients were prescribed with oral anti-diabetes medication (61%), followed by oral+insulin (38%), and insulin (1%). Patients with HbA1c data were 226 and among these 72% were uncontrolled (HbA1c >7%) and 28% were controlled (HbA1c <=7%). Overall the mean BMI change of -0.5 Kg/m2 was observed in 74 T2DM patients, in obese T2DM patients, there was a clinically significant reduction in BMI - 2.2kg/m2. BMI change in uncontrolled diabetes (HbA1c >7%) was -0.4 kg/m2. Further, when BMI change was compared between patients on only orals (38) and oral+insulin (37), we observed a significant reduction in BMI in only orals (-1.4kg/m2), in oral+insulin there is a slight increase in BMI of 0.3kg/m2. In addition, overall the correlation between baseline BMI and follow up BMI was not clinically significant.

Conclusion: The current analysis indicates that BMI reduction is significant in T2DM patients with high HbA1c and on orals antidiabetes medication.

Keywords Epidemiology

MMS02

Characteristics of patients with diabetes mellitus attending a tertiary care centre in East Delhi

Sandeep Goyal, Mishra BK, Jain N, Madhu SV
Department of Endocrinology, Centre for Diabetes Endocrinology & Metabolism, UCMS and GTB Hospital, University of Delhi, Dilshad Garden, Delhi 95

Background: The prevalence of Diabetes mellitus in India is rising and has been reported to vary in different parts of the country. The clinical characteristics of patients with diabetes may also vary in view of the different dietary, life style and other socio cultural factors. There is a need to understand these regional differences.

Methods: We retrospectively analyzed the case records of 6055 diabetic patients above the age of 20 years registered in Centre for Diabetes Endocrinology & Metabolism, UCMS and GTB Hospital with a focus on their background characteristics at registration. These included socio demographic parameters (age, gender, , educational level, occupation, income, family history of diabetes and duration of diabetes), clinical and anthropometric measures (BMI. Waist and Blood pressure), glycaemic indices (fasting and postprandial plasma glucose and HbA1C) and data on diabetic complication and co- morbodities.

Result: Diabetic subjects (2427 males and 3628 females) had a mean age of 50.48±11.06 years with low literacy (63.9% had schooling less than class 10) and low income (mean income per month INR 8876±12047) levels. 3.54% of diabetic patients were type 1 while the remaining were either Type 2, indeterminate or secondary diabetes based on clinical criteria. The mean duration of diabetes of 5.02 ± 5.7 years at the time of registration. Over forty percent of the subjects (41.7%) had at least one diabetic individual in the family. Two thirds of the subjects were either overweight or obese (mean BMI; 25.28±11.06 kg/m^2) and 73.66% were centrally obese. The mean fasting plasma glucose at presentation was 183.01±75.5 mg/dl, mean PPPG 262.30±91.8 mg/dl and mean HbA1C was 9.23±2.21 %. Over 80% of subjects had dyslipidaemia (81.1%) and 43.32 % had hypertension while

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23.23% had the renal-retinal syndrome (Retinopathy-14.67%, Nephropathy- 16%).

Conclusion: Patients with diabetes mellitus presenting to a tertiary care centre in North India display high rates of obesity, central obesity, dyslipidaemia and hypertension all of which significantly enhance cardiovascular risk in them.

MMS03

Dysglycemic detection drive in Bangalore (East) under the aegis of KRSSDI- 2017

R Selvarajan[1], M Patra[2]
1-Corona Sugars, Bangalore, India, 2- Corona Sugars, Bangalore, India

Background and Aims: Uncontrolled and Undiagnosed diabetes continues to be a global burden on society, governments, HCPs, adding to this has been alarming rise in the incidence of diabetes in young. Many people with dysglycemic are unaware that they have the condition. The international diabetes federation has estimated the epidemic of diabetes in India with as many as 66.85 million diagnosed cases as of 2014 (IDF 2013). India is heading towards becoming the diabetes capital of the world with an estimated prediction of 109 million cases by 2035 (IDF 2013). We conducted a screening study under the aegis of KRSSDI to study the prevalence of dysglycemia in and around our clinic with an urban population visitation in Bangalore.

Materials and methods: We prospectively conducted an observation study on 1056 outpatient subjects of both sexes who visited our screening events conducted by Corona Sugars. The age range of the cohort was 18-85 years. A detailed clinical history including family history of Diabetes, Hypertension, smoking /alcohol intake, Occupation status were recorded. Random blood sugars of patients who had not measured their blood glucose levels for at least one year and their anthropometric data were measured.

Results: In our study, we report the prevalence of family history of diabetes is 59.94% (59.71% males) with an average GRBS of 162.89mg/dl. The prevalence of family history of hypertension was 47.25% with a slight male preponderance (55.11%). About 28% of the patients reporting to our clinic presented with family history of both hypertension and diabetes. This subset of the cohort also reported a higher incidence of increased body mass index with 91.67% males reporting BMI >25. The occupation status indicated that majority of the men reporting family history of both hypertension and diabetes with a BMI of >25 were working in the private sector and majority of the women were housewives. 16.4 % of the Cohort had dysglycemia in young (18-40) with 4.2% family history of diabetes, and 8.2% with BMI >25. This indicated a sedentary lifestyle as one of the risk factors contributing to the early onset of dysglycemia. Smoking and alcohol history were comparable in all the groups. Cross clinical parameters were not statistically significant in ascertaining any single parameter as a risk factor for increased prevalence of dysglycemia. However, it can not be ruled out as risk factors.

Conclusion: Our study showed increasing burden of undiagnosed diabetes in all age groups, especially in young adults (18-40) at 16.3 % which is alarming. In young, family history was not a major contributing factor for development of diabetes (4.2%), it was rather faulty lifestyle, sedentary extended working hours and urbanisation. Early identification of dysglycemia, would help to reduce the prevalence of emerging Diabetes and its related complications.

Keywords Epidemiology

MMS04

Glycemic status evaluation in newly diagnosed type 2 diabetes mellitus (T2DM) adult Indian patients and requirement of insulin therapy at the time of diagnosis

T Shah[1], N Suthar[2], D Solanki[3], S Amdani[4], P Sharma[5], R Tandel[6], R Patel[7]
1-AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India, 2- AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India, 3- AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India, 4- AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India, 5- AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India, 6- AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India, 7- AMC MET Medical College and Sheth LG Hospital, Ahmedabad, India

Background and Aims: India is one of the epicentres of the global diabetes mellitus pandemic. Aim is to study the value of Glycated Haemoglobin (HbA1C) in Indian patients at the time of diagnosis of T2DM, in this way to know glycemic status of Indian patients with T2DM at the time of their first presentation and requirement of insulin therapy at the time of diagnosis.

Materials and methods: From 1st July 2017 all patients attending our OPD are studied. Those patients, who are suspected to have T2DM on clinical grounds were subjected for further investigations i.e. Fasting Blood Sugar (FBS), Post Prandial Blood Sugar (PP2BS), HbA1c prior to any treatment for DM. All anemic patients and critically ill patients were excluded from study. FBS/ PP2BS were done with GOD/ POD method & HbA1c was done with NGSP certified automated HPLC method in standard laboratory.

Results: Total 298 patients were diagnosed to have T2DM based on standard diagnostic criteria. In 14 patients HbA1c was not done due to financial constraint, hence excluded. Mean HbA1c was 10.39 with SD of 2.29. HbA1c was ≥9% in 189 patients (63.2%) and ≥10 % in 160 patients (53.5%). So, according to ADA Standards of medical care in diabetes 2018 guidelines more than 50% of Indian adults with T2DM will require combination injectable insulin therapy at the time of diagnosis.

Graph/Table:
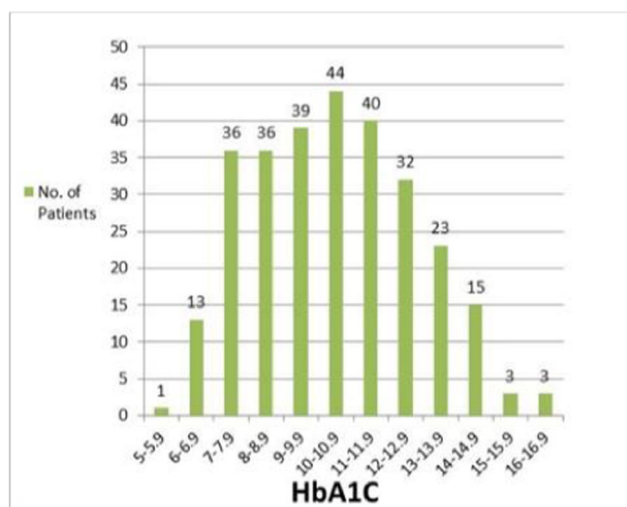
Conclusion: HbA1c value in Indian patients of T2DM at the time of first diagnosis is very high. Indian T2DM patients seek medical help from health care professionals very late, after their symptomatic status. At the time of diagnosis of T2DM, Indian patients have very poor glycemia, i.e. highly undisciplined glycemic status. We can label this as an awareness inertia.
Keywords Epidemiology; Insulin therapy

MMS05

INDIAB data

RM Anjana
Dr. Mohan's Diabetes Specialities Centre, Madras Diabetes Research Foundation, Chennai, India

Background and Aims: Diabetes and associated metabolic non-communicable diseases (NCDs) including hypertension, obesity etc. are no longer diseases of affluent developed nations. The prevalence of diabetes and metabolic NCDs is steadily increasing in developing countries like India. The epidemiological transition occurring in the India, as a result of rapid urbanization and economic development, has made it one of the epicenters of the diabetes epidemic.

Materials and methods: The Indian Council of Medical Research-INdia DIABetes (ICMR-INDIAB) study is the largest nationally representative epidemiological survey conducted on adults aged ≥ 20 years to determine the prevalence of diabetes and prediabetes in India by estimating the state-wise prevalence of the same, and to compare the prevalence rates in urban and rural areas across the country in a phased manner. The first phase of the study completed in 4 regions of India, which includes three states randomly selected to represent the south (Tamil Nadu), west (Maharashtra) and east (Jharkhand) of India and one UT representing northern India (Chandigarh) has already provided authentic epidemiological data on diabetes, hypertension, dyslipidemia and obesity in the country. The North East component, which includes 8 north eastern states namely Sikkim, Assam, Meghalaya, Tripura, Mizoram, Manipur, Nagaland and Arunachal Pradesh has also been completed. In Phase II, which includes 17 states, the National Capital territory of New Delhi and 1 union territory, 8 states and the National Capital territory of New Delhi have been completed and the rest are under progress. Till date, 21 states/UT have been surveyed.

Results: The data from 15 states/UT estimates the prevalence of diabetes in India to be 7.3%. The overall prevalence of diabetes was found to be higher in the mainland (8.3%) than in the northeastern states (5.9%). There are also wide differences in diabetes prevalence between states in India. The States with higher per capita GDP had higher prevalence of diabetes.

Chandigarh, with the highest per capita income, had the highest prevalence of diabetes (13.6%) and conversely, Bihar, the state with the lowest per capita income of the 15 states studied, had the lowest prevalence of diabetes (4.3%). The prevalence of diabetes was higher in urban areas (11.2%) compared with the rural areas (5.2%). While diabetes was more prevalent among individuals of higher socioeconomic status (SES) in rural areas across the country, higher prevalence of diabetes was noted in low SES groups of urban areas in the more economically developed states.

Conclusion: A significant proportion of individuals with diabetes were unaware that they had the disorder, and this proportion was higher in rural compared to the urban areas. An additional point of concern is that the take-off point in prevalence of diabetes was at 25-34 years with a decline after age 65. The ICMR-INDIAB study also reported a high prevalence of prediabetes across the country (10.3% and 24.7% based on the WHO and ADA definitions respectively). We can therefore expect huge increases in the numbers of people with diabetes in India in the coming years, particularly in the rural areas and among the lower socioeconomic strata.
Keywords Non-communicable diseases; prevalence of diabetes

MMS06

Phenotype and beta cell function in young type 2 diabetics from upper Assam

A Dutta[1], PK Dutta[2], S Kakati[3], CS Yajnik[4]
1-Assam Medical College and Hospital, Dibrugarh, India, 2- Assam Medical College and Hospital, Dibrugarh, India, 3- Assam Medical College and Hospital, Dibrugarh, India, 4- KEM Hospital Research Center, Pune, India

Background and Aims: The Young Diabetic Registry (YDR) of North East India, which runs from our Institute, started picking up a large number of young type 2 patients over a period of last 10 years. This led us to thinking why are we seeing such an epidemiological change in our population and if it was a recent phenomenon in our region. This brainstorming gave birth to our ICMR funded study named PHENOEINDY-2 (Phenotyping North East Indian Young type 2 diabetic patients). We present here our initial findings from the first year data.

Materials and methods: This is a hospital based observational study including 150 subjects. 90 (51 male and 39 female) young diabetics and 60 (35 male and 25 female) healthy matched controls were studied over a period of 1 year from April 2017 to March 2018. Proper demographic, family, diet and treatment history was recorded. Anthropometric measurements and biochemical examinations were made after proper consent. Biochemical tests were done and body fat composition was studied using DEXA densitometer. C-peptide was measured by immunometric assey (ELISA). Insulin resistance was modeled in both populations from C-peptide using Homeostasis Model Assessment (HOMA2-IR) program, HOMA-B and Disposition Index (HOMA- B/HOMA-IR).

Results: The median age was 33 years. there were slightly higher number of urban patients than rural. 67% were native Assamese. The diabetic population had higher BMI, subcutaneous fat deposition, body fat composition and lipid profile in blood. 51 male diabetics and 39 female diabetics who were studied over a period of 1 year, had median beta cell function at 43% (22-99) and 26% (21-49) respectively in comparison to 147% (108-178) and 136% (112-159) in healthy controls. Insulin sensitivity was 43% (29-80) and 48% (26-69) in diabetic males and females in comparison to 67%(42-86) and 74%(50-95) in non diabetic males and females. Overall the Insulin Resistance (IR-HOMR) was 2 in diabetics compared to 1.5 to1.2 in healthy controls.

Conclusion: The diabetic patients were fat, both anthropometrically abd biochemically. There was significant beta cell dysfunction and insulin resistance recorded in young type 2 diabetic patients from upper Assam when compared with matched healthy controls.
Keywords: Epidemiology; Insulin sensitivity and resistance; Adipose tissue biology and adipocytokines

MMS07

Prevalence & characteristics of insulin requiring ketosis-resistant diabetes mellitus from Central India

Sunil Gupta, Kavita Gupta, Sachin Gathe
MD, FRCP(Edinburgh)(Glasgow), FACP(USA), FICP, FIAMS, FIACM
Managing Director, Sunil's Diabetes Care n' Research Centre Pvt. Ltd
Nagpur, Maharashtra, India

Introduction: Clinicians are aware of type 1 and Type 2 diabetes, but they are less familiar with tropical pancreatic diabetes, which is one of the forms of secondary diabetes mellitus and is not

uncommon in India. Earlier, it was reported from Kerala, part of Orissa and then from Chennai. There are two clinical forms of pancreatic diabetes seen. One with history of alcoholism resulting from post-alcoholic chronic pancreatitis, which may be with calcification termed as fibrocalculus pancreatic DM (FCPD) or without pancreatic calcification. The other non-alcoholic subgroup of pancreatic diabetes which was earlier classified as Protein Deficiency DM (PDDM) and FCPD, but was subsequently removed and kept in a category of secondary DM. These patients typically have low BMI, poor socio economic background, negative family history of diabetes, low C-peptide & severe nonketotic hyperglycemia. We have tried to highlight the characteristics of alcoholic and nonalcoholic pancreatic diabetes mellitus.

Observations: Data was collected from 51084 people with diabetes enrolled at tertiary care center Nagpur. Of them, 32,900 records were updated in the software which were selected for assessment. 31709(86%) had Type 2 DM, 2003(5.4%) were Type 1 DM, 2310(6.3%), had Gestational Diabetes Mellitus, while 585 (1.6%) patients had Pancreatic Diabetes. Amongst T2 DM, 15371(48.47%), had Hypertension, 3577(11.28%), had CAD, 5562(17.54%) have Retinopathy, 3583(11.29%) have Neuropathy and 2378(9.3%), have Nephropathy.

Of 585 patients of Pancreatic Diabetes, 460 patient's data was compiled analyzed for their characteristics and associated co-morbidities.

Results: Data was analyzed in two groups Alcoholic and Nonalcoholic pancreatic diabetes. Age of onset, gender, duration of diabetes, BMI, WHR, Family History of Diabetes, Addiction like Smoking, FBG, PPBG, HBA1C, Total insulin Dose in both Groups, comorbidities like Hypertension, Thyroid, pulmonary TB, Peripheral Vascular Disease and complications like CAD, Retinopathy, Nephropathy, Neuropathy, presence of calcification in Pancreas (FCPD) was compared.

Alcoholic pancreatitis was more seen in male population (P<0.001). Mean age of patients was 44.7+ 12.14, Mean duration of Diabetes was 5.13 ± 5.80 yrs, & Mean BMI was 18.8 ± 3.6 kg/m2. There was no statistically significant difference in age, onset of diabetes, duration of diabetes, BMI, presence of hypertension, CAD, Nephropathy, Neuropathy, PVD, Thyroid disease, Pulmonary Koch's, HbA1C, Total Insulin dose, Total Cholesterol, Triglycerides & LDL Cholesterol in both Alcoholic & non alcoholic pancreatic DM groups. There was significant increase in the prevalence of pancreatic calcification in alcoholic group (P= 0.0035). Retinopathy was found to be significantly high in nonalcoholic pancreatic DM (P= 0.0005). Central obesity & smoking was significantly high in alcoholic pancreatitis group (P<0.0001) & (P<0.0001) respectively. HDL-Cholesterol was significantly lower in nonalcoholic pancreatic DM (P= 0.0049).

Conclusion: Insulin requiring ketotic resistant diabetes is not uncommon in central India. These patients behave as alcoholic pancreatic diabetes with minor differences.

Prof. B.B.Tripathi Nutrition Symposium- Dietary Carbohydrate Consumption in Diabetes Patients and Normal Individuals

BBT01

Glycemic indices of traditional Indian foods

Shobana S, Sudha V, Anjana RM, Unnikrishnan R, Mohan V
Madras Diabetes Research Foundation, Dr. Mohan's Diabetes Specialties Centre, Chennai, India

Background and Aims: Indian diets are cereal staple based high carbohydrate diets. Consumption of diets rich in fibre depleted refined cereals, fatty, salty foods act as triggers for the escalation of diabetes epidemic. Hence, both quantity and quality of carbohydrates needs attention. Glycemic Index (GI) is the most important method to assess the quality (glycemic property) of carbohydrate rich foods. High GI (≥ 70) foods elicit a higher glycemic and insulinemic responses and mediate diabetes risk through beta cell exhaustion and insulin resistance. It is prudent to understand the glycemic properties of commonly consumed Indian foods for judicious meal planning. There are variety of cereal based preparations consumed pan India contributing to bulk of carbohydrate calories in the diets.

Materials and methods: In this context, we tested the GI of commonly consumed traditional foods preparations. GI testing was carried out using Internationally recognized GI protocol by FAO/WHO (1998) and the method has been validated and is in accordance with international standards for conducting clinical research. All volunteers gave informed consent and obtained ethical approval. A total of 15 healthy volunteers (men and women) aged between 20- 37 years were recruited and the participants in the study were excluded if they were overweight, dieting, had a family history of diabetes, suffering from any illness, food allergy or on regular medications. All volunteers underwent 3 days of reference food testing and 1 day for the test foods in random order with at least 2 days gap between measurements to minimize carry over effects. Volunteers visited the GI testing Centre each test day in the morning after a 10-12 hr overnight fast. Brief questionnaire on previous day's diet (24hr recall) and physical activity to ensure that the volunteers maintained the same diet and physical activity on pre-test dates and refrained from smoking and alcohol during study period. Fasting capillary blood samples were taken as the baseline value. The volunteers then consumed a test meal containing 50 g of available carbohydrates, the first bite in the mouth is set as time 0 and the capillary blood samples were taken at 15, 30, 45, 60, 90 and 120 minutes after starting to eat the test foods. The Incremental Area Under the Curve (blood glucose response) for the standard and the test foods were used for calculating the GI.

Results: The GI of the preparations varied from low to high GI category. Plain cooked white rice (WR) varieties showed high GI with high fibre polished rice as exception showing medium GI. Even minimal polishing of rice increased the GI equivalent to that of WR. Plain cooked parboiled brown rice (BR) varieties showed medium GI. Both BR and WR based idli, oothappam, kitchidi and upma showed high GI while dosa, pongal showed medium GI. BR based sambar rice showed low GI. Finger millet (FM) cooked in the form of upma (except vermicelli upma with incorporated soluble fibre) and gruel, plain cooked unpolished FM and LM showed very high GI in spite of being a whole grain and containing higher fiber contents. Brown rice flakes (BRF) upma showed medium GI and was almost similar in GI to that of plain cooked BR. Roti's from pearl millet (PM), sorghum, and idli from sorghum, wheat dosa, methi paratha, adai and snacks from wheat showed medium GI. Broken wheat upma and sundal preparations showed low GI, Whereas Maize roti showed high GI.

Higher degree of processing, decreased particle size of the grains, increased degree of gelatinization of starch, grain matrix disruption may lead to higher glycemic responses. Many of the millet based preparations in spite of higher fibre contents (as compared to white rice) showed medium to very high GI and none of the millets showed low GI. More studies are required before appropriate recommendations could be made. Dietary fibre content of foods alone may not be a potential indicator for glycemic response of foods. There is an urgent need for GI database for region wise carbohydrate foods in the country for imparting effective dietary advice on the quality and quantity.

Conclusion: More studies are required before appropriate recommendations could be made. Dietary fibre content of foods alone may not be a potential indicator for glycemic response of foods. There is an urgent need for GI database for region wise carbohydrate foods in the country for imparting effective dietary advice on the quality and quantity.

Keywords Glycemic indices, carbohydrate

BBT02

Insights on macronutrient intake among T2dm individuals in South India - interim results from a South Indian cohort of the rssdi multicentric survey

Geethu Sanal, Arun Shankar, Lakshmy Ramachandran, Viji Krishna A, Gopika Krishnan, Sunitha Jothydev, Jothydev Kesavadev
Jothydev's Diabetes Research Centre, JDC Junction, Mudavanmugal, Poojapura, Trivandrum, Kerala, India, 695032

Keyword Macronutrient

Background and Aims: India is a united nation despite diversities in language, culture and food choices. Macronutrients like dietary fibre and vegetable fat have been reported to be inversely linked to T2DM whereas high intakes of dietary carbohydrate, and animal protein are reported to increase the T2DM risk.

As a part of the RSSDI initiated multi-centric survey on macronutrient intake of T2DM individuals in India, we have been collecting data from our South Indian patients with T2DM and comparing the observations with that of a matched normal control group.

Materials and methods: A questionnaire is administered to South Indian patients with T2DM visiting our diabetes care centre, and consists of questions concerning demographics, behavioural characteristics, health history, and nutritional preferences. To avoid bias, we also recruit our newly enrolled T2DM patients. Dietary intake of the patients is assessed using a 24-h recall.

Results: T2DM group: n= 50, age= 55.10±9.97 years, 50% males, 90% non-vegetarian, BMI= 27.08±3.47 kg/m2, HbA1c= 8.45±1.98%. Control group: n= 20, age= 52.32±6.54 years, 50.00% males, 85.00% non-vegetarian, BMI= 23.21±1.51 kg/m2, HbA1c= 5.02±0.51%. Interim analysis revealed a trend of higher fat consumption (% of energy) among T2DM individuals than those in the normal control group (27.58±5.40% vs. 21.28±3.85%, p < 0.0001). Carbohydrate and protein consumption were within the recommended limits in both the study groups. Interestingly, when the T2DM patients were grouped on the basis of their HbA1c levels (≤7% vs. >7%), the latter group with higher HbA1c levels was noticed to have a trend of higher fat consumption than the former group 25.66 ±6.08% vs. 28.35±4.99%, p=0.1161. Again, carbohydrate and protein consumption remained within the recommended limits in these groups.

Conclusion: Our interim results reveal a trend among the S.Indian population to consume more than the recommended levels of fat in their diet (probably due to their non-vegetarian diet pattern, including the use of oil and coconut in the preparations), while the carbohydrate and protein consumption pattern tend to remain within the recommended limits. Whether this factor contributes as a triggering factor for T2DM development needs to be researched at. Completion of the study, with the data of more participants being available for analysis, is expected to provide further robust results and insights.

BBT03

Macronutrient intake pattern in T2DM from Central India

Kavita Gupta, Sunil Gupta
Sunil's Diabetes Care n Research Centre Pvt Ltd, Ramdaspeth Nagpur

Abstract: Rapid change in the dietary practice has been considered as the biggest culprit for rising trends in non-communicable diseases like obesity, type 2 diabetes, hypertension, coronary heart diseases etc. We selected 1200 people (745 male and 455 female), with history of Type 2 diabetes for more than 6 months duration. Mean age was 50.2 years, Mean weight of male was 73.3kg and of female was 64.85kg. 3 days dietary intake recalls of macronutrients with pre-designed food frequency questionnaire was taken. Table: Macronutrient Intake of the male and female subjects with the statistical interpretation of the data.

Macronutrient		Male	Female	t-test	P Summary
	n	745	455		
1 **Total Energy (kcals)**					
	Mean	1889	1549	0.0001**	HS
	SD	± 423	± 298		
	Range	1120 – 3881	1051 - 2516		
2 **Carbohydrates (gms)**					
	Mean	263	218	0.0001**	HS
	SD	± 67	± 51		
	Range	80 – 527	104 – 420		
3 **Protein (gms)**					
	Mean	57	50	0.0001**	HS
	SD	± 11	± 10		
	Range	23 – 77	20 - 79		
4 **Fat (gms)**					
	Mean	61.69	61.20	0.0059*	S
	SD	± 14.24	± 15		
	Range	20 - 90	12 – 97		

HS: Highly Significant; S: Significant; NS: Non-significant

The Types of Oils used, included Soyabean, Groundnut, Mustard, Rice Bran, Safflower, Sunflower, Mixed oils. A maximum number of male and female subjects indicated using Soyabean oil male (66%) and female (65%) as a cooking media, Rice bran was used only by 2% of the subjects. In both the sexes 13% of the subjects used a combination of two different oils. The mean total fat intake per day ranged between 20-40gm to above 81gms. The percentage of subjects were more in the range of 41-60gm/day followed by 61- 80gms. A negligible percentage were taking 20-40gm/day.

The CHO and protein intake of both male and female subjects did not differ significantly according to their BMI status. However both sexes reflected significant difference in fat intake (males p=0.018 and female p=0.001). A low positive (r=0.172) and highly significant relationship (p=0.000) of Waist Circumference to fat intake is observed in female subjects. Similarly a low positive (r=0.084) and significant (p=0.023) relationship is observed in male subjects. The rest of the nutrients showed insignificant relationship with WC in both male and female subjects.

Amongst the selected subjects 25% male and 20% Female consumed salad daily while 25% male and 28% female consumed salads 2-3 times a week, while 11% of male and 18% of female never consumed salads. Surprisingly 36% male and 33% of female diabetics never consumed sprouts. Only 21% male and 25% female consumed sprouts once a week. More than 50% of the subjects that is 65% of male and 62% female subjects consumed Green leafy vegetable 2-3 times a week. Fruits: Only 25% males and 29 % females consumed fruits 2-3 times a week while 23% males and 22% females consumed fruits once a week.

Major percentage of male and female subjects were vegetarian and never consumed Egg, Fish, Mutton and Chicken. Almost an equal percentage of male (16%) and female (15%) subjects consumed fish and mutton once a month. While males (14%) and females (9% and 13%) consumed eggs and chicken once a month respectively. 40% male and 53% female subjects consumed Samosa once a month, 40% male and 54% female

subjects consumed kachori once a month. 35% male and 47% female consumed panipuri once a month. Cutlets were rarely consumed; almost 52% male and 43% female never consumed cutlets More than 80% of male and female subjects did not consume Pizza and Burger. Very meager percentage of subjects consumed them once a month.

Male population of T2DM from central India consume 56% of CHO, 29% of fat and 12% of Protein, which is as per recommended daily allowances (RDA), while female population consume 56% CHO, 35% fat and 13% protein in their diet. Thus, fat consumption was higher than RDA in female group.

Conclusion: Dietary intake of macronutrients in T2DM population of central India seem to be acceptable, except that fat intake in female population may need to be reduced.

BBT04

The dietary advance glycation end products (dAGE) of high carbohydrate Indian diets and its effect on inflammatory markers in overweight adults

R Mookambika Ramya Bai, Anjana RM, Unnikrishnan R, Mohan V
Madras Diabetes Research Foundation, Dr. Mohan's Diabetes Specialties Centre, Chennai, India

Background and Aims: Dietary Advance Glycation End products (dAGEs) are the primary sources of AGEs being accumulated in the body. AGEs are linked to many metabolic risk factors leading to NCDs like diabetes. dAGEs are formed as result of various cooking methods like grilling, broiling, roasting, searing and frying. Consumption of diets with low AGEs have reported to reduce the metabolic risk markers. Hence there is a need to quantify the AGE content in the commonly consumed Indian foods for which the dAGE data is sparse and study the effect on metabolic risk.
Materials and methods: A randomized crossover design was conducted in 50 overweight participants (BMI ≥23; age 25-45 years) matching the study criteria. After a week of run-in-period, the participants were randomized either to low dAGE diet or high dAGE diet for a period of 3 months with in-between washout period of 2 weeks to minimise the carryover effect of the previous diet. The average dAGE content of foods administered to the study participants were as follows, for low AGE diets- 31071.70±1450 (mean ±SD) and for high AGE diets 55765±4004 (mean ±SD). Institutional ethics committee and written informed consent was obtained from the study participants. Baseline, mid and end study parameters were assessed, which included an interviewer-administered questionnaires on medical history, demographics, and lifestyle factors such as physical activity, alcohol consumption, and smoking status. An interviewer-administered validated semi- quantitative food frequency questionnaire (FFQ) was also administered to all the volunteers. In addition, 24-hour recalls were administered at baseline, during and at the end of the intervention period. Blood samples were analysed to assess fasting and postprandial blood glucose, lipid profile, HbA1C and plasma insulin. Both low and high AGE diets provided to the study participants was Iso caloric (~2000-2200) (p=0.44), but significantly different (p<0.001) in their dAGE content.
Results: Out of the 75 overweight participants screened 50 were recruited for the trial, and 40 participants (response rate-80%) completed the entire study protocol. The change in blood glucose and insulin levels was significantly lower in low dAGE diet compared to high dAGE diet. The insulin sensitivity was assessed (oral disposition index-DIO) and found to be significantly higher (Base: mean± SD= 3.3 ±3.2 End: mean± SD 7.6 ± 14.3) in low dAGE diet.
Results of this pilot study shows a positive effect of low dAGE foods on blood glucose and insulin levels-markers of early diabetes risk. Thus from

this study low dAGE foods can be identified and therapeutic product development can be initiated.
Conclusion: Results of this pilot study shows a positive effect of low dAGE foods on blood glucose and insulin levels-markers of early diabetes risk. Thus from this study low dAGE foods can be identified and therapeutic product development can be initiated.
Keywords Advance Glycation End products (dAGEs), carbohydrate

Research Grant Oral Presentations

RGO01

Effect of monochromatic infra red energy (MIRE) on intraepidermal nerve fibre density in painful diabetic peripheral neuropathy: randomized, sham control study

Ashu Rastogi, Pavan Uppula, Anil Bhansali, Uma Nahar Saikia
Deptt. of Endocrinology and Histopathology, PGIMER, Chandigarh

Background: The distal symmetrical polyneuropathy (DSPN) is by far the most common type of diabetic neuropathy, which affects more than 90% of the subjects. Many of these patients present with painful diabetic neuropathy (PDN) Till now satisfactory pharmacological treatment option for PDN is far from satisfactory. Monochromatic Infra red energy (MIRE) has been used for symptomatic relief in PDN. No studies are available which evaluated the effect of MIRE on IENFD change in painful DPN.
Materials and methods: This is a prospective single blind randomized controlled study including Patients with T2DM on stable oral hypoglycemic drugs and insulin during the preceding one month and with symptoms suggestive of PDN for at least 1 month. They were randomized into two groups, 1) Active cohort: received MIRE therapy or 2) Sham cohort: received sham therapy for 3 months. A thorough neurological and foot examination was performed. A 3mm skin punch biopsy was carried out, 10 cms proximal to lateral malleolus in the limb which scored worst on former evaluation tools and was sent for IENFD quantification to histopathology department at baseline and after 3 months of intervention.
Results: Twenty three participants completed the study protocol (15 in active group and 8 in sham group). The mean (±SD) age of patients in MIRE cohort was 59.07±9.16 years, diabetes duration was 12.86±3.09 years and mean duration of painful DPN was 3.93±3.74 years. Both groups had comparable mean age, BMI, HbA1C and duration of diabetes. There was no significant difference in painful DPN duration and treatment module either. The median decline in VAS at 3 months when compared to baseline was 5.10 (4.00-7.60) in MIRE cohort versus 3.00 (0.37-5.57) in sham cohort. The median delta change in Norfolk QOL DN from baseline was 15 (11-18) in the MIRE and 4 (4-14.2) in sham cohort (p=0.021). MIRE or sham therapy couldn't show any effect on NDS scores. Both cohorts had comparable median MNSI-Q and MNSI-P scores. The mean IENFD was 0.90±0.73 and 1.71 ±1.11 in the MIRE cohort and 0.60±0.89 and 2.17±0.98 before and after therapy in sham cohort. There was no statistically significant difference between both groups in terms of IENFD change post therapy.
Conclusions: Patients treated with MIRE therapy had symptomatic improvement as assessed by VAS scores and better quality of life scores after 12 weeks of therapy. However, MIRE therapy was no more effective than placebo in enhancing cutaneous re-innervation in patients with longstanding type 2 diabetes with symptomatic established painful peripheral neuropathy although longer follow-up duration might have tilted the balance.

RGO02

Facility based prevalence study of cutaneous infections in type 2 diabetes mellitus

Chippagiri Soumya[1]; Sanjay Kambar[2]; Dr. Shivkumar Patil[3]; Mr. M.D. Mallapur[4]
1-Senior Resident in department Community Medicine, C.M.C. Vellore, 2-Professor in the Department of Community Medicine, 3-Assistant Professor in the Department of Dermatology, 4- Biostatistician in the Department of Community Medicine, Jawaharlal Nehru Medical College, KLE University, Belagavi.

Introduction: Diabetes mellitus, the most common endocrine disorder affecting 65.1 million Indians.
Cutaneous signs of diabetes mellitus are extremely valuable to clinicians as some of them can alert the physicians to the diagnosis of diabetes mellitus and reflect the status of glycemic control and lipid metabolism.
Aim: To know the prevalence of cutaneous infections among type 2 diabetes mellitus in urban areas of Belagavi.
Methodology: Data was collected from type 2 diabetes mellitus patients attending in Urban Health Centre Ashok Nagar and Ram Nagar under field practice area of Department of Community Medicine, Jawaharlal Nehru Medical College, K.L.E. University, Belagavi. Informed written consent was taken. The diagnosis of diabetes mellitus type 2 was confirmed by verifying the Diabetic Register, maintained in the Urban Health Centres and patients' Medical Records was reviewed for information of duration, medications and complications of diabetes. Information about socio- demographic profile, general physical examination, systemic and cutaneous examination was recorded using validated, predesigned and pretested proforma. All patients were subjected to detailed history regarding skin complaints, duration of type 2 diabetes mellitus, family history and treatment of diabetes mellitus. All cases were subjected to thorough cutaneous examination under natural light. Cases which were doubtful of the diagnosis were confirmed with the help of Co- guide from the Department of Dermatology at K.L.E.'s Dr. Prabhakar Kore Hospital & Medical Research Centre. The study is a part of a year long research project titled "Cutaneous manifestations in type 2 diabetes mellitus in urban areas of Belagavi - A longitudinal study"
Results: Of the 180 study participants, the average age was 59.88 ±11.06 and 74.44% were female. 46.67% were living with diabetes from 1-5 years and 89.44% were on Oral Hypoglycemic Agents. Prevalence of cutaneous manifestations was found to be in 88 (48.88%). Cutaneous infections was found in 37.50% [most common was Tinea paedis with (21.59%)].
Conclusions: The cutaneous lesions were asymptomatic in majority of the participants (48.86%).
Keywords
Cutaneous infections, Diabetes mellitus, Tinea paedis

RGO03

sRAGE (soluble receptors for advanced glycation end products) levels and their association with inflammatory markers in type 2 diabetes mellitus, pre-diabetes andcontrols

C Yadav, PA Manjrekar
Department of Biochemistry, Kasturba Medical College, Mangalore

Background and Aims: Recent research in the field of type 2 diabetes mellitus has linked the mediation of AGE-signalling by their receptors (RAGE) to underlying hyperglycemia and inflammatory changes. However, the studies on whether the circulating pool of soluble RAGE (sRAGE) acts as a counteract measure to AGE related injury or if it contributes to the endothelial damage have yielded inconsistent results with very little knowledge available on sRAGE role in pre-diabetes and type 2 diabetes. Thus, this multi-hospital based comparative study was taken up to estimate and compare the levels of sRAGE in the diseased state "type 2 diabetes mellitus", the pre-clinical stage "pre-diabetes" and healthy controls and to correlate these levels with inflammatory markers (Interleukin-6 (IL-6) and Monocyte Chemoattractant protein-1 (MCP-1)) and glycemic indices (FPG and HbA1c) so as to have a better insight into the relationship of sRAGE with underlying inflammation.
Materials and Methods: Based on their FPG and HbA1c values, a total of 105 subjects aged 25-55 years chosen from KMC constituent Hospitals, Mangalore were categorised into type 2 diabetes, pre-diabetes and healthy controls (35 subjects per category). FPG (GOD-POD method), HbA1c (HPLC method) and baseline data (age and sex) were collected from patient's records. Serum sRAGE, IL-6 and MCP-1 were estimated using sandwich ELISA method. Statistical analysis was done using SPSS ver.16 employing ANOVA with Tukey's as post-hoc test for intergroup comparison of means and Pearson's correlation for correlation analysis.
Results: Serum sRAGE levels differed significantly ($p<0.05$) among the three groups (4.44 ± 1.06 ng/ml in diabetes, 5.21 ± 1.39 ng/ml in pre-diabetes and 5.72 ± 1.32 ng/ml in controls). Inflammatory markers were significantly increased ($p<0.05$) in diabetes (IL-6 = 60.5 ± 13.2 pg/ml, MCP-1 = 694.01 ± 57.3 pg/ml) and pre-diabetes group (IL-6 = 33.4 ± 8.09 pg/ml, MCP-1 = 282.5 ± 84.2 pg/ml) as compared to controls (IL-6 = 11.6 ± 3.2 pg/ml, MCP-1 = 174.1 ± 49.2 pg/ml). In the diabetes group, a significant negative correlation of sRAGE was seen with IL-6 (r = -0.604, $p<0.05$) and MCP-1 levels (r= -0.484, $p<0.05$) and also with the glycemic indices (FBS (r = -0.663, $p<0.05$) and HbA1c (r = -0.508, $p<0.05$)) whereas in the prediabetes group, a significant negative correlation of sRAGE was seen only with IL6 (r = -0.482, $p<0.05$), FBS (r = -0.571, $p<0.05$) and HbA1c (r = -0.361, $p<0.05$).
Conclusion: Serum sRAGE levels were significantly decreased whereas both the inflammatory markers showed an increasing trend in the diabetes group followed by pre- diabetes as compared to healthy controls. A significant inverse association observed between sRAGE levels and inflammatory markers as well as the glycemic indices is indicative of a possible cytoprotective role of sRAGE in the pathogenesis of impaired glucose homeostasis and its progression to overt diabetes.

RGO04

Role of yoga in prevention of type 2 diabetes mellitus - interim results from the Indian prevention of diabetes study (IPDS)

SV Madhu[1], PV Rao[2], J Kesavadev[3], HB Chandalia[4], A Gupta[5], AK Das[6]
1-University College of Medical Sciences, Delhi, India, 2- Diabetes Research Society, Hyderabad, India, 3- Jothydev's Diabetes Research Centre, Trivandrum, India, 4-Diabetes Endocrine Nutrition Management and Research Centre, Mumbai, India, 5- Jaipur Diabetes Research Centre, Jaipur, India, 6- Pondicherry Institute of Medical Sciences, Pudicherry, India

Background and Aims: Earlier short term studies have demonstrated that practice of yoga can reduce glycaemia in patients with type 2 diabetes. The present study was therefore initiated to determine whether Yoga can prevent type 2DM in non diabetic people with IGT/IFG.
Materials and methods: A 3-year multicentric, randomized, controlled, study for efficacy of yoga and matched controls is being conducted in individuals aged 30-70 years with prediabetes from both genders. Yoga consists of 40 minutes of pranayama and specific yoga postures known to be beneficial in diabetes daily. Progression to type 2 diabetes mellitus

(T2DM) is being monitored annually by OGTT. Interim results in those completing 2 year follow up are being presented.

Results: 305 subjects (males 44.5% and females 55.5%) with mean age of 45.1 ± 9.5 years and mean BMI of 28.5+ 4.2 Kg/m2 completed 2 years of follow up. Overall, 46 subjects (15.1%) converted to diabetes mellitus. Conversion rates for the yoga group (10.4%) were lower than for controls (17.7 %,). Glucose levels of 122 (40%) subjects did non worsen (non-progressors) ; The proportion of non-progressors in the yoga group (58/ 115 - 50.43%) was significantly higher than in controls (33/99 - 33.33%; p= 0.017) 27 out of 505 subjects who have completed 1 year of follow up developed diabetes. 3.93% of those on yoga converted to diabetes compared to 5.36% in the control group.

Conclusion: The results of the present study suggest that Yoga is effective in prevention of type 2 Diabetes Mellitus in subjects with prediabetes.

Keywords Prevention of type 2 diabetes

Oral Presentations

OP01

Diagnostic utility of glucose and insulin kinetics during OGTT for assessing insulin resistance in women with polycystic ovarian syndrome

AS Joshi[1], SN Shinde[2], RS Shinde[3]
1-Deenanath Mangeshkar Hospital, Pune, India, 2- Poona Hospital and Research Center, Pune, India, 3-Sanjeevan Institute of Cardiology, Pune, India

Background and Aims: Hyperinsulinemia (HI) is a common finding in polycystic ovarian syndrome (PCOS) though not included in the guidelines for the diagnosis of PCOS. We studied diagnostic utility of Glucose and Insulin Kinetics during Oral Glucose Tolerance Test for assessing Insulin resistance in women with PCOS.

Materials and methods: Seventy premenopausal women with ultrasonic evidence of polycystic ovaries (PCO) were studied using two-hour 75 grams OGTT with concurrent insulin levels. Seven women, without PCO, having normal glucose and insulin profiles were included as control. The study group was sub-grouped into thin, overweight and obese depending upon their BMI, as per current Indian obesity guidelines. HOMA-IR and Matsuda Indexes were calculated to estimate the IR status. Additionally, we studied the rate of rise of insulin (RIR) in first 30 minutes and the angle theta (THT) which is subtended by rising arm of insulin curve with the baseline. The multiplication product of glucose and insulin represents IR. Hence, we calculated Hepatic IR (HIR) by using the difference in first 30 minutes of OGTT for glucose and insulin. Similarly, Peripheral IR (PIR) was calculated using 90 min and 120 min difference. The results are presented in Table 1.

Results: Control and study group were significantly different when IR was assessed using OGTT. Nobody in the study grouphad diabetes. However, everybody had increased IR and HI, increased RIR and THT but normal glucose and HbA1c levels. Rising BMI correlated significantly with rise in fasting (FPI) and 120 min insulin (PPI) levels as well as HOMA-IR, RIR, THTand rise in both HIR and PIR. Progressive fall in Matsuda index of composite insulin sensitivity and the beta cell function marker i.e. disposition index, ISSI-2, was also noted. Since the FPI levels are known to vary due to physiological oscillations, HOMA-IR values are also likely to vary in the same individual. Instead, RIR or THT are apparently more stable and have wider range for given IR change.

Many studies have used '2.7' as the cut off for HOMA-IR. Our study suggests that alower cutoff should be used. Since the confounding effect of obesity on IR is absentin the thin PCO group, we sub-groupedthis group into hepatic resistant (3), Peripheral resistant (7) and combined (3) groups depending on their HIR and PIR. The peripheral IR subgroup could be diagnosed only by increased PPI levels. This group could be missed if only HOMA-IR is used as a criterion.

Graph/Table:

	Control (n=7)	Thin (n=13) < 23	OverWt (n=7) 23-24.9	Obese (n=50) > 24.9		Control (n=7)	Thin (n=13) < 23	OverWt (n=7) 23-24.9	Obese (n=50) > 24.9
BMI	25.16	19.46	23.5	31.54	Rate of Insulin Rise	2.1	3.33	4.88	5.83
HbA1c	5.2	5.38	5.2	5.54	Theta Angle in Degrees	63.18	71.17	77.9	77.87
Fasting-PG	89.43	92.47	92.34	90.74	HOMA Insu-Resistance	1.77	2.37	3.51	4.97
Glucose-30	134	136.15	138.4	152.22	Matsuda Insu-Sensitivity	4.98	3.04	2.46	2.03
Glucose-120	94.59	102.46	97.99	112.52	Average PG : (F+120)/2	90.1	97.47	95.16	101.63
Fasting-PI	7.94	10.27	15.43	21.94	Disposition Index ISSI-2	297.4	336.5	325.8	267.2
Insulin-30	66.15	110.17	161.81	196.69	Hepatic Resistance	4156	6849	10217	13472
Insulin-120	48.59	101.96	130.35	182.04	Prepheral Resistance	5514	12305	14766	25531

Conclusion: RIR and THT are more sensitive than HOMA-IR in diagnosing PCOS, especially the thin PCOS. We suggest use of OGTT with insulin levels and study the RIR, FPI and PPI levels to make an accurate and early diagnosis of IR in PCOS.

Keywords Insulin sensitivity and resistance, Weight regulation and obesity

OP02

Circulatory LIGHT/TNFSF14 as a Biomarker For Early Nephropathy in Patients with Tpe 2 Diabetes Mellitus

D Umapathy[1], KN Amin[2], RK Mohanram[3], V Viswanathan[4]
1-SRM Research Institute, SRM University, Chennai, India, 2- SRM Research Institute, SRM University, Chennai, India, 3- SRM Research Institute, SRM University, Chennai, India, 4- M.V.Hospital for Diabetes, Royapuram, Chennai, India

Background and Aims: Although numerous evidences indicate that the pathogenesis of Diabetic Nephropathy (DN) is multifactorial, inflammation has been emerged as a key pathophysiological mechanism. Therefore, there is an imperative need to identify an effective, specific and sensitive biomarker that can predict the developmentof DN among Type 2 Diabetes Mellitus (T2DM) individuals who will develop this life-threatening disease at an early stage. LIGHT/TNFSF14 (Lymphotoxin-like, exhibits Inducible expression, and competes with Herpes SimplexVirus Glycoprotein D for Herpesvirus entry mediator), a receptor expressed by T lymphocytes), a 29 kDa type 2 transmembrane protein belonging to the tumor necrosis factor (TNF) superfamily (TNFSF), primarily expressed on T cells and dendritic cells, but has also been found on monocytes, and granulocytes. It is involved in innate and adaptive immune responses, in the regulation of cell survival and proliferation. Earlier studies have shown a beneficial role for LIGHT in reducing the damaging pathology associated with multiple autoimmune and inflammatory conditions. Thus, in the present study, we measured the levels of circulatory LIGHT/TNFSF14 in different stages of albuminuria and assessed its diagnostic accuracy as a biomarker for DN and correlated with different families of circulatory cytokines.

Materials and methods: In the present cross sectional study, we enrolled a total of 306 subjects in which, Group-I (n=83; M/F:46/37): Healthy

controls consisted of non-diabetic subjects. Group-II (n=81; M/F:49/32): T2DM/Normoalbuminuria, diabetic subjects without any late complications. Group-III (n=142; M/F:80/62): T2DM-DN, T2DM subjectswith DN. Further, group-III subjects were subdivided into two groupsbased on their urinary albumin excretion rate (UAE). Group-IIIa (n=73; M/F:41/32): T2DM subjects with persistent microalbuminuria. Group-IIIb (n=69; M/F:39/30): T2DM subjects with persistent macroalbuminuria. The circulatory levels of inflammatory cytokines including LIGHT/TNFSF14 was carried out using a Bio-Plex Pro™ Human Inflammation Panel in amultiplex bead-based assay system.

Results: The levels of LIGHT were significantly increased in T2DM with further stepwise elevation in patients with micro and macroalbuminuria. The AUC_{ROC} for LIGHT was found to be the greatest than other acute phase markers and the optimal cut-off value was found as 12.1ng/ml, with 67.4% sensitivity and 96.9% specificity along with a positive predictive value (PPV) of 98.2% and a negative predictive value (NPV) of 45.4%. The results also showed that there was a significant association of plasma LIGHT with other risk factors of DN such as urea, creatinine, eGFR and HbA1c. We further investigated the correlation of plasma LIGHT levels with other inflammatory cytokines/chemokines and have found a strong positive correlation with sIL-6Ra, sIL-6Rβ, IFN-β, IL-8, LIGHT, sCD-30 and a strong negative correlation with TWEAK, TSLP and IL-28 A.

Conclusion: Plasma LIGHT measurement might become a biomarker for early incipient DN among T2DM patients.

Keywords Prevention of type 2 diabetes, Inflammation in type 2 diabetes, Nephropathy, Pathogenic mechanisms / complications

OP03

Rosalic acid attenuates ER stress by ameliorating its antioxidant activity via Nrf2 signaling cascade in endothelial cells

R Kunka Mohanram[1], K Amin[2], S Dornadula[3], S Natarajan[4], S Chatterjee[5]
1-SRM Institute of Science and Technology, Kattankulathur, India, 2-SRM Institute of Science and Technology, Kattankulathur, India, 3-SRM Institute of Science and Technology, Kattankulathur, India, 4-AU-KBC Research Centre, Anna University, Chennai, India, 5- AU-KBC Research Centre, Anna University, Chennai, India

Background and Aims: Endothelial dysfunction is a key event in the onset and progression of vascular complications associated with diabetes. Numerous strategies have been developed to improve the dysfunction of endothelial cells and there are still no drugs in clinical use that effectively treat diabetic microvascular disease. In this study, we investigated the protective effects of rosalic acid against ER stress-induced toxicity in endothelial cells.

Materials and methods: The cytotoxicity of rosalic acid (RA) and ER stress inducer, tunicamycin (TUN) on Human umbilical vein cell line, EA.hy926. RA cells were assessed using MTT assay. The role of RA on TUN-induced ER stress was studied by the expression of the markers such as GRP78 and CHOP using quantitative reverse transcriptase (qPCR). Immunoblotting was performed to identify RA-mediated nuclear translocation of Nrf2 protein and activation of Nrf2 target genes was studied using luciferase reporter driven by ARE-NQO1 and ARE-GST1 promoters in endothelial cells. In addition, an annexin-V binding assay was performed to identify the apoptotic status of RA-treated endothelial cells and further confirmed by the expressions of both pro- and anti-apoptotic genes using qPCR.

Results: A significant protective effect of RA was observed in TUN-exposed endothelial cells in a dose (2.5-20 μM) and time dependent manner (8-48 hrs). Further, RA suppressed tunicamycin (TUN)-induced ER stress as demonstrated by the expression of GRP78 and CHOP in endothelial cells. RA induced significant activation of Nrf2, in dose- and time-dependent manner, in TUN-treated endothelial cells. In addition, RA increased the expression of target genes downstream of Nrf2, such as heme oxygenase 1 (HO1), superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx), that confer cellular protection. PTS also up-regulated the expression of anti-apoptotic gene, Bcl-2, with a concomitant reduction in pro-apoptotic Bax and caspase-3 expression.

Conclusion: Our findings indicate the therapeutic potential of Nrf2 activation by RA as a promising approach to safeguard endothelial cells against ER-stress induced toxicity.

Keywords Endothelium

OP04

Prevalence of diabetes related vascular complications in subjects with normal glucose tolerance, prediabetes, newly detected diabetes and known diabetes

R Yadav[1], R Jhamb[2], J Rohatgi[3], S Madhu[4]
1-University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi, India, 2- UCMS & GTBH, Delhi, India, 3- UCMS & GTBH, Delhi, India, 4- UCMS & GTBH, Delhi, India

Background and Aims: A developing literature links prediabetes to complications that were previously attributed to diabetes. These complications include both macrovascular {coronary artery disease (CAD), peripheral vascular disease (PVD)} and microvascular (retinopathy, nephropathy and neuropathy) complications. Studies conducted across the globe have revealed a varying prevalence of diabetes related vascular complications in prediabetic individuals. Prevalence of CAD in prediabetic subjects has been found to range from 14.9% to 17.6% whereas PVD was reported to range from 2.9% to 9.5%. Prevalence of retinopathy has been shown to vary from 7.9% to 20.91%, that of nephropathy from 15% to 17.7% and neuropathy has been shown to vary from 11.2% to 24.3% in subjects with prediabetes. These studies suggest that diabetic complications may be seen earlier and at lower levels of dysglycaemia than the levels at which the diagnosis of diabetes mellitus is made.

Our aim was to study the prevalence of vascular complications of diabetes in subjects with normal glucose tolerance (NGT), prediabetes (PD), newly detected diabetes mellitus (NDDM) and known diabetes mellitus (KDM). Similar work has not been reported from our country before, to the best of our knowledge.

Materials and methods: Study subjects without any history of diabetes underwent oral glucose tolerance test (OGTT) and were classified as either NGT, PD or NDDM on the basis of American Diabetes Association (ADA) criteria. Age and sex matched KDM patients were also recruited. All the participants were subsequently screened for both macrovascular (CAD, PVD) and microvascular (retinopathy, nephropathy and neuropathy) complications of diabetes. CAD was assessed on the basis of history of myocardial infarction and ECG changes. PVD was assessed using vascular doppler to determine ankle brachial index (ABI). Retinopathy was assessed by fundus examination. Nephropathy was evaluated by urinary albumin-creatinine ratio. The presence or absence of neuropathy was determined by Neuropathy Symptom Score (NSS) and Neuropathy Disability Score (NDS) as per Research Society for the Study of Diabetes in India (RSSDI) guidelines.

Results: Prevalence of vascular complications among prediabetic subjects was 11.1% as compared to 1.4% among NGT subjects, 13.9% among NDDM subjects and 23.8% among KDM subjects. Difference in the complication rate between prediabetes and NGT group (p=0.033) and between prediabetes and KDM group (p=0.041) was significant whereas no significant difference was observed between prediabetes and NDDM group (p=0.060). The prevalence of macrovascular complications was 4.2%

among prediabetes subjects as compared to 0% among NGT, 4.2% among NDDM and 6.3% among KDM subjects. The prevalence of microvascular complications was 6.9% among prediabetic subjects as compared to 1.4% among NGT, 9.7% among NDDM and 17.6% among KDM subjects.

Conclusion: The proportion of prediabetic subjects with vascular complications was about half of those with known diabetes and almost similar to those with newly detected diabetes mellitus.

Keywords Nephropathy, Pathogenic mechanisms / complications

OP05

Morning cortisol level and cognitive abilities in people with type 2 diabetes

R Agrawal[1], DRP Agrawal[2]
1-S.P. Medical College, Bikaner, India, 2- S.P. Medical College, Bikaner, India

Background and Aims: Incresing evidences suggest that elevated glucocorticoid levels have widespread effects within the central nervous system (mainly hippocampus), a key locus for cognitive function and cortisol levels are increased in patients of diabetes. Keeping these two points in mind, relation between morning cortisol level and cognitive abilities in people of Type 2 diabetes were accessed.

Materials and methods: 100 Participants, aged 60-75 years were recruited randomly of type 2 diabetes, living in North-west Rajasthan. A fasting venous blood sample was taken, for measurement of plasma cortisol. Cortisol levels were measured by radioimmunoassay with intra-assay coefficient of variation (CV) 5.1-7.0% and interassay CV 6.0-7.9%. Cognitive ability was assessed by a battery of psychometric tests including MiniMental State Examination (MMSE), Executive function- Verbal Fluency Test (VFT) and Mental flexibilityTrail Making Test (TMT).

Results: This study showed significant relationship between cortisol levels and cognitive dysfunctions. Odds ratio of morning cortisol levels with minimental state examination (MMSE), mental flexibility-trail making test (TMT) and executive function- verbal fluency test (VFT) were 4.407, 2.647 and 0.195 respectively. Increased age, poor glycemic control, increased waist hip ratio, deranged lipid profile also had negative impact on cognitive functions.

Conclusion: There is highly significant causal correlation between cortisol level and cognitive dysfunctions in diabetic patients. Increased age and other complications of diabetes also have impact on cognitive function spectrum.

Keywords Other hormones, Cognitive dysfunction and Alzheimer Disease

OP06

Elevated one hour plasma glucose helps to identify those at risk for development of type-2-diabetes - 11 years observational study from South India

S Kumpatla[1], R Parveen[2], S Stanson[3], V Viswanathan[4]
1-Prof M Viswanathan Diabetes Research Centre and M V Hospital For Diabetes, Chennai, India, 2-Prof.M.Viswanathan DRC and M V Hospital for Diabetes, Chennai, India, 3- Prof.M.Viswanathan DRC and M V Hospital for Diabetes, Chennai, India, 4- Prof.M.Viswanathan DRC and M V Hospital for Diabetes, Chennai, India

Background and Aims: Prevention of diabetes become an important strategy to be dealt with new diagnostic criteria's for its early detection. IFG and IGT prediabetes states are well studied but there is sparse data on elevated 1 hr post glucose (1hrPG)response during an OGTT. The aim was to compare conversion rates in subjects with elevated 1hrPG during an OGTT in comparison with normal glucose tolerance (NGT) subjects over a period of 11 years follow-up (FU).

Materials and methods: A total of 4023 subjects underwent an OGTT between 2007 to 2011 were selected from electronic data base of medical records. All newly diagnosed diabetes subjects (n=1490) and subjects with no FU or with few FU (1-3FU's)(n=2310) were excluded. Conversion rates reported for those subjects who had a minimum of 8 years of FU through GTT and were followed up for a period of 11 years were included for final analysis (n=233)(Age:46.3±10.5, M:F155:78). Diagnosis was based on ADA criteria. 15.9% had NGT and 84.1% were diagnosed with PreDM at baseline.160 subjects with isolated prediabetes states and their combinations were further excluded. The remaining 73 subjects were categorized into group1 (n=37) consisting of subjects with NGT (F<100,1hr<155,2hr<140) and group-2 (n=36) with elevated 1hrPG (F<100,1hr≥155,2hr<140). Kaplan Meier curves for incident diabetes using Log rank test and Cox proportional hazard model were derived and compared between groups.

Results: During FU, 10.8% and 44.4% converted to DM in group1 and 2 respectively (p= 0.003).51.3% converted to PreDM in group1 and 50% remained as PreDM in group2. 37.8% of the subjects remained as NGT in group1 whereas in group2 only 5.5% of subjects reverted back to NGT. Elevated 1hrPG was associated with incident diabetes (hazard ratio7.25 [95% CI 2.07 - 25.3] (p=0.002) and provided better risk assessment. The unadjusted risk of event in subjects with elevated 1hrPG is likely to be 7 times more when compared to NGT. The Kaplan -Meier plot showed that subjects with elevated1hrPG remained free of diabetes for a median period of 8 years (95% CI 6.0-8.12) whereas NGT subjects remained free for a median of 10 years (95% CI 8.88-10.32) (p<0.001).

Graph/Table:
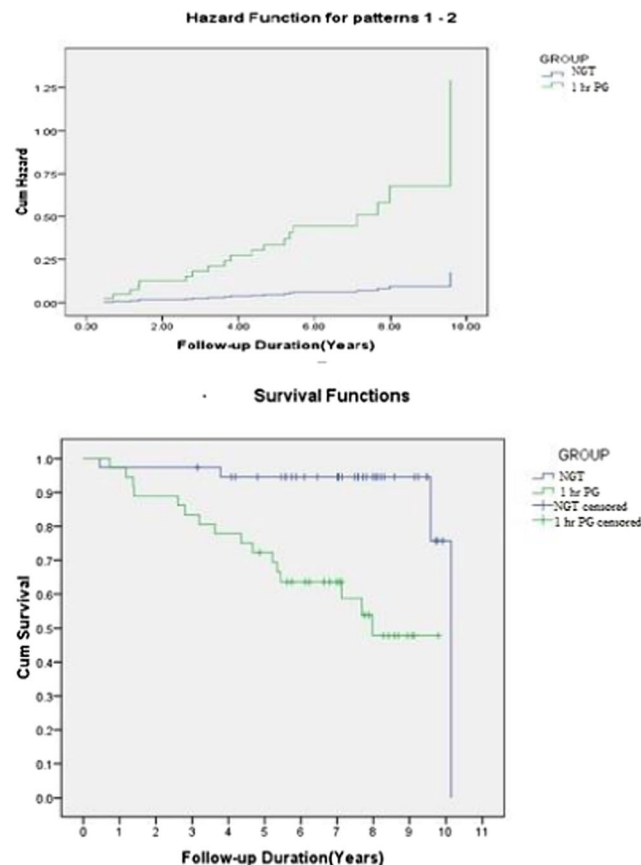
Conclusion: In conclusion, conversion to DM was higher in subjects with elevated 1hrPG as compared to NGT. The risk of event is likely to be 7 times more in subjects with elevated 1hrPG than NGT. Elevated 1hrPG during OGTT has to be considered as a distinct entity.
Keywords Prediction of type 2 diabetes

OP07

Exploring gene expression networking and development of diabetic retinopathy

A Valodara[1], T Sharma[2], D Bhojwani[3], A Vasavada[4], K SR[5]
1-Gujarat University, Ahmedabad, India, 2- Iladevi catarcat and IOL Research Centre, Ahmedabad, India, 3- Raghudeep eye hospital, Ahmedabad, India, 4- Raghudeep eye hospital, Ahmedabad, India, 5- Gujarat University, Ahmedabad, India

Background and Aims: Diabetic Retinopathy (DR) is frequently associated with type 2 diabetes mellitus (T2DM) and involves epithelial mesenchyme transition [EMT] or trans-differentiation of retina pigment epithelial cells. Most of the polymorphisms/variations associated with T2DM and DR are in the coding region of genes but very few of them are reported in the promoter region of genes. Therefore, we have analysed reported polymorphisms/variations in the promoter region of genes which are associated with T2DM and DR.
Materials and methods: Bioinformatics analysis of these polymorphisms/variations was performed to evaluate its role in the development of DR. 5000 bp upstream of selected genes sequence was downloaded from PubMed/Gene. With the help of Eukaryotic Promoter Database [EPD] the basic promoter sequence was obtained. With the help of TRANSFAC/Match database, associated TFs binding sites were predicated. Gene annotation was performed with the help of DNA Star Lasergene software. Gene networking was done with String tool.
Results: The effect of polymorphisms/variations on the gene expression and thus on the development of DR is predicted.
Conclusion: Our result indicates the interplay between the genes and alteration in their expression associated with the development of phenotypes associated with T2DM and DR.
Keywords Genetics of type 2 diabetes

OP08

Polymorphism of TCF7L2 gene & its expression in adipose tissue is associated with postprandial hypertriglyceredemia and glucose intolerance

B Mishra[1], B Banerjee[2], V Agrawal[3], M Aslam[4], S Goyal[5], M SV[6]
1-University college of medical sciences, Delhi university, Delhi, India, 2- University college of medical science, Delhi, India, 3- University college of medical science, Delhi, India, 4- University college of medical science, Delhi, India, 5- University college of medical science, Delhi, India, 6- University college of medical science, Delhi, India

Background and Aims: TCF7L2 gene is the strongest genetic predictor for Type 2 diabetes mellitus and it is believed that this risk is mediated by its effects on insulin secretion. However the exact mechanism of diabetes risk is still unclear. While a few studies have suggested a role of TCF7L2 gene in lipid metabolism, whether these could mediate the associated risk of T2DM has not been explored. We aimed to study whether polymorphism of rs7903146 TCF7L2 gene & its expression in adipose tissue is associated with post prandial hypertriglyceredemia and glucose intolerance.
Materials and methods: Polymorphism study of TCF7L2 gene (rs7903146) was carried out by using PCR-RFLP method in two hundred age and sex matched subjects who were recruited in three groups {NGT (n=67), Prediabetes (n=66) and T2DM (n=67} with varying glucose tolerance following 75 gm OGTT. Gene expression studies using Real Time PCR were also done in subcutaneous and omental adipose tissues in 10 subjects from each group who were scheduled to undergo abdominal surgery. A Standardized oral fat challenge test was performed in all the study subjects to determine their post prandial Tg responses besides measurement of anthropometric (BMI, Waist) and Glycaemic (Fasting, Postprandial plasma glucose and HbA1c) indices and fasting serum insulin.
Results: The mean age of study subjects were 40.25 ± 8.27 years and their mean BMI was 28.12 ± 4.89 kg/m^2. There were 93 males and 107 females. Distribution of T allele (TT+CT genotypes) of rs7903146 polymorphic form of TCF7L2 gene was found to be significantly higher in pre diabetes (51% vs 45% p=0.01) and Diabetes (66% vs 45% p<0.001) as compared to NGT. TT+CT genotypes of rs7903146 polymorphic form of TCF7L2 gene showed significantly higher fasting (154 ± 57 vs 124 ± 45 mg/dl p<0.001), 4hr (345 ± 199 vs 250 ± 133 mg/dl p<0.001), 6hr (408 ± 234 vs 296 ± 140 mg/dl p<0.001), Triglyceride area under curve (2798 ± 1405 vs 2106 ± 989 mg dl^{-1} 2hr^{-1} p<0.001), peakTg (452 ± 252 vs 336 ± 181 mg/dl p<0.001), iTgauc (1245 ± 1026 vs 825 ± 767 mg dl^{-1} 2hr^{-1} p<0.002) postprandial plasma glucose (186 ± 76 vs 146 ± 66 mg/dl p<0.001), and HOMA-IR (3.53 ± 2.40 vs 2.67 ± 2.16 p<0.01) levels as compared to CC genotype. TCF7L2 gene expression was 11 fold higher in prediabetes group (P<0.01) and 5.7 fold higher in T2DM group (P<0.003) as compared to NGT group in visceral adipose tissue. There was a significant correlation of expression of TCF7L2 gene in visceral adipose tissue with fasting Tg (r= 0.51 p<0.007), Tgauc (r= 0.42 p<0.03), peak Tg (r= 0.45 p<0.02) and postprandial plasma glucose levels (r= 0.48 p<0.01).
Conclusion: The present study demonstrates for the first time that rs7903146 polymorphic form of TCF7L2 gene as well as TCF7L2 gene expression in visceral adipose tissue is associated with PPHTg and glucose intolerance. Modulation of PPTg metabolism by TCF7L2 gene may be an important mechanism that mediates risk of T2DM associated with this gene.
Keywords Genetics of type 2 diabetes

OP09

Gut bacteria alteration in individuals with diabetes and its relationship with LEPR gene polymorphism

G Visvanathan[1], B Dhanasekaran[2], K Sekar[3], S Coimbatore Subramaniam[4], A Ranjith Mohan[5], M Viswanathan[6], R Venkatesan[7]
1-Madras Diabetes Research Foundation, Chennai, India, 2- Madras Diabetes Research Foundation, Chennai, India, 3- Madras Diabetes Research Foundation, Chennai, India, 4- Madras Diabetes Research Foundation, Chennai, India, 5- Madras Diabetes Research Foundation, Chennai, India, 6- Madras Diabetes Research Foundation, Chennai, India, 7- Madras Diabetes Research Foundation, Chennai, India

Background and Aims: Type 2 diabetes (T2D) is a multifactorial metabolic disorder which occurs as a result of complex gene environment interactions. Although it is now widely accepted that the gut microbiota plays a crucial role in host metabolism, current knowledge on how environmental and genetic factors interact with each other in diabetes remains to be elucidated. The leptin receptor (LEPR) single nucleotide polymorphism (SNP) rs1137101 (A/G), is known to be associated with diabetes, obesity and also has an effect on gut microbial profile. We hypothesized that individuals carrying the susceptible genotypes (GG/AG) of the LEPR

rs1137101 SNP would have a different gut bacterial profile than those carrying the wild-type genotype (AA). Hence, we investigated the association of LEPR rs1137101 SNP, with the gut microbiota composition of the study subjects.

Materials and methods: We characterized the gut microbial composition of normal glucose tolerance (n=137), prediabetes (n=141) and type 2 diabetes (n=157) by 16s sequencing of V3-V5 hypervariable regions and evaluated the association of diabetes and prediabetes status with the gut microbiota. Additionally, we genotyped LEPR rs1137101 (A/G) SNP by PCR-RFLP method in the study subjects using the genomic DNA extracted from the blood and further the relation between LEPR gene variant and gut microbiota composition were analyzed to elucidete whether the composition of gut microbiota is mediated by host genetic factors.

Results: Individuals with type 2 diabetes had lower gut microbiota diversity than healthy individuals. The abundances of several taxa were associated with glucose tolerance status. Genera such as Ruminococcus, SMB53, Erwinia and Prevotella were found to be significantly enriched in normal glucose tolerance group (NGT), whereas, Megasphaera, Vibrio and Bifidobacterium were significantly enriched in prediabetes group and genus Eubacterium was enriched in T2D group. Although, we did not find an association between LEPR gene polymorphism (rs1137101 A/G) with prediabetes and T2D; we found that genera SMB53, Faeclaibacterium, Lachnobacterium, Parabacteroides and Ruminococcus were present in higher proportion in non risk genotype AA of LEPR rs1137101 (A/G) and furthermore, these genera were shown to be enriched in NGT group in the study subjects.

Conclusion: Our results suggest that an altered microbiota composition may be mediated by a specific host genotype and can contribute to the development of diabetes.

Keywords Genetics of type 2 diabetes

OP10

Evaluation of relationship between corneal endothelium morphology with glycosylated haemoglobin level in type 2 diabetes mellitus patients

N Garg[1], D Singhal[2], DA Gauri[3]
1-Sardar Patel Medical College, Bikaner, India, 2- Sardar Patel Medical College, Bikaner, India, 3- Sardar Patel Medical College, Bikaner, India

Background and Aims: Dibetes Mellitus can affect almost all structures of the eye. Patients can develop not only diabetic retinopathy but also corneal complications. The purpose of this study was to investigate the effect of type 2 dibetes mellitus on corneal endothelial density and morphology by comparing these patients with normal subjects and to look for correlation between the state of the corneal endothelium and haemoglobin (HbA1c) levels.

Materials and methods: Hospital- based, observational study including 100 diabetic and 50 age matched control subjects. Study subjects were divided into 3 groups. Group A- 50 non-diabetic patients. Group B- 50 type 2 diabetes mellitus patients with good metabolic controL, (HbA1c <7%). Group C- 50 type 2 diabetes mellitus patients with poor metabolic control, (HbA1c >7%). After history taking and complete ocular examination, specular microscopy was used to measure central corneal thickness, endothelial cell density (ECD), Hexagonality (6A%), and coefficient of variation of cell size (CV).

Results: Endothelial cell density in the diabetic group was significantly lower than that in the control group (p<0.05). Coefficient of Variation (CV) of cell size was significantly higher (p= 0.04) in diabetics. Hexagonality was significantly lower in diabetics (p =0.031). No difference was found in central corneal thickness. Mean value of endothelial cell density was significantly lower in diabetics with poor glycemic

control as compared to those with good glycemiuc control. However no statistically significant difference was found in central corneal thickness, coefficient of variation and hexagonality between group B and C patients. Strong negative correlation was found between glycosylated haemoglobin and endothelial cell density in diabetic patients with Pearson co-relation coefficient -0.72.

Conclusion: Type 2 diabetes causes a significant alteration in the state of the cornea including reduction in endothelial cell density and increased pleomorphism and polymegathism. Poor glycaemic control was associated with a decrease in endothelial cell density. Hence evaluation of corneal endothelium should be a part of routine assesment in all diabetic patients.

Keywords Retinopathy, Endothelium

OP11

Influenza in hospitalized diabetics with severe acute respiratory infection

PA Koul[1], A Bhavsar[2], H Mir[3], M Simmerman[4], H Khanna[5]
1-SKIMS, Srinagar, India, 2- Sanofi Pasteur, India, 3- SKIMS, Srinagar, India, 4- Sanofi Pasteur, Thailand, 5- Sanofi Pasteur, India

Background and Aims: Data on contribution of influenza in causation of severe acute respiratory infection (SARI) in diabetics in the Indian subcontinent are limited. We assessed contribution of influenza as a cause of SARI among diabetics in northern India.

Materials and methods: Study was conducted in SKIMS, a tertiary care hospital in Srinagar, with temperate geography and northern hemispherical influenza activity. All diabetics receiving anti-diabetic treatment and presenting with SARI were recruited during two influenza seasons (November to April) for 2015-16 and 2016-17. Combined throat and nasal swabs were collected in viral transport medium. Samples were tested by realtime RT-PCR (ABI systems, USA) for influenza viruses using the standard CDC protocol. All the influenza A viruses were subtyped into A/H1N1 and A/H3 strains, and influenza B viruses were subtyped into B/Yamagata and B/Victoria lineages using standard primer/ probes. We also explored association of influenza with BMI or smoking status by test negative design. All the patients were managed as per standard treatment protocols. Oseltamivir was given to all SARI cases and continued in influenza positive patients. Data were analyzed using SPSS (version 21.0).

Results: 192 patients (age range 35-93 years; median 66 years, 84 male) were enrolled. Majority (n=165) had sought care previously from other healthcare providers. The median duration between symptoms onset and first consultation was one day (IQR=1-2 days). Diagnoses on admission were community acquired pneumonia (n=165), Congestive heart failure (CHF) (n=55), COPD with acute exacerbation/ CHF (n=51), sepsis (n=25) and Multi-organ dysfunction syndrome (n=9). Duration of diabetes ranged from 1 to 10 years (median 4 years) and 141 patients were receiving insulin. 17 patients (8.9%) patients were found to be Influenza positive. Influenza A was detected in 12 patients [AH1N1=4; AH3N2=8] and Influenza B in five patients [B/Yamagata=4; B/Victoria=1]. The clinical features among the influenza and non-influenza cases did not differ significantly. We did not found any correlation between influenza and BMI or smoking status. Oseltamivir was administered in all influenza patients. 22 (11.4%, one influenza positive) patients died during hospitalization. 17 (8.8%) patients had received influenza vaccine, and only one of them was influenza positive.

Conclusion: Influenza should be suspected among all diabetics presenting with SARI. Poor uptakes of influenza vaccine argue for measures to improve vaccine uptake among Indian diabetics.

Keywords: Epidemiology, Other complications

OP12

Use of Artificial Intelligence in prediction of Diabetic Retinopathy using a Fundus on phone camera

R Krishnan[1], A Jain[2], A Sivaraman[3], S Natarajan[4]
1-Aditya Jyot Foundation for Twinkling Little Eyes, Mumbai, India, 2-Aditya Jyot Foundation for Twinkling Little Eyes, Mumbai, India, 3-Remidio Innovative Solutions Pvt Ltd, Bangaluru, India, 4- Aditya Jyot Foundation for Twinkling Little Eyes, Mumbai, India

Background and Aims: Diabetes Retinopathy (DR) is the leading cause of blindness in working age adults. It might be asymptomatic in the early stages. If left untreated, it can cause irreversible blindness. Around 15-20% of patients with diabetes have some form of DR and 10% have sight-threatening DR. With the ever increasing number of diabetics and the limited number of ophthalmologists available in India, it is difficult to screen all diabetics especially those living in remote locations. The cameras currently used in taking fundus images are expensive and not portable. The solution to these problems is to train people to take fundus images using a portable camera and use the artificial intelligence to detect referable cases so that need for ophthalmic surgeons for screening is minimized and they can utilize their time to treat those who are actually in need.
The aim of the study was to compare the ability of artificial intelligence in predicting diabetic retinopathy compared to an ophthalmologist using fundus images taken from a smartphone based portable camera.
Materials and methods: Known cases of diabetes mellitus visiting the municipal dispensaries of Mumbai were included in the study. Patients were dilated using a single drop of 1% Tropicamide eye drops. Fundus images of both the eyes were then taken. The images so taken were uploaded and saved on cloud storage space. An ophthalmologist sitting in a distant location would then see the images and grade the severity of retinopathy. The artificial intelligence incorporated in the camera was also used to grade the severity of retinopathy. The ophthalmologist grading the images was masked to the results of artificial intelligence. The sensitivity and specificity of artificial intelligence in detecting referable DR was then calculated. Referable DR was defined as moderate nonproliferative diabetic retinopathy or more severe disease or presence of maculopathy.
Results: A total of 200 patients were screened using the fundus on phone camera. The mean age of the patients was 53.9 years. The mean duration of diabetes was 5.3 years. The prevalence of DR was 15.3% in the population. The sensitivity and specificity of AI in detecting referable DR was 100% and 79.8% respectively. Few of the false positive cases were seen due to retinal diseases other than DR.
Conclusion: Artificial intelligence can be used during the screening process to grade fundus images for diabetic retinopathy due to its high sensitivity. The fundus images can be taken by a technician and graded using artificial intelligence so that reports can be made readily available to patients even in the remotest locations. Only those detected with the disease would then be referred to an ophthalmologist.
Keywords Retinopathy

OP13

Early detection of diabetic kidney disease using urinary podocyte markers in normoalbuminuric patients with type 2 diabetes mellitus

R Y S[1], D Reddy[2]
1-JSS Hospital, Mysore, India, 2- JSS Medical College, Mysore, India

Background and Aims: Diagnostic markers to detect diabetic nephropathy at an early stage are important as early intervention can slow loss of kidney function. Microalbuminuria is not always predictive of diabetic nephropathy.increased levels of urinary bioarkers (nephrin, podocin) can be detected even before the onset of albuminuria.
AIM; To detect increased expression of urinary podocyte markers in normalbuminuric patients with diabetes compared to controls.
Materials and methods: It was a hospital based case control study of 61 patients-diaqbetics admitted as in-patients between october 2015 to october2017, with normal urea and creatinine values and normoalbuminuria were taken as cases.controls were normal healthy age matched adults without any co-morbidities.patients with hypertension, infections and critically ill were not included in this study.
Results: Out of 31 normoalbuminuric diabetics included in the study,13(41.9%) had nephrinuria and 9(29%) had podocinuria and none of the controls had nephrinuria/podocinuria.
Conclusion: Podocyte protiens are excreted in urine in diabetics even before the onset of microalbuminuria. So nephrinuria/podocinuria may be an early marker for damage of glomeruli in type 2 diabetes mellitus.
Keywords Nephropathy

OP14

Higher postprandial triglyceridaemia among first degree relatives of diabetic patients with normal glucose tolerance

S Goyal[1], M Aslam[2], M B K[3], S Madhu[4]
1-Centre for Diabetes Endocrinology & Metabolism, University College of Medical Sciences University of Delhi & GTB Hospital, Pitampura, India, 2- Centre for Diabetes Endocrinology & Metabolism, University College of Medical Sciences University of Delhi & GTB Hospital, Delhi, India, 3- Centre for Diabetes Endocrinology & Metabolism, University College of Medical Sciences University of Delhi & GTB Hospital, Delhi, India, 4- Centre for Diabetes Endocrinology & Metabolism, University College of Medical Sciences University of Delhi & GTB Hospital, Delhi, India

Background and Aims: Post prandial hypertriglyceridaemia is emerging as a risk factor for insulin resistance and type 2 diabetes mellitus and few earlier studies have suggested that this could be secondary to inherited defects. The present study compared postprandial triglyceride responses of normal glucose tolerance (NGT) subjects with or without a positive history of diabetes in at least one first degree relative in the family to ascertain the possible influence of genetic factors on them.
Materials and methods: Fifty four age and sex matched NGT subjects identified on the basis of oral glucose tolerance tests were recruited and divided into two groups. Group 1: NGT subjects without family history of diabetes (n=27) and group 2: NGT subjects with family history of diabetes (n=27). Postprandial triglyceride levels in response to standardized oral fat challenge test were assessed in all the subjects. In addition, anthropometry, HbA1c, serum insulin and fasting triglyceride levels were also measured.
Results: Mean age of study population was 34.81 ± 7.46 years. Postprandial triglyceride area under the curve (1764.50 ± 869.64 mg*dl*8hr^{-1} vs 1405.70 ± 299.40 mg*dl*8hr^{-1}, P=0.04) and 4 hr triglyceride levels (265.87 ± 149.93 mg/dl vs 199.33 ± 74.31 mg/dl, P=0.04) were found to be significantly higher in subjects with family history of diabetes (group 2) compared to those who had no family history of diabetes (group 1). Fasting serum triglyceride levels were however comparable between group 2 and group 1 (116.81 ± 50.98 mg/dl vs 111.86 ± 37.57 mg/dl, P=0.68). Insulin resistance as indicated by HOMA-IR was significantly higher in group 2 compared to group 1 (2.00 ± 1.21 vs 1.12 ± 0.48, P=0.001).

Postprandial triglyceride area under the curve (PPTG-AUC) also showed positive correlation with HOMAIR overall (r=0.44, P=0.001) and in subjects with family history of diabetes (group 2) (r = 0.39, P=0.04) but not in those without family history of diabetes.

Conclusion: First degree relatives of diabetic patients with normal glucose tolerance displayed significantly higher postprandial triglyceride responses that were associated with greater insulin resistance in them. This suggests that inherited defects could be associated with abnormalities in post prandial triglyceride metabolism and insulin resistance.

Keywords Lipid metabolism

OP15

Impact of previously undetected type 2 diabetes in critically ill patients admitted in an intensive care unit of a suburban hospital in South Bengal

S Sud
Konnagar Matrisadan Municipal Hospital, Konnagar Hooghly, India

Background and Aims: Analysis of the glycaemic status of critically ill patients without a prior history of diabetes mellitus admitted in an ICU of a suburban hospital located in South Bengal was done to find out the prevalance of the undetected disease. In my present study - a prospective non-randomised study, data was collected from patients who were admitted in the abovementioned setting and diagnosed with Type 2 diabetes for the first time, to evaluate its effect on hospital stay and mortality compared to non-diabetic patients. The aim of the study was to impress on more vigilant screening for diabetes in the population studied, so that early detection may help reduction in mortality and reducing the burden of cost of treatment, which is a very important factor for healthcare in a country like India. This would also be helpful in raising the awareness levels among healthcare providers regarding screening for Type 2 diabetes and formulating future recommendations.

Materials and methods: Patients included in this study were adults aged > 18 years, admitted in ICU, and blood samples were taken at the time of admission for assessement of random blood sugar and HbA1C values along with a detailed clinical history of the patients. The final diagnosed arrived, number of days needed for treatment as inpatients, along with final outcome (Discharge / Death / Referral to a higher centre) were also noted. The study was done for three years (January 2015 to December 2017). All patient data were collected and stored in the digital database of the hospital along with informed consent as mandated, during the abovementioned period of time.

Results: The data was analysed. Only three categories were selected for final diagnosis of the disease, namely -(a) Septicaemia, (b) Acute Coronary Syndrome (ACS), and (c) Others [which included any other diagnosis except (a) or (b)]. The results showed that a large number of patients (51.6%) had undiagnosed Type 2 diabetes and needed a longer duration of inpatient care with higher mortality when compared to those patients who were non-diabetic. Patients were divided into three groups - Group A (HbA1C less than 6.5%), Group B (HbA1C 6.5% - 8%) and Group C (HbA1C above 8%). Patients in Group C had the highest duration of hospital stay and mortality compared to Group B (p <0.01) and Group A (p<0.001). The diagnostic criteria used in the study was those outlined by the ADA for diagnosis of Type 2 diabetes, as per ACC / AHA for ACS and Sepsis - 3 (The third international consensus on definitions for sepsis and septic shock 2016).

Graph/Table:

TOTAL No. OF PATIENTS (n)= 992 (DATA COLLECTED --- JANUARY 2015 TO DECEMBER 2017)

		NUMBER OF PATIENTS			PERCENTAGE	
AGE (YEARS)	45-65	484			48.79	
	66-80	273			27.52	
	81 and above	235			23.69	
SEX	Male	561			56.55	
	Female	431			43.45	
RANDOM BLOOD SUGAR(mg/ dL)						
	Less than 200	417			42.03	
	201 and above	575			57.97	
HbA1C	Less than 6.5%	480			48.39	
	6.5%-8%	308			31.04	
	Above 8%	204			20.57	
FINAL DIAGNOSIS	Septicaemia	623			62.80	
	ACS	90			9.07	
	others	279			28.13	
OUTCOME	HbA1C	Average inpatient stay (days)	Discharge	Death	Referred	
GROUP A	Less than 6.5%	480	Less than 7 days	396	22	62
GROUP B	6.5%-8%	308	7-14 days	194	76	38
GROUP C	Above 8%	204	More than 14 days	84	88	32

Conclusion: My study revealed a high prevalance of T2DM in ICU admitted patients not previously diagnosed with the disease - having a poor outcome. Higher HbA1C had a clear corelation with longer hospital stay and higher mortality. More vigilant screening for T2DM is required to reduce mortality and cost of treatment if the suffer from a critical illness.

Keywords Epidemiology, Socio-economic aspects

OP16

Associaton between organochlorine pesticide levels and postprandial triglyceride levels in patients with varying degrees of glucose intolerance

S Gupta[1], B Mishra[2], R Jhamb[3], B Banerjee[4], S Madhu[5]
1-UCMS, New delhi, India, 2- Guru teg bahadur hospital, Delhi, India, 3-UCMS, Delhi, India, 4-UCMS, Delhi, India, 5- UCMS, Delhi, India

Background and Aims: Organochlorinepesticides (OCP) have been linked with insulin resistance and metabolic syndrome which have been postulated as one of the mechanisms of development of diabetes due to increase in OCP exposure. Postprandial hypertryglyceridemia (PPhTG) is also known to be associated with type 2 diabetes mellitusandprediabetes. We have studied the effect of high fat meal on blood level of OCPs and their relation with post prandial triglyceride (TG) levels as it may be hypothesised that some of the cardio metabolic effects of post prandial hypertriglyceridemia may be attributable to their potential to increase the blood levels of lipophilic OCPs.

Aim: To ascertain if there is any association between postprandial OCP levels and post prandial TG levels following a standardized oral fat challenge in patients with varying degrees of glucose intolerance.

Materials and methods: Sixty subjects were divided after an oral glucose tolerance test (OGTT) into 3 groups normal glucose tolerance (NGT), prediabetes and newly detected diabetes mellitus (NDDM) (20 each). Serum triglycerides were estimated at 0,2,4,6 and 8hrs after a standardised fatty meal. Plasma OCP levels were also measured at fasting, peak triglyceride levels and at 8hrs. TG and OCP levels were compared in the 3 groups and association of these with glucose intolerance determined by correlation analysis.

Results: Out of the 11 OCPs detected in the study population, p,p'DDE levels were found to be significantly higher in NDDM subjects compared with NGT group along with PPTg levels. p,p'DDE-AUC was significantly higher in the NDDM group compared with the other two study groups. Mean p,p'DDE levels also showed strong positive correlation with both PPTg levels i.e. peak TG (rho=0.295 p=0.022) incTGAUC (rho=0.281 p=0.030) and TGAUC (rho=0.303 p=0.018) as well as with glycaemic parameters fasting plasma glucose (FPG) (rho=0.269 p=0.038) postprandial plasma glucose (PPPG) (rho=0.424 p=0.001) and HbA1c (rho=0.321 p=0.012). TGAUC levels also had significant positive correlation with glycaemic parameter i.e. FPG (rho=0.33 p=0.010) PPPG (rho=0.392 p=0.002) and HbA1c (rho=0.56 p=<0.001).

Conclusion: In conclusion, the present study found significantly higher levels of postprandial triglycerides and p,p'DDE in newly detected diabetes mellitus patients compared to those with NGT. We also found a significant positive association of p,p'DDE levels and postprandial TG measures with each other and glycaemic parameters. This suggest at least part of the cardiometabolic risk due to PPL may be secondary to the associated increase in OCP levels in the blood.

Keywords Environmental factors (viruses, nutrients, toxins), Lipid metabolism, Dyslipidaemia, lipoproteins

OP17

A novel bio-electrical model of glucose homeostasis to explain the patho-physiology of diabetes

SN Shinde[1], RS Shinde[2], AS Joshi[3]
1-Poona Hospital & research center,, Pune, India, 2- Sanjeevan Institute of Cardiology, Pune, India, 3-Deenanath Mangeshkar Hospital & Research Centre,, Pune, India

Background and Aims: We created and simulated a model using capacitors, resistors and a diode.

Materials and methods: Glycogen and adipose tissue, physical growth till adulthood and foetal growth during gestation are all capacitor equivalents. The plasma glucose level is a current equivalent. Energy expenditure during metabolism and physical exercise are two main resistances which serve as load in this circuit. Resistances are current regulators. Insulin and glucagon levels are other main resistances. A diode allowing current to flow in one direction symbolises one-way mechanism of insulin facilitated glucose entry into muscle and adipose cells. The brain and RBCs also use glucose and the kidneys work as an escape route for excess glucose. The basic unit in this model consists of three capacitors connected next to each other 'in series' and a resistance connected at right angles to it in the shunt arm of the circuit. One such unit is proposed for liver with hepatic resistance. A second single combined unit for muscle and fat tissue is defined as the peripheral one with peripheral resistance. This basic unit works as a RC filter allowing either higher or lower frequencies of current to pass through.

Results: In this model, the liver acts as a high pass filter blocking lower frequencies i.e. preventing hypoglycaemia by continuously supplying glucose to the periphery. The periphery, behaves as low pass filter blocking higher frequencies, thereby preventing hyperglycemia. Cascading together these two filters make 'a bandpass filter' which regulates the blood glucose in a narrow range. In these filter units, the arithmetic product of resistance and total capacitance is always a 'constant'. If the value of either capacitor or resistance decreases then the value of the other component increases proportionately and vice-a-versa. Importantly, when two capacitors are connected in series, their combined value decreases. Hence when glycogen and obesity are represented by two capacitors in series, increasing obesity increases the peripheral and hepatic

resistances which are reflected in the increasing plasma levels of insulin and glucagon. Increasing obesity leads to progressive hyperinsulinemia and hyperglucagonemia. This leads to fasting and prandial hyperglycemia. After reaching the inherited maximum secretory capacity i.e. the Betamax, the insulin secretion starts falling leading to diabetes i.e. peripheral tissue starvation state with glycogenolysis and lipolysis. However, the hepatic and peripheral resistances are genetically controlled and hence vary in every individual.

Graph/Table:

'BIO-ELECTRICAL MODEL OF GLUCOSE METABOLISM'
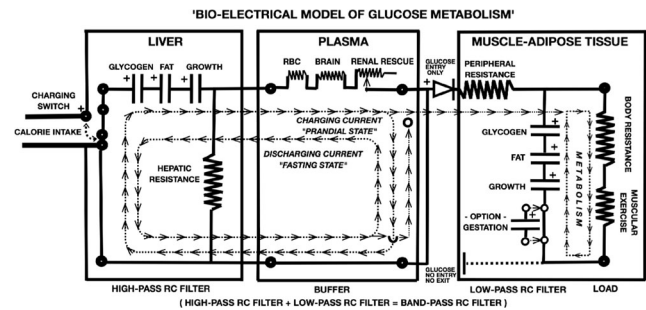
Conclusion: This model can be used to explain monogenic, obesity associated, gestational and childhood diabetes, as well as the anti-diabetic actions of all drugs including leptin.

Keywords Insulin sensitivity and resistance, Weight regulation and obesity, Nutrition and diet

OP18

Seroprevalence and risk factors associated with HBV and HCV infection among subjects with type 2 diabetes from South India

U Juttada[1], S Kumpatla[2], V Viswanathan[3]
1-Prof M Viswanathan Diabetes Research Centre and M V Hospital for Diabetes, Chennai, India, 2- Prof M Viswanathan Diabetes Research Centre And M V Hospital For Diabetes, Chennai, India, 3- Prof M Viswanathan Diabetes Research Centre And M V Hospital For Diabetes, Chennai, India

Background and Aims: Diabetes and viral infections such as Hepatitis C and B virus (HCV and HBV) are both prevalent diseases worldwide, and are associated with increased morbidity and mortality. Epidemiological studies have revealed that subjects with Type-2-diabetes (T2DM) may also be at higher risk for worse outcomes of their viral infections. Therefore, we aimed to screen T2DM subjects for HCV and HBV prevalence and to find out the risk factors and biochemical parameters associated with the viral infections.

Materials and methods: This was a hospital based retrospective study done among 385 (male: female 215:170) subjects attending a tertiary care centre for diabetes between April 2018 to August 2018 in Chennai, Tamilnadu. The study subjects were divided into two groups. Group 1 was control group without T2DM (n=130), Group 2 was T2DM patients with abnormal liver function test (LFT) (n=117), and Group 3 was T2DM patients with normal LFT (n=138). Socio-demographic details and information regarding the risk factors of Hepatitis C and B infection were recorded. The presence of HCV and HBV infection was determined by the HCV and HBV Real Time-Polymerase Chain Reaction (RT-PCR)

(Biorad CFX 96) by quantifying their viral load. The anthropometric and biochemical parameters were also recorded. The analysis was done using IBM SPSS statistics for windows version 21.0 descriptive.

Results: The mean age group of the total subjects was 58.2 ±11.6 yrs and around 72.7 % of patients were males. The prevalence of HCV among the three groups was found to be 0.1%, 1.4% and 4.3%. Based on the HCV results the study subjects were classified into HCV positive and HCV negative. The risk factors significantly associated with HCV positive subjects were history of hospital admission (p=0.032), history of surgeries (p=0.001), history of jaundice (p=0.04), HbA1c (p=0.02) and post prandial blood glucose (p=0.004). There was no significant association with consumption of alcohol, smoking and tobacco use among HCV positive as compared to HCV negative subjects. The mean age group of the subjects with HBV infection was 48.2±11.6 year's. The prevalence of HBV among the three study groups was found to be 0.4 %, 5.9% and 20.2 % respectively. The risk factors most commonly associated with HBV positive cases was longer duration of diabetes (p=0.001) and hospital admission (p=0.004) and history of surgeries (p=0.001).

Conclusion: In conclusion, prevalence of HBV infection was higher among subjects with Type-2-Diabetes. There was no significant prevalence of HCV infection among subjects with Type-2-Diabetes. The past histories of jaundice, surgeries and hospital admission were significantly associated in HCV and HBV positive cases.

Keywords Environmental factors (viruses, nutrients, toxins)

OP19

Association between type 2 diabetes mellitus and serum prolactin, an analytical cross-sectional study

V Mullagura[1], D Kumar[2]
1-JSS Medical Collage, Mysuru, India, 2- JSS Medical College, Mysuru, India

Background and Aims: Serum prolactin has been reported have strong association with acute coronary syndrome (ACS) and also correlated positively with cardiac troponin levels. Hence elevated prolactin level may be a useful marker to predict cardiovascular complications in people with Type 2 Diabetes mellitus. Considering the scarcity of literature on the subject, the current study was conducted to compare serum prolactin levels between people with diabetes with and without ACS and healthy controls

Materials and methods: An analytical cross sectionals study was conducted in a tertiary care teaching hospital, where serum prolactin levels were compared between diabetic population with and without ACS and healthy controls. Females, type 1 DM, patients on drugs affecting prolactin levels and severe hepatic/ renal failure subjects were excluded. Prolactin level was assessed by Human prolactin ELISA kit. Prolactin levels were compared between two groups using unpaired t-test. Other categorical variables were compared using chi square test. P value < 0.05 was considered as statistically significant. IBM SPSS software version 21 was used for data analysis.

Results: The final analysis included 50 diabetic subjects without ACS, 50 diabetic subjects with ACS and 50 age matched controls. The mean age among people with ACS was slightly higher (62.98 ± 12.46 Vs 57 years) compared to other two groups. All other baseline demographic and life style parameters were comparable across the groups. Mean serum prolactin in non-diabetic was 4.05 ± 0.65, it was 7.16 ± 2.71 in diabetics without ACS and it was 10.11 ± 1.72 in diabetics with ACS. Taking non-diabetic as base line, the mean difference of serum prolactin (3.11) in diabetic was statistically significant (P value<0.001) and in diabetics with ACS (6.06) was also statistically significant (P value<0.001).

Conclusion: There seems to be strong positive association between diabetes mellitus and serum prolactin levels. Also the prolactin levels are associated with cardiovascular complications. The prolactin's utility as prognostic marker needs to be evaluated by large scale prospective studies.

Keywords Other hormones, Cardiac complications

OP20

SNP in KCQN1 gene is associated with susceptibility to diabetic nephropathy in type 2 diabetes patients in India

V Singhal[1], S Kumar[2], VK Aswal[3]
1-Sardar Patel Medical College, Bikaner, India, 2- Sardar Patel Medical College, Bikaner, India, 3- Sardar Patel Medical College, Bikaner, India

Background and Aims: Diabetic nephropathy remain the most common cause of end stage renal disease as the burden of patients with type 2 diabetes mellitus (T2DM) develop diabetic nephropathy irrespective of glycemic control so there should be a specific genetic basis for the development of diabetic nephropathy.

Materials and methods: We have collected venous sample from 50 cases (diabetic nephropathy) and control (T2DM without nephropathy) diagnosed by spot urine albumin creatinine ratio (ACR). DNA was isolated from processed sample. PCR study and sequencing was done to detect polymorphism of rs2237897 in KCQN1 gene.

Results: Statistically significant difference was found when the allelic frequencies between the two group were compared (p=0.03), with the C allele having a 2.4 fold higher risk of having diabetic nephropathy (risk ratio, RR)=1.16, 95% CI of RR =1.01 to 1.3, Odds ratio (OR) =2.4; 95% CI of OR=1.06 to 4.6) Chi-square analysis showed a significant difference in genotype frequency of rs2237897 ($x2=_{4.63, p=0.03}$) in Diabetic nephropathy subjects, compared with that of contols.

Conclusion: This study suggested that,(KCQN1) being an established type 2 diabetes gene, genetic variation in this group may contribute to diabetic nephropathy and the C allele is the risk allele for diabetic nephropathy, which is different from japanese population where the allele was the risk allele.

Keywords: Genetics of type 2 diabetes

OP21

Expression of TNF-a and IL-6 Genes in visceral adipose tissue in patients with type 2 diabetes mellitus

N Tawar[1], BD Banerjee[2], B Mishra[3], S Madhu[4], V Agrawal[5], S Gupta[6]
1-University college of medical science, Delhi, India, 2- University College of Medical Sciences and GTB Hospital, Delhi, India, 3- University college of medical science, DELHI, India, 4- University college of medical science, DELHI, India, 5- University college of medical science, DELHI, India, 6- University college of medical science, DELHI, India

Background and Aims: Type 2 diabetes, a metabolic disorder characterized by elevated blood glucose due to decreased insulin sensitivity in peripheral tissues, has raised the concept of metaflammation. TNFα gene and IL-6 genes are the most important genes involved in the regulation of inflammation in adipose tissue and can play a putative role in immune-related mechanisms in the pathogenesis of this metabolic disorder. However, there is no study evaluating the expression of TNFα gene and IL-6 genes in visceral adipose tissue inT2DM patients. Therefore

the present study was carried out to evaluate the inflammatory status at the genetic level in peripheral body tissue of clinically diagnosed type 2 diabetes patients in comparison to normal glucose tolerant subjects.

Materials and methods: Fifty age and sex matched subjects who were scheduled to undergo abdominal surgery were recruited in two groups i.e. NGT (n=25) after performing a standard oral glucose tolerance test, and clinically diagnosed T2DM (n=25). Omentum tissue was collected from all the subjects for gene expression study. Quantitative real time PCR for TNFα gene and IL-6 gene were done to compare the differences in gene expression among case and control group. Anthropometric (BMI and Waist) measurements were performed

Results: Mean age of the study subjects were 39.50±7.54 years. There were 18 females and 7 males in each group. Mean waist in T2DM group was significantly higher as compared to NGT (98.12 ± 14.89 vs 82.25 ± 8.62 cm ; p=0.01). Also BMI was significantly higher in T2DM group (27.88 ± 5.42 vs 24.58 ± 3.55 kg/m^2 ; p=0.03) The gene expression of TNFα was 3 folds and of Il-6 were 2 folds higher in T2DM group as compared to NGT group.

Conclusion: A higher expression of TNFα and IL-6 genes which regulate pro-inflammatory markers were found to be associated with T2DM

Keywords Genetics of type 2 diabetes

OP22

Genetic association of G128A and C363G single nucleotide polymorphism in Nrf2 with Type 2 diabetes in South Indian population

T Rajan[1], D Umapathy[2], P Balashanmugam[3], V Viswanathan[4], E Krishnamoorthy[5], KM Ramkumar[6]
1-SRM Institute of Science and Technology, Chennai, India, 2- SRM University, Chennai, India, 3- SRM University, Chennai, India, 4-M.V.Hospital for Diabetes, Chennai, India, 5- M.V.Hospital for Diabetes, Chennai, India, 6- SRM University, Chennai, India

Background and Aims: Nuclear factor erythroid 2-related factor 2 (Nrf2) a transcription factor is a member of small family of basic leucine zipper proteins, acts as a master regulator of redox homeostasis. Under physiological conditions, Nrf2 is associated with its negative regulator, Kelch-like ECH-associated protein-1, whereas in response to stress, this complex dissociates and Nrf2 translocate to the nucleus where it binds to antioxidant responsive element and facilitates multiple functions including, antioxidant activity, detoxification, maintenance of cellular redox homeostasis, glutathione homeostasis and influences mitochondrial biogenesis.Nrf2 activation protects against oxidative damage produced by inflammation as a result of acute injuries, drugs, and exogenous agents. Therefore, there is a growing interest in the relation between Nrf2 and the identification of novel approaches targeting Nrf2 pathway to prevent and/or retard tissue injury. Our earlier findings suggested that Nrf2 is indeed associated with reduced risk of diabetes and its complications. At present, however, information is still limited as to the clinical impact of genetic polymorphisms of the Nrf2 gene. In the present study, we examined single nucleotide polymorphisms (SNPs) in Exon 2 (G128A) and Exon 3 (C363G) of NRF2 gene and its association with Type 2 diabetes in South Indian population.

Materials and methods: In this case-control study of 150 Known Type 2 Diabetes mellitus (T2DM) and150 controls, NRF2 [Exon 2 (G128A) and Exon 3 (C363G)] gene were genotyped by PCR-restriction fragment length polymorphism (RFLP).

Results: The genotype and allele frequencies of −128G/A and −363C/G SNPs in the study groups were found to be in Hardy-Weinberg

equilibrium. Genotype and allelic frequencies of the NRF2 Exon 2 (G128A) SNP in T2DM patients and healthy control (NGT) were as follows: GG: 29(19.3%); GA: 104 (69.3%); and AA: 17 (11.3%) in the control group and GG:24(16%); GA: 96 (64%); and AA: 30 (20%) in T2DM group (P<0.05). The frequency of AA genotype was found to be significantly higher in diabetes compared to NGT (P=0.04). Multiple logistic regression analysis showed that AA genotype was a significant risk factor for the development of diabetes. On the other hand, genotype and allelic frequencies of the NRF2 Exon 3 (C363G) SNP in Patients with T2DM and Healthy Control Individuals are as follows: CC: 129 (86%), CG: 18 (12%), and GG: 3 (20%) in NGT and CC: 131 (87.3%), CG: 15 (10%), and GG: 4 (2.7%) in T2DM group (P >0.05). Statistical analysis showed that NRF2 Exon 3 (C363G) SNP was found to have no significant association with diabetes.

Conclusion: NRF2 Exon 2 (G128A) functional SNP may play a role in T2DM pathogenesis and can be targeted for prevention, prognosis, and treatment of T2DM.

Keywords Genetics of type 2 diabetes, Inflammation in type 2 diabetes, Pathogenic mechanisms / complications

OP23

Mechanism and Clinical Profile of Steroid of Steroid Inuced Diabetes

A Holla[1], S Vidyasagar[2], B Shastry[3]
1-Kasturba Medical College, Manipal, India, 2- Kasturba Medical College, Manipal, India, 3- Kasturba Medical College, Manipal, India

Background and Aims: Exogenous steroids (synthetic steroids) which are potent antinflamatory agents are normally utilized in the treatment of both acute and chronic illness. Their frequent use has resulted in many side effects, one of which is diabetes. Despite steroid induced diabetes being well reported, so far the impact of its development and risk factors are poorly quantified. The strength of association of risk factors with the development of hyperglycemia remains unclear and the mechanism of steroid-induced diabetes may be more complex as evidenced by newer studies which implicate the bone through the osteoclast derived protein osteocalcin. Further the relative contributions of both β-cell dysfunction and insulin resistance are still to be elucidated. So we undertook this study to know the mechanism and clinical profile of steroid induced diabetes.

Materials and methods: A Prospective Longitudinal Cohort study on 185 Nondiabetic subjects aged ≥ 18years started on steroids were considered eligible for the study. In every case after detailed examination, FPG, PPG, GlycatedHb, fasting insulin and total osteocalcin was measured prior to starting steroids and was repeated in first week (day 3/4) after starting steroid according to standard guidelines. FPG and PPG were repeated periodically during follow up of the patients. The utility of Indian Diabetic Risk Score (IDRS) using age family history waist circumference and physical activity in predicting the risk for SID was also assessed.

Results: Out of 185 patients, steroid induced diabetes was seen in 68(37%) patients on the third day after starting steroid therapy. It was found to be more in females than in males. We found increased age, waist circumference, dose of steroids and decreased physical activity had significant association with steroid induced diabetes. 65% of patients had an elevation of PPG sugars with or without FPG, but only 4% of patients had isolated elevation of FPG. We found there is significantly decrease in insulin sensitivity (HOMA-S) and beta cell function (HOMA-B) and increase in insulin resistance (HOMA-IR) after starting steroid therapy (day 3). serum ostocalcin levels decreased after starting steroids and this is

statistically significant compared to normal group.11.3% of the cases, steroid induced diabetes persisted even after three month of stopping steroids or on minimal dosage of steroids.

Conclusion: It was found that IR increases and beta cell function decreases in patients with steroid induced diabetes. Monitoring of PPG as compared to fasting sugars is more important for the screening of steroid induced diabetes. Cumulative dose of steroid may not be important to precipitate steroid diabetes as most patients developed SID in first week. In patients with SID, the decrease in osteocalcin was much more than those with normal subjects, pointing to novel mechanism of SID.

Keywords: Insulin sensitivity and resistance

OP24

S-RAGE (soluble receptors for advanced glycation end products) levels and their association with inflammatory markers in type 2 diabetes mellitus, pre-diabetes and controls

C Yadav[1], PA Manjrekar[2]
1-Kasturba Medical College, Mangalore, India, 2- Kasturba Medical College, Mangalore, India

Background and Aims: Recent research in the field of type 2 diabetes mellitus has linked the mediation of AGE-signalling by their receptors (RAGE) to underlying hyperglycemia and inflammatory changes. However, the studies on whether the circulating pool of soluble RAGE (sRAGE) acts as a counteract measure to AGE related injury or if it contributes to the endothelial damage have yielded inconsistent results with very little knowledge available on sRAGE role in pre-diabetes and type 2 diabetes. Thus, this multi-hospital based comparative study was taken up to study the levels of sRAGE in the diseased state "type 2 diabetes mellitus", the pre-clinical stage "pre-diabetes" and healthy controls and to correlate these levels with inflammatory markers (Interleukin 6 (IL-6) and Monocyte Chemoattractant protein-1 (MCP-1)) and glycemic indices (FBG and HbA1c) so as to have a better insight into the relationship of sRAGE with underlying inflammation.

Materials and methods: Based on their FPG and HbA1c values, a total of 105 subjects aged 25-55 years chosen from KMC constituent Hospitals, Mangalore were categorised into type 2 diabetes, pre-diabetes and healthy controls (35 subjects per category). FBG (GOD-POD method), HbA1c (HPLC method) and baseline data (age and sex) were collected from patient's records. Serum sRAGE, IL-6 and MCP-1 were estimated using sandwich ELISA method. Statistical analysis was done using SPSS ver.16 employing ANOVA with Tukey's as post-hoc test for intergroup comparison of means and Pearson's correlation for correlation analysis.

Results: Serum sRAGE levels differed significantly ($p<0.05$) among the three groups (4.44 ± 0.22ng/ml in diabetes, 5.2 ± 0.19ng/ml in pre-diabetes and 5.72 ± 0.24ng/ml in controls). Inflammatory markers were significantly increased ($p<0.05$) in diabetes (IL-6 = 60.5 ± 2.2pg/ml, MCP-1 = 694.01 ± 57.3pg/ml) and pre-diabetes group (IL-6 = 33.4 ± 1.5pg/ml, MCP-1 = 282.5 ± 15.1pg/ml) as compared to controls (IL-6 = 11.6 ± 0.6pg/ml, MCP-1 = 174.1 ± 8.8pg/ml). Correlation analysis revealed a significant negative correlation of sRAGE with IL-6 ($r = -0.604$, $p<0.05$), MCP-1 ($r= -0.479$, $p<0.05$), FBG ($r = -0.663$, $p<0.05$) and HbA1c ($r = -0.417$, $p<0.05$) in the diabetes group and with IL6 ($r = -0.482$, $p<0.05$), FBG ($r = -0.571$, $p<0.05$) and HbA1c ($r = -0.494$, $p<0.05$) in the prediabetes group.

Conclusion: Serum sRAGE levels were significantly decreased whereas both the inflammatory markers showed an increasing trend in the diabetes group followed by pre-diabetes as compared to healthy controls. A significant inverse association observed between sRAGE levels and inflammatory markers as well as the glycemic indices is indicative of a possible cytoprotective role of sRAGE in the pathogenesis of impaired glucose homeostasis and its progression to overt diabetes.

Keywords Prediction of type 2 diabetes, Inflammation in type 2 diabetes

Poster Presentations

PP01

A study of blood sugar levels and risk factors for coronary artery disease in early menopausal women

M Suvarna[1], DN Hayagreev[2], D Gangadharappa[3]
1-Dr. B.R. Ambedkar Medical College and Hospital, Bangalore, Bangalore, India, 2- Dr. B.R. Ambedkar Medical College and Hospital, Bangalore, Bangalore, India, 3- Dr. B.R. Ambedkar Medical College and Hospital, Bangalore, Bangalore, India

Background and Aims

Introduction: Postmenopausal women are at higher risk of hypertension, dyslipidaemia, hyperglycaemia and cardiovascular disease than premenopausal women. Here we would like to see whether early age at menopause increases the likelihood of aforementioned factors

Objectives: To study the blood sugar levels and to assess the risk factors for coronary artery disease in early menopausal women.

Materials and methods: Cross sectional study was done among 50 early menopausal women (<45 years with >12 months of amenorrhea) in outpatient and inpatient departments of Dr. B.R. Ambedkar Hospital.

Results: Study patients were wound to be 40-70 years of age, most subjects being 40-50years. Mean age of patients in study was 52.80 ±7.38 while mean age at menopause was 42.34±1.92. 88% of study population were diabetic, the duration of diabetes ≤1 year-7(14%); 1-2 years 10(20%); 2-5years 11(22%); >5years 16(32%). Most of the study population was diabetic for >5years. 41(82%) were hypertensive,28% of patients had been diagnosed to have hypertension more than 5 years ago. 19(38%) had dyslipidemia, high triglyceride levels were found to be statistically associated with age at menopause. 8(16%) were found to have normal body mass index,33(66%) were overweight,9(18%) were obese. 17(34%) of studied patients had ischemic heart disease.

Conclusion: Early menopause is associated with higher prevalence of dyslipidaemia and insulin-resistance;these may indirectly contribute to increased risk of cardiovascular disease among post-menopausal women.

Keywords: Hypertension; Cardiac complications

PP02

Prevalence of lipitension in newly detected type 2 diabetes

H Mahapatra[1], M Khuntia[2], S Mishra[3], B Jena[4], S Das[5], RK Padhi[6], AK Sahoo[7], AR Jena[8], RK Khatua[9], M Chhatria[10], BK Rout[11], AK Behera[12], L Soren[13], S Panda[14], JR Parida[15]
1-Sevayan Diabetes Centre, IMS & SUM Hospital, SOA University, Bhubaneswar, India, 2- Sevayan Diabetes Centre,, Puri, India, 3- IMS

& SUM Hospital, SOA University,, Bhubaneswar, India, 4- Aswini Hospital,, Cuttack, India, 5- Apollo Hospitals,, Bhubaneswar, India, 6- IMS & SUM Hospital, SOA University, Bhubaneswar, India, 7- IMS & SUM Hospital, SOA University, Bhubaneswar, India, 8- Sevayan Diabetes Centre,, Puri, India, 9- Dr. Ranjit's Diabetes Specialty Centre, Bhadrakh, India, 10- All India Institute of Medical Sciences, Bhubaneswar, India, 11- Sevayan Diabetes Centre, Puri, India, 12- Sevayan Diabetes Centre, Puri, India, 13- Sevayan Diabetes Centre, Puri, India, 14- Apollo Hospitals, Bhubaneswar, India, 15- Kalinga Institute of Medical Sciences, Bhubaneswar, India

Background and Aims: Cardiovascular events account for premature mortality and morbidities in people with diabetes. Hypertension and abnormal cholesterol values are major risk factors for diabetic macrovascular complications. These two are the most common comorbidities associated with type 2 diabetes. The coexistence of hypertension and dyslipidemia in a person has been named as "Lipitension". The aim of this cross sectional study was to find out the prevalence of lipitension in a newly diagnosed type 2 diabetes cohort.
Materials and methods: We conducted a clinic based survey, in the month of May through August 2018, of subjects who were diagnosed with type 2 diabetes within the previous 2 months. Subjects who were on ACE inhibitors, ARBs, CCBs, alpha or beta blockers or any other antihypertensive medicines, statins, fibrates, thyroid supplements, oral or inhaled steroids were excluded from consideration. Similarly, known hypertensives or dyslipidemic subjects were excluded. Fasting blood was collected for lipid panel estimation. Blood pressure was recorded thrice in sitting posture and mean was taken.
Results: Finally 432 subjects (244 males, 188 females) met the inclusion criteria and were taken up for analysis. The mean age of the sample was calculated to be 46 ± 8 years. While 272 (63.0%) participants had hypertension, dyspidemia was encountered among 225 (52.1%) subjects. Out of 432 newly detected diabetics, 183 individuals (42.4%) were diagnosed with lipitension. Isolated hypertension (without dyslipidemia) and isolated dyslipidemia (normotensive) were seen in 40 (9.3%) and 16 (3.7%) diabetics respectively.
Conclusion: Lipitension is a rising epidemic in newly diagnosed type 2 diabetic adults. Lipitension in the background of diabetes is difficult to manage and requires patient education along with multiple pharmacological agents.
Keywords: Epidemiology; Hypertension; Dyslipidaemia, lipoproteins

Background and Aims: LY2963016 insulin glargine (LY IGlar), the first biosimilar insulin approved in the European Union and Lantus® (IGlar) are long-acting basal insulin analogs with identical primary amino acid sequence. ELEMENT 5, a Phase 3 open-label study, assessed the efficacy and safety of LY IGlar and IGlar in type 2 diabetes mellitus (T2DM) patients (N=493); results suggested similar efficacy and safety profiles of LY IGlar and IGlar in the total population. Analysis in Indian subpopulation (N=100) is discussed here.
Materials and methods: Indian T2DM patients who were insulin-naïve (HbA1c ≥7.0% and ≤11.0%) or on basal insulin (HbA1c ≤11.0%) were randomized to daily dose of LY IGlar (n=49) or IGlar (n=51) in combination with oral antihyperglycemic medications (OAMs) for 24 weeks (wks). All patients were instructed to self-titrate from the starting dose by 1 U/d until a fasting blood glucose (BG) level ≤100 mg/dL was achieved. The primary objective was to test for non-inferiority (at 0.4% noninferiority margin) of LY IGlar to IGlar with regard to changes in HbA1c levels from baseline to Wk 24 wks.
Results: The within-group least squares mean (LSM) HbA1c decrease from baseline to Wk 24 was similar in both groups (LY IGlar: -0.83%, IGlar: -0.62%; p=0.389; difference [95% CI]: -0.21 [-0.70, 0.28]). The LSM change in fasting BG levels from baseline to Wk 24 was higher for IGlar (LY IGlar: -43.4 mg/dL, IGlar: -51.8 mg/dL; p=0.002). The LSM daily pre-meal mean BG at Wk 24 was comparable for LY IGlar and IGlar (126.0 mg/dL and 118.1 mg/dL respectively; p=0.069). Higher number of patients achieved HbA1c levels <7.0% with LY IGlar (20.5%) at Wk 24 than IGlar (11.4%) but was not statistically significant (p=0.365). Insulin dose at baseline was 13.2 U/d (LY IGlar) and 14.8 U/d (IGlar). Insulin dose change from baseline to Wk 24 was similar in both groups (LY IGlar: 16.7 U/d, IGlar: 22.4 U/d; p=0.156). Total hypoglycemia incidence rates were 0.77 and 0.78 events/patient-year for LY IGlar and IGlar respectively; nocturnal hypoglycemia incidence rates were 0.34 and 0.30 events/patient-year for LY IGlar and IGlar respectively. Treatment-emergent adverse events were comparable in both groups (LY IGlar: 28.6%, IGlar: 29.4%; p >0.999). Injection site adverse events were low and similar in both groups. No serious adverse events were reported. There was no statistically significant difference between the groups for the proportion of patients with detectable insulin antibodies.
Conclusion: The results for LY IGlar in the Indian subpopulation were similar to those of IGlar - implying noninferiority of LY IGlar to IGlar; this was consistent with observations in the ELEMENT 5 total population.
Keywords: Clinical immunology; Hypoglycaemia

PP03

Similar efficacy and safety of LY2963016 and Lantus® insulin glargine products in Indian type 2 diabetes mellitus patients (subgroup of ELEMENT 5 study)

R Sahay[1], M Chadha[2], R Sahay[3], S Kalra[4], I Bhattacharya[5], RK Pollom[6], E Spaepen[7]

1-Dr. Mohans Diabetes Specialities Centre & Madras Diabetes Research Foundation, Chennai, India, 2- P D Hinduja National Hospital & Medical Research Center, Mumabi, India, 3- Osmania Medical College & Osmania General Hospital, Hyderabad, India, 4- Bharti Hospital, Karnal, India, 5- Eli Lilly and Company, Indianapolis, United States, 6- Eli Lilly and Company, Indianapolis, United States, 7- Eli Lilly and Company, Indianapolis, United States

PP04

Efficacy and safety of hydroxychloroquine compare to teneligliptin in uncontrolled T2DM patients as add on therapy

A Kumar[1], A Prakash[2]
1-Sugar Care, Patna, India, 2- Prakash Diabetes Hospital, Patna, India

Background and Aims: Hydroxychloroquine 400 mg is approved by DCGI and recomended by RSSDI clinical practice recommendations 2017 as add-on therapy after metformin and sulfonylurea in T2DM patients. The aim of this observational study is to compare the efficacy and safety of Hydroxychloroquine 400 mg and Teneligliptin 20 mg when used as add-on therapy in Indian Type 2 DM patients who were inadequately controlled (HbA1c ≥ 7.5%) with Metformin 1000 mg and Glimepiride 2 mg combination.

Materials and methods: This study is a prospective observational study to be conducted in 2 diabetic centres of Patna city in between October 2017 to May 2018 among 180 patients and each patients had followed up for 6 months. One group of patients received Hydroxychloroquine 400 mg + Metformin 1000 mg + Glimepiride 2 Mg, other group has received Tenelgliptin 20 mg + Metformin 1000 mg + Glimepiride 2 Mg. Efficacy was assessed by FBG. PPBG and HbA1c reduction and safety was evaluated by no of event of hypoglycemia and changes in serum creatinine levels. Home based monitor used to detect the hypoglycemic events. Patients who had any type of retinopathy/maculopathy were excluded.

Results: Mean age of entire population was 66±8 years with mean 6±2 years of DM and 102 were males. Mean body weight was 71±12 Kg. Baseline HbA1c was 8.1±0.3 in hydroxychloroquine group and 8.2±0.2 in Tenelgliptin group. At 24 weeks there were statistically significant reduction in mean HbA1c in Hydroxychloroquine group (1.1±0.3) as compared to Tenelgliptin group (0.82±0.3) (P≤0.001). The mean FBG and PPBG was 169±18 mg/dl and 232±18 mg/dl respectively in hydroxychloroquine group which was reduced to 121±15 mg/dl and 161±19 mg/dl at the end of 24 weeks where as in tenelgliptin group FBG and PPBG was 171±16 mg/dl and 239±21 mg/dl which reduced to 121±15 mg/dl and 161±19 mg/dl respectively in same period of time (P≤0.005). There were 4 incidence of hypoglycemic events in hydroxychloroquine group (4.4%) and 6 in tenelgliptin group (6.67%). No patients required medical assistance for hypoglycemic events. There were no statistically significant change in body weight of both the group. No marked changes in creatinine levels were found in patients in both the groups.

Graph/Table:
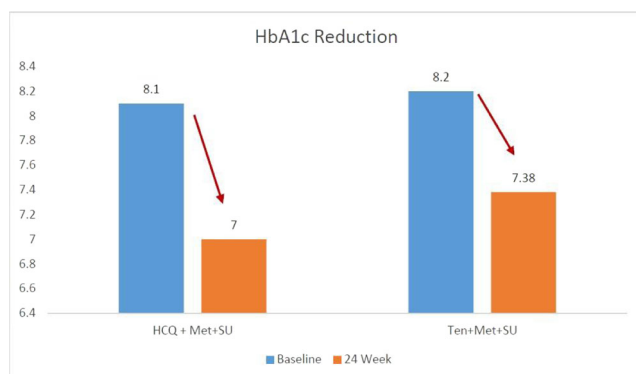
Conclusion: In conclusion, treatment with Hydroxychloroquine 400 mg for 24 weeks reduces glycemic parameters more aggressively than Tenelgliptin 20 mg in Indian type 2 diabetes patients.

Keywords: Inflammation in type 2 diabetes; Oral therapies: metformin, sensitizers and other non- secretagogues

PP05

Impact of dulaglutide as add-on therapy on glycaemic variability (DIVA): first real world evidence in Indian patients with inadequately controlled type 2 diabetes

S Patange

Dr. Sonali Patange's Speciality Diabetes Centre (CGMS speciality), Mumbai, India

Background and Aims: Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are used for the management of type 2 diabetes mellitus (T2DM) in adult patients. Present study for the first time assessed the efficacy, safety and glycaemic variability (GV) of dulaglutide (GLP-1 RA) added on to oral hypoglycaemic agents (OHA) and/or insulin in a real world setting in Indian patients.

Materials and methods: This prospective, real world, single-arm, interventional study enrolled 35 patients (Men: 18, mean age: 53 years) with inadequately controlled T2DM, either on no medications or treated with combinations of OHA, and/or insulin and other agents. The use of dipeptidyl peptidase-4 inhibitors was discontinued in patients with a past medication history of treatment with these agents. All the enrolled patients received dulaglutide (0.75 or 1.5mg) once-weekly as add-on therapy. GV was assessed in 54% of patients using FreeStyle Libre Pro, continuous glucose monitoring system (CGMS) for ≤15 days following dulaglutide administration. Improvements in HbA_{1c}, waist/hip ratio (WHR), body weight (BW) and eGFR from baseline to follow-up at 2 months were analysed using paired t-test. Sub-group analysis for age, gender, BMI, duration of diabetes, baseline HbA_{1c}, chronic kidney disease (CKD) stages and medication history was also performed.

Results: At 2 month follow-up, dulaglutide as add-on therapy demonstrated significant reductions (P<.001) in HbA_{1c} (mean reduction [MR]:1.8% [95% CI, 1.58-2.12]), BW (MR: 6.07 kg [95% CI, 2.51-9.63]), WHR (MR: 0.02 [95% CI 0.01 - 0.03]) in the overall population. Subgroup analysis revealed significant reduction (P<.05) in HbA_{1c} and BW across all subgroups. Significant reduction (P<.05) in WHR was also evident in patients >40 years of age, >5 years duration of diabetes and on some medication. Dulaglutide showed significant improvement (P<.05) in eGFR in patients aged >60 years, BMI <30, mild/moderate CKD and previously treated with OHA, insulin and other agents. Patients with BMI ≥30 showed better improvements in HbA_{1c}. Reduction in BW and WHR was prominent in men. Reduction in WHR was better in patients aged >60 and >15 years of diabetes duration. Assessment of GV monitored using CGMS revealed significant reduction in mean CGM glucose on Day 5, which further reduced at Day 15, indicating the need for titration of insulin and OHA as early as Day 5 (Figure). Further improvement in mean% time of glucose in target (80 -140 mg/dL) along with reduced time in above target (>140 mg/dL) through 15 days suggests minimised GV. Nausea (25.71 %), diarrhoea (5.7%) and loss of appetite (5.7%) were reported and were managed using probiotics and rabeprazole.

Graph/Table:

Figure. Box Plot of Glycaemic Variability in Patients Monitored Using Continuous Glucose Monitoring System After Dulaglutide Administration
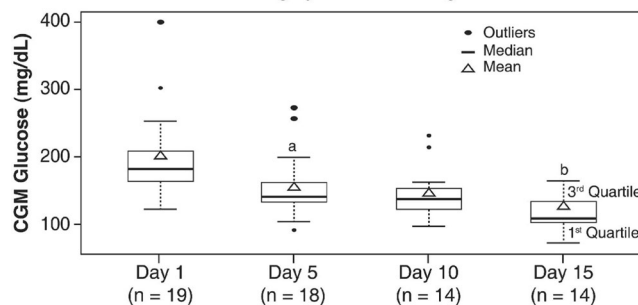
"a" represents significance of difference in glucose levels between Day 1 to Day 5 (P<.05); "b" represents significance of difference in glucose levels Day 10 to Day 15 (P<.001).

Conclusion: Dulaglutide as an add-on therapy was well tolerated with an acceptable safety profile and demonstrated significant improvements in clinical outcomes and glycaemic variability in Indian patients with inadequately controlled T2DM.

Keywords: Incretin based therapies 43 Novel agents; Devices

PP06

Identifying translational gaps in diabetology research in India

SK Jena[1], A Yadav[2], B Mishra[3], P Desai[4]

1-Jawaharlal Nehru University, New Delhi, India, 2- Jawaharlal Nehru University, New Delhi, India, 3-University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi, India, 4- Jawaharlal Nehru University, New Delhi, India

Background and Aims: Background: Diabetes emerges out to be a major epidemic in recent years that makes no distinction between developed and developing countries across the globe. India, a country witnessing rapid socioeconomic progress and urbanization carries a considerable share of the global diabetes burden. There has been an incongruity between disease burden and the technical capacity to make use of existing knowledge or to generate new knowledge to combat diabetes in India. Translational Research promises to bridge this gap from knowledge to practices. Translational Research (TR) aims to translate findings in fundamental research into medical practice and meaningful health outcomes. However, while achieving this objective TRs goes through various phases of innovation. The transition from one stage to other confronts with bottleneck and challenges. The aim of this study is to identify such translational gaps at different stages of research and innovation in diabetology in India.

Aim: This paper examines the role of different actors, organizations & institutions in shaping diabetology research in India and their contribution at different stages of translational activities. This paper also attempts to identify research gaps and challenges pertinent to each stage of translational activities from basic research to clinical science and public policy formulation.

Materials and methods

Methodology: Mixed methodology used for collection and analysis of primary and secondary data. A combination of citation methods such as patent data, publication data, clinical trials data and portfolio analysis of firms, products and organisations along with primary survey is used in this study. The main purpose of the primary survey is to identify and gather knowledge from domain experts about the different sectoral experience, their perception, priorities, barriers and facilitators of research and innovation at different stages of translational activities. Here, the domain experts include researcher, scientist, clinicians, firms, CROs, finance and regulating agencies and policymakers.

Results

Results: This paper identifies different actors involves in translational research in the area of diabetology from invention to innovation, product formation and public policy sphere stages. It also identifies some key structural barriers and institutional challenges pertinent at each stage of translational activity. This paper attempts to canvass the major reasons of failure for reproducibility and the translational ability of research and innovation in India.

Conclusion

Conclusion: Research and innovation do not occur in isolation. Various factors such as research financing, infrastructures, policy guidelines, regulatory mechanism, human resources, technological capabilities, reflexivity affect translational activities. Multilevel intervention requires bridging the gap between knowledge and action.

Keywords: Prevention of type 2 diabetes; Health care delivery; Other complications

PP07

A quantitative study to understand socio-demographics and diabetes awareness among general population for diabetes prevention

B Sehgal

Population Services International, Delhi, India

Background and Aims: India constitutes 73 million people suffering from diabetes and is expected to rise by 134 million by 2045. Representative data on characteristics of general public and their awareness about diabetes is important to plan and design tailor made public health interventions for prevention of the disease in India. The objective of the study is to elucidate the characteristics and basic knowledge about diabetes among general population in Sonepat and Visakhapatnam.

Materials and methods: The cross-sectional, community-based study was conducted with both females and males of ≥30 years of age belonging to rural and urban areas of Sonepat and Visakhapatnam. A pre-designed, pre-tested questionnaire in a bilingual version with English followed by Hindi and Telugu was put to use for data collection after taking verbal consent. Questions consisted of participant demographics, whether heard of diabetes, its definition, risk factors, signs and symptoms, complications, diagnostic methods, ways of prevention and management. The main survey data elicited using Computer Assisted Personal Interview (CAPI) was cleaned in MS Excel and analysed using STATA version 14.1 statistical software.

Results: A total of 1710 individuals were surveyed 51% females and 49% males. Approx. half (43%) of the respondents were in the age group of 30-40 years. Majority (38%) of the respondents were illiterates followed by 32% up to secondary level and only 30% had studied above tenth class. Though 90% of the respondents had heard of the disease but majority (70%) of them thought sweets/sugar as a risk factor of developing diabetes. Most of the subjects were unable to recognize physical inactivity (95%) and obesity (90%) as risk factors. Only 0.91% were aware of all the classical symptoms of diabetes. Majority (80%) of the respondents perceived that avoiding sugar in any form is a way of preventing diabetes. Only 41% had awareness that one can have diabetes without experiencing symptoms. More than one third (37%) of the respondents were unaware of any of the complications of diabetes. Further, only about one fourth subjects considered regular exercise, early detection and maintaining normal body weight as ways of diabetes prevention.

Graph/Table:

Characteristics of General Population ≥30 years of age	
Characteristics & Knowledge	n (%)
Age (Years)	
30-40	741 (43)
41-50	404 (24)
51-60	297 (17)
61-max	268 (16)
Sex	
Male	844 (49)
Female	866 (51)
Marital Status	
Unmarried	62 (4)
Married	1515 (89)
Widowed/Divorced	133 (8)
Mother tongue	
Telugu	841 (49)
Hindi	666 (39)
Haryanvi	191 (11)
Others	12 (1)
Religion	
Hindu	1593 (93)
Muslim	60 (4)
Others	57 (3)
Education	
No schooling	657 (38)
Up to 10th	544 (32)
More than 10th	509 (30)
Occupation	
Housewife	547 (32)
Farmer	312 (18)
Unskilled Manual Worker	236 (14)
Others	615 (36)
Household Income	
<5000	478 (28)
5000-10,000	682 (40)
>10,000	511 (30)
No response/Can't say	39 (2)
Tobacco intake	
Yes	552 (32)
No	1158 (78)
Alcohol intake	
Yes	357 (21)
No	1353 (79)
Physical Activity	
Yes	1192 (70)
No	518 (30)
Correct Knowledge of Diabetes	
Yes	522 (31)
No	1188 (69)

Conclusion: Low levels of literacy, knowledge and awareness coupled with cultural beliefs, myths and misconceptions regarding diabetes was found among general population. The direct relation of one's educational status and knowledge of diabetes raises an optimism that integrated public health education programs, especially at grassroots level can play an important role in prevention and management of diabetes. The current study provided public insights which could help to effectively address the barriers through tailor- made communication interventions integrating different media channels for prevention of diabetes among general public.
Keywords: Prevention of type 2 diabetes

PP08

Assessment Of Silent Myocardial Ischemia In Asymptomatic Patients With Type II Diabetes Mellitus

S Bhakthavatchalam[1], B Naraganti[2]
1-Dr.B.R.Ambedkar Medical College And Hospital, Bengaluru, India, 2-Dr.B.R.Ambedkar Medical College And Hospital, Bengaluru, India

Background and Aims: The present study was aimed at the asymptomatic presentation of coronary artery disease in diabetes mellitus patients. It consists of assessing the prevalence of asymptomatic coronary artery disease with normal resting ECG in diabetes mellitus, by seeking the TMT changes (positivity). Through this study, we made an effort to know the cardiac changes present in the patients with type II diabetes mellitus.
Materials and methods: 60 type II diabetes patients for more than one year duration with age 30-75yrs who do not have any complaints relating to cardiovascular system were included in this study. All were assessed with detailed history, clinical examination and relevant investigations including resting ECG and Treadmill Test.
Exclusion criteria includes patients with past history suggestive of an acute coronary event, arrhythmia, or heart failure associated with uncontrolled blood pressure and other chronic diseases were excluded from the study.
Results: In the 60 diabetic patients in this study, 32 patients were males and remaining 28 were females. None of the patients showed resting ECG and 2D echo changes. 11 patients in the study group showed inducible ischemia in the treadmill test.

Conclusion: This study shows that type 2 diabetes patients especially of longer duration should undergo cardiac evaluation even though they do not have any symptomsrelating to cardiovascular system.
Keywords: Cardiac complications

PP09

Clinical effectiveness of dulaglutide in real-world setting: Evidence of improved glycaemic and weight control in overweight/obese Indian patients with type 2 diabetes

S Jha[1], S Waghdhare[2], N Chhabra[3], M Panda[4], A Yadav[5], N Batul[6]
1-Max Super Speciality Hospital, Delhi, India, 2- Max Super Speciality Hospital, Delhi, India, 3- Max Super Speciality Hospital, Delhi, India, 4- Max Super Speciality Hospital, Delhi, India, 5- Max Super Speciality Hospital, Delhi, India, 6- Max Super Speciality Hospital, Delhi, India

Background and Aims: Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are a class of agents that aid in the management of type 2 diabetes (T2D) in adults by potentiating glycaemic control and weight loss with a low risk of hypoglycaemia. This study evaluates the effectiveness of once-weekly dulaglutide (GLP-1 RA) as an add-on to oral hypoglycaemic agents (OHA) with or without insulin in overweight/obese Indian patients with poorly controlled T2D in a real-world setting.
Materials and methods: This retrospective, single-centre study included 25 obese/overweight patients (male: 17, female: 8; mean age: 56.64 years; mean BMI: 34.21 kg/m^2) with poorly controlled T2D. The patients received once- weekly dulaglutide (1.5 mg) as an add-on to OHA with or without insulin. Changes in the HbA$_{1c}$, body weight and BMI were recorded for a mean follow-up duration of 6 months post initiation of therapy with dulaglutide. Adverse events experienced by patients during the course of treatment were also recorded. Statistical significance of the treatment outcomes was assessed using paired t-test.
Results: For a mean follow-up duration of 6 months, administration of once-weekly dulaglutide as an add-on to OHA with or without insulin resulted in a significant reduction (P<.05) in HbA$_{1c}$ from baseline to follow-up with a mean reduction (MR) of 1% (95% CI: 0.42-1.58). A significant reduction (P<.001) in the body weight from baseline with an MR of 6.28 kg (95% CI: 4.02-8.53) was observed. Accordingly, a significant reduction (P<.001) in BMI was also evident from baseline with an MR of 2.31 kg/m^2 (95% CI: 1.49-3.14). Treatment was well tolerated, with a majority of patients (76%) experiencing no adverse events. Nausea, the most common adverse event was reported in 12% of patients. The limitations of the study include lack of a comparator arm and small sample size with highly selected set of patients who continued with dulaglutide.
Conclusion: In a real-world setting, once-weekly dulaglutide administration as an add-on to OHA with or without insulin in overweight/obese Indian patients with T2D was associated with significant reduction in HbA$_{1c}$, body weight and BMI. Add-on therapy with dulaglutide was well tolerated with majority of the patients experiencing no adverse events.
Keywords: Incretin based therapies 43 Novel agents

PP10

Impact of combination therapy with dulaglutide and SGLT2i on vascular age, an indicator of cardiovascular risk, in Indian adults with type 2 diabetes: a real-world study

S Bhattacharyya
AMRI Hospital, Kolkata, India

Background and Aims: Patients with type 2 diabetes mellitus (T2DM) often present with a range of cardiovascular (CV) risk factors including obesity, hypertension and hyperlipidaemia. Vascular age, as assessed by structural and functional arterial properties, represents hypothetical age of the CV system and is an independent predictor of CV risk. Anti-diabetic agents such as glucagon-like peptide-1 receptor agonists (GLP-1RAs) and sodium glucose cotransporter-2 inhibitors (SGLT2i) are known to have a favourable impact on CV risk factors in addition to glycaemic control. Tools to monitor vascular age not only support the physicians in therapeutic decisions but also leverage patient awareness and adherence to novel therapies. This study evaluates the impact of combination therapy with dulaglutide (GLP-1 RA) and higher doses of SGLT2i on vascular age, systolic blood pressure (SBP), diastolic blood pressure (DBP), HbA$_{1c}$ and body weight in Indian patients with inadequately controlled T2DM in a real-world setting.
Materials and methods: This retrospective, real-world, single-centre observational study included 15 adults (men: 9; mean age: 49.47 years; mean BMI: 32.27 kg/m^2) with inadequately controlled T2DM. The patients received a combination of once-weekly dulaglutide, higher doses of SGLT2i (canagliflozin, empagliflozin or dapagliflozin) and metformin with or without insulin. The follow-up duration was 3 months. Changes in vascular age, SBP and DBP were investigated using AGEDIO B900 Pulse Wave Analysis System (Hibernia Medical). Changes in HbA$_{1c}$ and body weight were also investigated. Self-reported adverse events were recorded. The outcomes were statistically analysed using paired t-test.
Results: At the 3-month follow-up, combination therapy resulted in significant reduction from baseline in vascular age, SBP and DBP with a mean reduction (MR) of 3.93 ± 2.46 years (P<.001), 4.40 ± 4.61 mmHg (P<.05) and 2.80 ± 3.84 mmHg (P<.05), respectively. A significant reduction was reported for HbA$_{1c}$ and body weight with MR of 1.78 ± 1.08% (P<.001) and 6.40 ± 3.96 kg (P<.001), respectively. Combination therapy was well tolerated; however, self-reported gastrointestinal symptoms including nausea and bloated abdomen were reported in 5 patients, which subsided within 2 weeks of therapy initiation. Pantoprazole and domperidone combination was administered in 3 out of the 5 patients to mitigate the gastrointestinal side effects. The limitations of the study include small sample size and lack of a comparator arm.
Conclusion: In conclusion, combination therapy with once-weekly dulaglutide, higher doses of SGLT2i and metformin with or without insulin reduces the vascular age, SBP, DBP and body weight, indicating a beneficial impact on CV health along with improved glycaemic control in Indian adults with inadequately controlled T2DM.
Keywords: Incretin based therapies 43 Novel agents

PP11

Evaluation of safety of teneligliptin on qt/qtc interval in Indian type 2 diabetic patients

S Sengupta[1], AM Rathod[2], S Suryawanshi[3]
1-Dr. Soumya Sengupta's Diabetic Clinic, Chaibasa, India, 2- Glenmark Pharmaceuticals Ltd, Mumbai, India, 3- Glenmark Pharmaceuticals Ltd, Mumbai, India

Background and Aims: According to a strict QT/QTc evaluation study and clinical studies for type 2 diabetes conducted in Japan and other countries, NO AEs related to QT prolongation were detected with 40 mg/day of teneligliptin, which is the maximal dosage used in clinical practice. So far there is no data regarding the safety of Teneligliptin in Indian type 2 diabetic patients in respect to QTc prolongation. To evaluate safety of Teneligliptin in Type 2 Diabetic patients with respect to QT prolongation.
Materials and methods: A retrospective data was collected from T2DM patients with ECG records who were treated with teneligliptin along with ongoing treatment. Primary Endpoint was to compare the change in the ECG at 3 month from the baseline from the collected data. Mean daily dose (MDD) of anti-diabetic drugs, HbA1c, fasting plasma glucose (FPG) & postprandial plasma glucose (PPG) were also analyzed.
Results: Total of 49 patients data were collected and analyzed with a mean age of 55.5 years and mean duration of Diabetes 9.3 years. Hypertension was the most common co-morbid disease (63.3%) along with diabetes for a mean duration of 10.0 years. Metformin plus Glimepiride were the most prescribed dual drugs (63.3%) along with Teneligliptin with an overall MDD of Metformin was 1065.2 mg, Glimepiride was 2.1 mg. From the collected data there was significant reduction in FPG and PPG at 3 months were 49.6 mg/dL (p<0.0001) and 100.5 mg/dL (p<0.0001) reduction was observed from the baseline respectively. Significant changes was observed in the HbA1c from the baseline at 3 months was 0.9% (p<0.0001). There was no significant increase in the Mean QTc interval from baseline to 3 months. No serious adverse events or hypoglycemia were reported.
Conclusion: Teneligliptin was well tolerated with no significant change in QTc prolongation and significantly effective in reducing the FPG, PPG

and HbA1c at 3 months from the baseline with no adverse events. There was no increase in the mean QT interval.

Keywords: Cardiac complications

PP12

Indian diabetes risk score (Idrs), a strong predictor of diabetes mellitus: a cross sectional study among urban and rural population of Lucknow

A Arun[1], N Singh Verma[2], A Maheshwari[3]

1-Jagrani Hospital, Lucknow, India, 2- King George Medical University, Lucknow, India, 3- BBD University, Lucknow, India

Background and Aims: The prevalence of Diabetes Mellitus is growing rapidly worldwide and is reaching epidemic proportions. Globally around 366 million people have Diabetes in 2011 and by 2030 this will have risen to 552 million. IDRS is a cost effective & simple method for identifying undiagnosed diabetic subject at community level.

The aim of study was to estimate prevalence of Diabetes Mellitus and to identify high risk subjects by using Indian diabetes risk score for detecting undiagnosed Diabetes in urban and rural areas of Lucknow.

Materials and methods: It was a community based cross-sectional study done in the urban and rural areas of Lucknow, under a tertiary care hospital of Lucknow in subjects aged 20 years and above from August 2016-July 2017. It was a community based cross sectional study which was carried out in 820 adults aged more than 20 years in urban area (four zones) and rural area (two blocks) of Lucknow District. Out of these 820 adult population, 410 adults for Urban and 410 adults for Rural areas of Lucknow District was studied.

Results: 555 (67.7%) of subjects were in moderate risk IDRS category while 143 (17.4%) were in low risk and only 122 (14.9%) were in high risk IDRS category. Prevalence of Diabetes Mellitus was highest in high risk IDRS category (47.5%) followed by moderate risk (9.2%) and low risk (2.8%) IDRS category. The sensitivity of IDRS was 81.40% in the present study and a high specificity of 72.0%. Present study also showed a Positive Predictive value of IDRS as 31.7% and a Diagnostic accuracy of 73.3%.

Conclusion: This study provides a use of Indian Diabetes Risk Score for identifying undiagnosed high risk for patients with Diabetes in Indian population. It is essential to implement the simple IDRS tool in the community for mass screening so that proper intervention can be carried out to reduce the burden of Diabetes.

Keywords: Prediction of type 2 diabetes

PP13

Association of prolonged QTc interval with cardiac autonomic dysfunction in patients of type 2 diabetes mellitus

O Virani[1], L Phadke[2], S Bhat[3]

1-Smt.kashibai navale medical college and general hospital, Pune, India, 2- Smt.kashibai navale medical college and general hospital, Pune, India, 3- Smt.kashibai navale medical college and general hospital, Pune, India

Background and Aims: Introduction:-It is well known that reduced HRV (Heart Rate Variability) a marker of autonomic dysfunction and prolonged QTc interval in patients of Type 2 DM are independent risk factors for adverse cardiac events in patients of type II diabetes. It will be interesting to study association between these two risk factors so that it will shed a light on underlying mechanisms responsible for increased cardiac risk in type II diabetes.

Aim:-To study association of QTc interval with Heart Rate Variability (HRV) indices in patients of type 2 DM.

Materials and methods: It is a cross sectional study. Seventy five patients with Type 2 diabetes between age group of 30 to 65 yrs of both genders were enrolled. Diabetic patients with evidence of other co morbid conditions like heart diseases, hypertension, DCMP, respiratory, renal, hepatic, thyroid and cerebro-vascular diseases, acute electrolyte imbalance, previously abnormal resting ECG, and on medications known to interfere with autonomic function tests, HRV & QTc interval have been excluded. High sampled ECG (1 KHz) was recorded in supine resting condition for five minutes, and cardiac autonomic reflex tests that are recommended by Toranto consensus panel on diabetic neuropathy were performed. The QTc were determined with Bazett's formula $(QTc = QT / \sqrt{RR})$ and based on QTc interval patients were categorized into two subgroups. Those with prolonged QTc (QTc > 460 in female & QTc > 450 in male) as Group I (n=34) and normal QTc as Group II (n=41). The HRV analysis was done as per the standard guidelines of HRV task force. Comparison between two groups was done by using non parametric Mann-Whitney U test (two tailed). P value of <0.05 was considered significant.

Results: A significant cardiac autonomic dysfunction was observed in patients with prolonged QTc reflected by reduced variance (SDNN 19.8 ± 15 v/s 28.8 ± 13, p-value 0.0005), LF Power (ms^2) 86.1 ± 135 v/s 174.7 ± 232, p-value 0.02, HF Power (ms^2) 41.9 ± 52 v/s 129.6 ± 75, p-value 0.004. Interestingly the average heart rate in group I was higher than group II 88.3 ± 12 v/s 76.9 ± 1, p-value 0.001. Moreover percentage of patients with CAN in Group I was more as compared to Group II.

Conclusion: Prolonged QTc interval is associated with cardiac autonomic dysfunction and diabetic cardiac autonomic neuropathy. Results may have diagnostic and prognostic utility.

Keywords: Cardiac complications

PP14

Real world observational study to evaluate the comparative lipid lowering effectiveness for intermediate doses of rosuvastatin (ROSINDOOR)

N Dalal[1], N Dave[2]

1-INTAS pharmaceuticals Ltd, Ahmedabad, India, 2- INTAS pharmaceuticals Ltd, Ahmedabad, India

Background and Aims: To evaluate efficacy of intermediate strengths of rosuvastatin (15/30 mg) for the primary or secondary prevention of ASCVD in real world setting.

Materials and methods: This was a real world, observational, non-interventional and multi-centric post marketing surveillance (PMS) in adult patients taking rosuvastatin for primary or secondary prevention of ASCVD in India. Eligible patients were instructed to use rosuvastatin by the treating clinician for the period of 12 weeks. Two visits in 12 weeks of participation, one at the start (at the time of an enrolment) and second at the end of the evaluation period (After 12 weeks) were planned. During both visits, clinical laboratory examinations for the lipid profile viz. Total cholesterol (TC), LDL-C, HDL-C, VLDL, and Total Triglycerides (TG) were performed.

Results: Total of 333 patients were considered for final analysis. Rosuvastatin was most commonly prescribed statin for both primary as well as secondary prevention of ASCVD. Out of all patients, 186 patients (55.86%) were prescribed intermediate strengths of rosuvastatin (15/30 mg). Rosuvastatin was also commonly prescribed in patients with co-

morbid diabetes (n=54) and CKD (n=14). In statin naïve patients, rosuvastatin 10, 15, 20, 30, 40 showed significant mean reduction in LDL-C by 27%, 35%, 34%, 40%, 43% (p<0.001). Rosuvastatin 15 and 30 mg also exhibited good control of lipid parameters in patients with prior statin therapy. In patients with prior statin therapy, rosuvastatin 15 mg achieved mean reduction in TC 47.37 mg/dL (from baseline mean: 222.52 mg/dL), LDL-C 36.15 mg/dL (from baseline mean: 147.59 mg/dL), TG 32.71 mg/dL (from baseline mean: 193.46 mg/dL). In patients with prior statin therapy, rosuvastatin 30 mg achieved mean reduction in TC 61.2 mg/dL (from baseline mean: 251.13 mg/dL), LDL-C 53.94 mg/dL (from baseline mean: 166.84 mg/dL), TG 26.6 mg/dL (from baseline mean: 211.45 mg/dL). Most common reason for switching or titration of particular dose of statin was better control of lipid parameters (64.29%) followed by myalgia or muscle pain (27.38%). 14 patients with complaint of myalgia or muscle pain due to rosuvastatin 40 mg were switched to rosuvastatin 30 mg without any additional concern of muscle complaints. **Conclusion:** Results from this real world study suggest that intermediate strengths of rosuvastatin (15/30 mg) are efficacious and well tolerated. Hence, intermediate strengths of rosuvastatin may provide useful therapeutic options for clinicians in optimal management of dyslipidaemia. **Keywords:** Lipid metabolism; Dyslipidaemia, lipoproteins

PP15

Therapeutic efficacy of teneligliptin for management of type 2 diabetes mellitus: a meta - analysis in Indian scenario

NP Tiwari[1], SS Yadav[2], S Hussain[3], KK Sawlani[4], K Usman[5], S Khattri[6]
1-King George's Medical University, Lucknow, India, 2- National Innovation Foundation, Ahmedabad, India, 3- King George's Medical University, Lucknow, India, 4- King George's Medical University, Lucknow, India, 5- King George's Medical University, Lucknow, India, 6- King George's Medical University, Lucknow, India

Background and Aims: Background: Type 2 diabetes mellitus (T2DM) is one of the widest spreading chronic diseases and creating huge economic burden worldwide. New medication-therapy regimens are evaluated and compared with existing medications to provide more efficacious and cost-effective care. Teneligliptin is a relatively cheaper molecule and has dragged the attention of Indian physicians. There is no conclusive studies and analysis published on safety and efficacy of teneligliptin in Indian population.
Aim: The present meta-analysis was carried out to assess the efficacy of teneligliptin in Indian prospects.
Materials and methods: An extensive web-based literature search was carried out from Pubmed, Embase, and Cochrane central register for the previous 5 years studies done on teneligliptin in Indian population. Data were retrieved from only those studies which were designed as randomized controlled trial comparing the combination of teneligliptin ± placebo with placebo. The primary outcome measure was taken as a reduction in HbA1c, calculated using the fixed effect model with a 95% confidence interval. Other outcome measures were a reduction in Fasting and Post-Prandial Plasma Glucose.
Results: There were five studies retrieved in the literature search of which three were eligible for inclusion in our analysis. The current meta-analysis study included 223 patients treated with teneligliptin ± placebo and 155 treated with Placebo. Treatment with teneligliptin was associated with a greater reduction in HbA1c (%) as compared to placebo therapy producing an overall effect MD [95% CI] = -0.93 [-1.09, -0.77], p- value < 0.00001. Reduction in fasting and postprandial blood glucose were MD [95% CI] = -15.81 [-20.88, -10.74] and MD [95% CI] = -38.25 [-47.05, -29.44] respectively with p-value < 0.00001.

Graph/Table:

Mean Difference IV. Fixed, 95% CI

Favours [Teneligliptin]   Favours [Placebo]
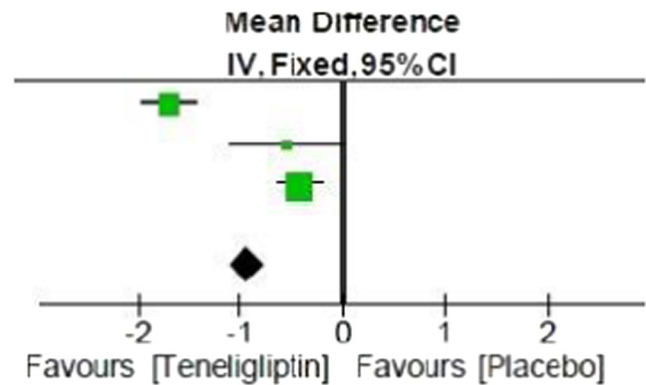
Conclusion: Teneligliptin can cause a significant reduction in HbA1c and fasting and postprandial plasma glucose as compared to placebo therapy. Therefore teneligliptin might be an effective and safe therapeutic option for patients with T2DM.
Keywords: Incretin based therapies 43 Novel agents

PP16

Effectiveness of teneligliptin in type 2 diabetes mellitus patients uncontrolled on insulin therapy

R Kumar[1], S Suryawanshi[2], A Rathod[3]
1-Medica Hospital (KGMH), Jamshedpur, India, 2- Glenmark Pharmaceuticals Ltd, Mumbai, India, 3- Glenmark Pharmaceuticals Ltd, Mumbai, India

Background and Aims: The incidence of type 2 diabetes mellitus (T2DM) is increasing at an alarming rate worldwide and in India. Incretins are being increasingly used in the treatment of Type 2 Diabetes Mellitus (T2DM). In India recently introduced cost effective gliptin, Teneligliptin is widely prescribed as monotherapy or with other oral antidiabetics as well as with insulin therapy if uncontrolled. There is lack of efficacy and safety data of usage of teneligliptin along with insulin. To evaluate the effect of Teneligliptin in type 2 diabetes mellitus (T2DM) patients uncontrolled on insulin therapy.
Materials and methods: A data of 29 T2DM patients uncontrolled on insulin therapy & treated using Teneligliptin were analysed retrospectively. The data was collected from the clinic records and analysed. HbA1c, fasting plasma glucose (FPG) & postprandial plasma glucose (PPG) along with reduction of Insulin dose were analysed at visits 1, and 3 months retrospectively.
Results: The mean age of patients in this study was 48.9 years with a 6.5 years of mean duration of diabetes. Most of the patients were on dual or triple drug therapy along with insulin therapy. Most common co- morbid condition along with diabetes was hypertension (51.7%) with mean duration of 7.9 years. 44.8% patients received Metformin and Glimepiride combination along with insulin therapy. FPG, PPG and Insulin dose was evaluated at baseline, 1 month and 3. The mean change from the baseline at 1 month and 3 months for FPG, PPG and Insulin dose was -41.4 mg/dL (p<0.0001), -95.9 mg/dL (p<0.0001) and -1.3 units (p=0.404) at 1 month and -90.2 mg/dL (p<0.0001), 173.9 mg/dL (p<0.0001) and -4.2 units (p=0.004) at 3 months respectively. Whereas change in the HbA1c from baseline to 3 months was -1.6% (p<0.0001).

Conclusion: Teneligliptin addition to insulin therapy significantly improved glycaemic parameters and also significantly reduced daily dose of insulin at 3 months of treatment.
Keywords: Incretin based therapies 43 Novel agents; Insulin therapy

PP17

Diabetic foot syndrome and its correlates in ambulatory type 2 diabetic patients

N Pattamsetty[1], R Mahajan[2], V Kumar[3], J Punnose[4]
1-St.Stephens Hospital, Delhi, India, 2- St. Stephens Hospital, Delhi, India, 3- St. Stephens Hospital, Delhi, India, 4- St. Stephens Hospital, Delhi, India

Background and Aims: Diabetic foot syndrome (DFS) is a complex entity with variable prevalence and several risk factors. Aims of the study were to find prevalence of DFS and two of its risk factors, diabetic peripheral neuropathy (DPN) and peripheral arterial disease (PAD) and to seek their relationship with patient's 5 parameters namely age, sex, BMI, duration and control of diabetes.
Materials and methods: 200 type 2 diabetic patients aged ≥30 years (mean age 52.0±10.7 years) comprising of 110 males and 90 females were evaluated for DFS, DPN, PAD and diabetic foot risk categories by history, examination, investigations and supported by vibration perception test using biothesiometer and ankle brachial index. Statistical analysis used : Student t test, Mann Whitney U test, Fisher exact test and/or Chi-square test.
Results: Prevalence of DFS, DPN and PAD was 2%, 14% and 34% respectively. 4 DFS patients included 2 with cellulitis and ulcer, 1 with healed foot ulcer and 1 had amputation. Mean BMI in DFS patients was significantly higher than in non DFS patients (P=0.014) while the remaining 4 parameters (age, sex prevalence, duration and control of diabetes) were not significantly different (P= 0.38 to 0.92). For DPN patients, both mean BMI and mean age were significantly higher (P=0.01 and P=0.001) than non DPN patients while there were no significant differences about sex prevalence, duration and control of diabetes. With regard to PAD versus non PAD patients, no significant differences were observed in any of the 5 parameters.
Patients among different diabetic foot risk categories also did not differ on these parameters except that mean age was higher in category 1 than category zero (P=0.001) and mean BMI was higher in category 3 than category 2 (P=0.012) and category zero (P=0.014).
Conclusion: Prevalence of DFS and its two risk factors, DPN and PAD was 2%, 14% and 34% respectively. Only the higher mean BMI was significantly associated with DFS and DPN and advanced foot risk categories while mean age was higher among DPN versus non DPN and foot risk category 1 versus category zero patients.
Keywords: Diabetic foot and skin disorders; Macrovascular disease

PP18

Medical nutrition therapy in diabetes management: an Apollo sugar initiative to enhance diet adherence in patients with diabetes

J Sai[1], B Jaganmohan[2], B TS[3], V S[4], S Shah[5], U Christopher [6], TA Kulkarni [7], P Bakshi [8], R Ragi[9], S Popuri [10], S Tippisetty[11], VK Kolukula[12]
1-Apollo Sugar Clinics, Hyderabad, India, 2- Apollo Sugar Clinics, Bangalore, India, 3- Apollo Sugar Clinic, Apollo Hospital, Chennai, India, 4- Apollo Sugar Clinic, Apollo Hospital, Chennai, India, 5- Apollo Sugar Clinics, Mumbai, India, 6- Apollo Sugar Clinics, Chennai, India, 7- Apollo Sugar Clinics, Mumbai, India, 8- Apollo Sugar Clinics, Bangalore, India, 9- Apollo Sugar Clinics, Hyderabad, India, 10- Apollo Sugar Clinics Limited, Hyderabad, India, 11- Apollo Sugar Clinics Limited, Hyderabad, India, 12- Apollo Sugar Clinics Limited, Hyderabad, India

Background and Aims: Type 2 Diabetes is a sporadic metabolic disorder primarily associated with reversible factors such as improper diet and physical inactivity. Early life style management through healthy diet prescription and regular exercise are the key to avoid progression of diabetes and delay in the complications. India is country with diversified culture and eating habits, Apollo Sugar a centre of Excellence for Diabetes and Endocrinology have the capabilities to cater region specific diet charts to diabetes patients as part of lifestyle management. We in the current study aimed to assess the diet prescriptions given to the patients based on their body mass index (BMI), and region specific
Materials and methods: A retrospective data analysis of T2DM patients registered at Apollo Sugar Clinics, India from Jan 2016 to Dec 2017. Apollo Sugar Clinics is an innovative, single specialty diabetes and endocrine healthcare service provider with 35 clinics, 90 health care providers serving >75000 patients across India. In order to enhance the diet adherence in patients we ensure that the diet prescription is recommended considering the eating habits and the region where they live. Patients were given measuring cups, a weekly food diary, and fridge magnets to encourage diet adherence. Further, a quality of life (QoL) questionnaire was asked to patients to understand the overall well-being of the patients. Currently, diet charts in all regional languages, such as Telugu, Tamil, Kannada, Hindi, Bengali and English were given to bridge the language barrier and have a healthy diet.
Results: Among 60000 T2DM patients registered at Apollo Sugar Clinics, 35,025 (58%) patients were given customized diet prescriptions along with medications, 42% of the patients were managed through health interactions with the nutritionists, SMS alerts and teleservices. Along with in-clinic diet prescription by nutritionist more than 23% of patients were regularly in contact with the health coaches regarding their diet, physical activity, blood sugar monitoring, and educational tips to avoid hypoglycemia. Nearly 4391 (31%) patients prescribed on diet were regularly doing self-monitoring of blood glucose (SMBG). Majority (64%) of these patients were on 1400 calories diet plan and 1600 (23%) calories diet plan. Patients with BMI ≥30 kg/m2 were prescribed with 1200 calories diet plan and 25-29.9 kg/m2 were prescribed with 1400 calories diet
Conclusion: Our analysis reveal that patients at Sugar are more adherent on lifestyle management through an appropriate healthy diet plan along with medication. Moreover, counselling and education on various aspects of diabetes management can benefit patients in a more meaningful way. Apollo Sugar is well quipped to manage diabetes patients in festive time, which is accomplished with the support of health coach, frequent SMS, and educational calls.
Keywords: Nutrition and diet

PP19

Vitamin D deficiency in patients with tuberculosis and its correlation with glycemic status

S Shakya[1], R Karoli[2], PS Singh[3], N Gupta[4], V Singh[5], M Singh[6]
1-Dr. RML IMS Lucknow, Lucknow, India, 2- Dr RML IMS Lucknow, Lucknow, India, 3- Dr RML IMS Lucknow, Lucknow, India, 4- Dr RML

IMS Lucknow, Lucknow, India, 5- Dr RML IMS Lucknow, Lucknow, India, 6- Dr RML IMS Lucknow, Lucknow, India

Background and Aims: Vitamin D has effects beyond its impact on skeletal health. Tuberculosis (TB) patients have a significant vitamin D deficiency (VDD) which may be closely related to the onset and progress of the disease. The comorbidity of diabetes (DM) and TB has posed an increasing challenge in recent years. However, the influence of DM on TB and the possible mechanism are still uncertain.

Aim: We therefore determined vitamin D status in patients with TB in relation to whether they had normal fasting blood glucose (FBG), pre-DM or DM.

Materials and methods: In this hospital based observational study, new patients who were diagnosed with tuberculosis were included. Detailed history taking and examination was done and vitamin D levels and glycemic control was assessed.

Results: There were 66 patients with TB, including 26 pulmonary TB, 22 with pleural effusion and 18 with extrapulmonary TB. Of these, 27 (41%) had normal blood glucose, 9 (14%) had pre-DM and 30 (45%) had DM. Median serum vitamin D levels were 16.1 ng/mL in patients with TB with normal FBG, 12.6 ng/mL in patients with TB with pre-DM and 10.2 ng/mL in patients with TB with DM (p<0.001). There was negative correlation between vitamin D levels and Hba1C and severity of pulmonary tuberculosis.

Conclusion: Vitamin D levels were lower in patients with TB with pre-DM and DM than patients who had normal glycemic status. Physicians need to pay more attention to vitamin D status in their patients, especially if there is coexisting pre-DM or DM.

Keywords: Environmental factors (viruses, nutrients, toxins); Clinical immunology; Inflammation in type 2 diabetes; Nutrition and diet

PP20

Retrospective study to evaluate efficacy and safety of azilsartan in diabetic hypertensive patients from hospital in Gujarat

MA Agarwal[1], D Agarwal[2], DC Raval[3], DU Petare[4], DYS Petare[5]
1-Medilink Hospital Research Centre, Ahmedabad, India, 2- Medilink Hospital Research Centre, Ahmedabad, India, 3- Medilink Hospital Research Centre, Ahmedabad, India, 4- Medical services- Glenmark Pharmaceuticals, Mumbai, India, 5- Medical services-Glenmark Pharmaceuticals, Mumbai, India

Background and Aims: Management of Diabetic hypertensives is a challenge. With availability of newer sartan such as Azilsartan which is more potent for reducing blood pressure was explored in Tertiary care center of Gujrat.

Materials and methods: This retrospective audit was approved by institutional ethics committee. Data from hospital records in Medilink Hospital Research Centre of Ahmedabad collected and analyzed with appropriate statistical tests

Results: Total diabetic hypertensive patients data available was 201 as per inclusion & exclusion criteria. Mean Age of population was 54.7 + 9.1 years & sex ratio as 1.7:1(M:F). Azilsartan was used as an add on to ongoing antihypertensive drugs in 90% patients & 10 % were on Azilsartan monotherapy. Significant (p<0.05) reduction in mean SBP/DBP observed at 1st follow up visit (around 8th week: 8.6/7.3 mmHg) & 2nd follow up visit (around 12th week: 19.2/12mmHg) as compared to baseline (Baseline Mean SBP/DBP: 156.1/97.3, 1st visit Mean SBP/DBP: 147.5/90, 2nd Visit Mean BP 136.9/85.3). Target BP of < 140/90 was achieved by 42% patient on 2nd follow up visit. Serious adverse events/Death were not reported in records.

Adverse events reported were Weakness (1.9%), Headache (0.9%), Vertigo (0.9%).

Conclusion: Azilsartan as an add on to other antihypertensive or monotherapy has significantly reduced BP in Diabetic hypertensives.

Keywords: Hypertension; Cardiac complications

PP21

A study of impact of diabetes mellitus on the profile of acute viral hepatitis

B Roy[1], PK Bansal[2], V Kumar[3], V Gupta[4]
1-St. Stephen's hospital, NEW DELHI, India, 2- St. Stephens Hospital, NEW DELHI, India, 3- St. Stephens Hospital, NEW DELHI, India, 4- St. Stephens hospital, NEW DELHI, India

Background and Aims: Acute viral hepatitis is generally a self-limiting illness but its clinical profile is known to be more severe and complicated in the presence of diabetes mellitus. This study is aimed to find the influence of diabetes mellitus on the profile and severity of acute viral hepatitis.

Materials and methods: 100 patients of acute viral hepatitis aged ≥ 12 years (Mean age 32.3±16.85) with 62 males and 38 females were evaluated by history, examination and investigations. These included 14 diabetics and 86 non-diabetics. Patient with INR ≤1.5 or serum albumin > 3gm/dl were labelled as mild while those with INR>1.5 or serum albumin<3gm/dl were labelled as severe acute viral hepatitis.

Results: Majority of both diabetic and non-diabetic cases had feco-oral disease transmission (Virus A and E) compared to parenteral transmission (Virus B and C). Compared to non-diabetics, diabetics had significantly higher mean age (57.7±13.2 vs 28.3±13.2 years), more frequent ascites (50 vs 9.3%) and altered sensorium (28.5 vs 4.6%) with respective P values being p<0.001, p<0.001and p=0.013. Mean values of total S. bilirubin, SGOT, SGPT and alkaline phosphatase for diabetics were 6.69±2.7 mg/dl, 1978±1405, 2247 ±1435 and 412±275 U/L respectively while corresponding values for non-diabetics were 5.0±2.4 mg/dl, 1248±1038, 1355±940 and 285±173 U/L with respective P values between the two patient groups being significant (p<0.001, p=0.023 and p=0.003 and p=0.023). Diabetic patients also had more frequent coagulopathy (8/14=57.1%), hypoalbuminemia (6/14=42.8%), acute kidney injury (4/14=28.5%), septic shock (5/14=35.7%) and prolonged hospital stay (8/14=57.1%). On the other hand, non-diabetics had less frequent coagulopathy (7/86=8.1%), hypoalbuminemia (6/86=7%), acute kidney injury (3/86=3.5%), septic shock (3/86=3.5%) and prolonged hospital stay (12/86=14%). P values between these two groups were as follows <0.001, <0.001, 0.007, 0.001 and 0.0002 respectively. 2 out of 100 patients died and both were diabetic.

It was also observed that diabetics were significantly more frequently associated with severe hepatitis as compared to mild form of hepatitis both by INR (p=0.001) and by S.albumin criteria (p<0.001). Since diabetic group had a higher mean age and since higher age may also be associated with more severe viral hepatitis, its role as a confounding factor was studied. It was observed that a higher age was indeed a confounding factor because when clinical and laboratory parameters of viral hepatitis were adjusted according to age, many differences between the two groups of diabetics versus non diabetics became statistically insignificant.

Conclusion: Acute viral hepatitis patients when associated with diabetes are older and have significantly more frequently severe hepatitis. Older age amongst diabetics however acts as an important confounding factor and severity of hepatitis should not be attributed to diabetes alone.

Keywords: Other complications

PP22

Improving medicine compliance through innovative slogans on medicine boxes and assess its impact

R Shukla[1], D Yagnik[2], S Mishra[3], B Ganguli[4], S Shukla[5], M Gupta[6]
1-Center for Diabetes & Endocrine diseases, Society for Prevention and awareness of diabetes, kanpur, India, 2- Society for prevention and awareness of Diabetes, kanpur, India, 3- Center for Diabetes and Endocrine Diseases, kanpur, India, 4- Society for prevention and awareness of Diabetes, kanpur, India, 5- Center for Diabetes and Endocrine Diseases, kanpur, India, 6- Center for Diabetes and Endocrine Diseases, kanpur, India

Background and Aims: Medicine non Compliance is not a much discussed issue to Improve HbA1c. There is documented improvement ranging 0.3 - 0.5 % of HbA1c by medicine adherence. We have been working on this issue for last 7 years. Our Initial patients survey (IDF 2013 Melbourne) reflected various reasons for non compliance including - financial, herbal medicine, side effects and fed up of medicine.

We aimed to educate people with T2 Diabetes through a different model and to see its impact. We aimed to implement the learnings and to see its impact at patient population.

Materials and methods: We created a model involving patients and pharmaceuticals industry. Understandings that Medicine non compliance is relevant issue to improve HbA1c. In this context we organized a first meeting at RSSDI 2015 (National) - Lucknow and invited top representations of key pharma Companies holding diabetes business in the country. We requested them to write "Do not stop Medicine" or Monitor your blood sugar" or extra. We requested all of them to write one liners. Next year at RSSDI 2016 at Hyderabad we held similar meeting to review our work. By that time many Companies came out with printed version on Medicine boxes. We requested to intensity and to write on other antidiabetic and anti Hypertensive medicines. We sent our work to EASD (2016 - Lisbon) and were invited to present our work. People asked there about the Impact of this on patient population. We conducted a study design Multicenter, cross sectional survey at Tertiary care centers hospitals and clinics across the country - patient were on brand "——————" Age - 18-70 years. 1018 patients were enrolled out of which 182 responded telephonically.

Study flow chart: Screening of patients according to inclusion & exclusion criteria Physician at respective centers across the Country

↓

Patient willing to participate enrolled in survey (No.1018)

↓

182 Patients responded

↓

Surveyed by telephonic conversation with pre-approved questionnaire

↓

Documented in case record form

↓

Compilation and analysis of data

Results: In this study 26% of patients noticed the statement on Medicine box of which 86% understood it, 70% accepted this would remind them to take medicine regularly.

Conclusion: The patient's pharmaceuticals model to Impart awareness through Innovative Ideas of "statements on medicine boxes" is useful and it is significantly appreciated by patient population. It is 360 degree activity starting from Innovation and execution to reach to the patient populations.

Keywords: Health care delivery

PP23

Burden of diabetes mellitus (DM) in sputum positive TB patients at a tertiary care hospital of South Gujarat

DR Surati[1], DN Bhatt[2], DY Sharma[3], DA Upadhyay[4]
1-Government Medical College Surat, Surat, India, 2- Government Medical College Surat, Surat, India, 3- Government Medical College Surat, Surat, India, 4- Government Medical College Surat, Surat, India

Background and Aims: Tuberculosis is one of the top 10 causes of death globally and in India. The burden of the disease has worsened in the presence of co morbidities like DM. Gujarat is the diabetic capital and ranks 7th in the incidence of TB in India. This study attempts to estimate the prevalence of diabetes mellitus in confirmed patients of sputum positive pulmonary TB cases in a tertiary care hospital of South Gujarat.

Materials and methods: Desk review of all cases of Pulmonary TB enrolled under Revised National Tuberculosis Control Programme (RNTCP) in the tertiary care hospital between January 2015 and December 2016 was done. Sociodemographic and clinical profile as well as laboratory investigations were analysed using tests of association.

Results: Among 22,417 sputum positive Pulmonary TB patients, 1939 had DM. Significant association was noted between DM, age more than 40 years and lower zone involvement. 10% of these patients did not achieve sputum conversion at the end of 6 months.

Conclusion: Tuberculosis is closely associated with both undernourishment and DM. Since these are two poles of malnutrition, TB patients need to be closely monitored for their glycemic control and nutrition.

Keywords: Epidemiology; Socio-economic aspects; Other complications

PP24

Patient demographics and treatment satisfaction prior to switching to biphasic insulin aspart 30/70: insights from a revealed-preference study in type 2 diabetes in India

Y Gogate[1], A Asirvatham[2], P Aneja[3], B Bhatt[4], LS Murthy[5], N Rhee[6], J Kesavadev[7]
1-Harmony Health Hub, Nashik, India, 2- Arthur Asirvatham Hospital, Madurai, India, 3- Max Hospital, Shalimar Bagh, India, 4- Novo Nordisk, Zurich, Switzerland, 5- Lifecare Hospital & Research Centre, Bangalore, India, 6- Novo Nordisk, Zurich, Switzerland, 7- Jothydevs Diabetes Research Center, Trivandrum, India

Background and Aims: Limited data exist evaluating patients' willingness to pay (WTP) for insulin analog treatment in countries with mainly out of pocket payment markets, such as India. A revealed preference study was conducted to investigate patients' ability and WTP for biphasic insulin aspart 30/70 (BIAsp 30) in people with type 2 diabetes (T2D) in India. We present the study population demographics and treatment satisfaction prior to switching to BIAsp 30.

Materials and methods: A 12 week, multicentre, non interventional, prospective, revealed preference study in people previously treated with biphasic human insulin (BHI) in vials. The study was conducted in centres prescribing BIAsp 30 (FlexPen® or Penfill® device) to a diverse

socioeconomic population believed able and willing to pay for ≥12 weeks' treatment after the baseline visit (NCT03374774).

Results: Participants (N=516) had mean age 57 years, mean diabetes duration 10.9 years, 54.1% (n=279) male, and 63.6% (n=328) BMI ≥25 kg/m^2. See Table for key baseline findings. Physicians considered 98.3% (n=507) participants were very likely/likely to continue to pay for BIAsp 30 after 12 weeks' treatment. Prior to switch to BIAsp 30, 59.2% (n=304) participants said they would have been satisfied to continue BHI treatment. Penfill® or FlexPen® device had previously been used by 39.9% (n=206) and 22.5% (n=116) participants, respectively. Baseline mean TRIM-D device satisfaction score was 24.2 (8-40 scale; higher scores = higher device satisfaction), with participants scoring previous device (vials) particularly low in TRIM-D device bother domain, indicating some dissatisfaction with device size, discomfort and/or use in public. Most participants would pay another 1200 IN Rupees/month toward treatment costs through savings or other funds (46.3%, n=237), or by reducing money spent on entertainment (32.8%, n=168).

Graph/Table:

Table. Key baseline information

Reasons for switching patient from BHI to BIAsp 30	Physician response[†], n (%)		
	Improve glycaemic control 491 (95.2)	Reduce hypoglycaemia risk 453 (87.8)	Other 449 (87.0)
Diabetes Treatment Satisfaction Questionnaire	Patient response on a scale of 0–6[‡], n (%)		
How satisfied would you be to continue with your present treatment (prior to switch)?	0–1 19 (3.7)	2–4 191 (37.2)	5–6 304 (59.2)
How often have you felt that your blood sugars have been unacceptably high recently?	0–1 120 (23.2)	2–4 353 (68.3)	5–6 43 (8.3)
How often have you felt that your blood sugars have been unacceptably low recently?	0–1 241 (46.7)	2–4 245 (47.5)	5–6 30 (5.9)
Discrete choice experiment	Patient response, n (%)		
What device have you tried?[†]	Vial/ syringe 360 (69.8)	Penfill® 206 (39.9)	FlexPen® 116 (22.5)	Other 11 (2.1)
What are your preferred HbA$_{1c}$ levels?[§]	<7.0% 425 (82.4)	7.0–9.0% 88 (17.1)	Above 9.0% 3 (0.6)	
What is your preferred time for medication?[§]	30 minutes before meal 191 (37.4)		Immediately after meal 320 (62.6)	
If you were to pay 1200 INR extra per month, how would you pay?[†]	Money from savings/other funds 237 (46.3)	Reduce spending on food/clothes 65 (12.7)	Lower spending on entertainment 168 (32.8)	Reduce spending on housing 38 (7.4)	Other 71 (13.9)

[†]Response categories are not mutually exclusive. [‡]A linear scale where 0 is very dissatisfied or infrequently and 6 is very satisfied or frequently. [§]Discrete response categories
%, percentage of patients; BIAsp 30; biphasic insulin aspart 30/70; BHI, biphasic human insulin; INR, Indian Rupee; n, number of patients

Conclusion: Baseline device satisfaction (BHI in vials) was mainly low. Most patients would willingly fund additional treatment costs through savings or reduced spending on entertainment. Full study results, due in 2018, will include a revealed preference assessment of WTP for BIAsp 30, and any change in patient reported treatment or device satisfaction after 12 weeks' treatment. The reported baseline information and upcoming results will help increase prescribers' understanding of the ability and WTP for BIAsp 30 in people with T2D in India.

Keywords: Socio-economic aspects

PP25

Clinical assesment of efficacy of world's first herbal cane diabliss sugar as a boon to diabetic individuals

C Janaki[1], S Lokanadham[2], R Lakshmi[3], S Vallabhaneni[4]
1-Department of Anatomy, Asan Memorial Dental College & Hospital, Chengalpet, Tamil Nadu-603105, India., chennai, India, 2- Santhiram Medical College, nandyal, India, 3- Chief Technology Officer, DiaBliss Consumer Products Pvt Ltd, Thoraipakkam, Chennai, TamilNadu, India., chennai, India, 4- Chief Operating Officer, DiaBliss Consumer Products Pvt Ltd, Thoraipakkam, Chennai, TamilNadu, India., chennai, India

Background and Aims: Low glycemic index (GI) diet plays a significant role in the management of Type -II diabetes mellitus and it is mandatory to identify herbal infused nutritional support on its long-term administration in Type-II Diabetic patients. Aim: To study the efficacy of herbal cane DiaBliss sugar in Type -II Diabetes mellitus patients.

Materials and methods: 100 adult diabetic patients of both genders with age ranged between 18 to 55 years and moderately active, non-smokers, non-alcoholics were considered from the Gnana Ganga Ayurvedic Trust Hospital, Tirupati to study the efficacy of DiaBliss herbal cane sugar in type -II Diabetes mellitus patients. DiaBliss Herbal Sugar was administered orally (25 g/day) for 90 days in all the patients and monitored by a physician. A baseline fasting blood sample was obtained on day zero and thereafter, three more blood samples were taken every 30 days. The samples were analyzed for the fasting and post-prandial blood glucose, HbA1c, lipid profile, and safety parameters.

Results: The efficacy of DBS is revealed by blood glucose levels which were not elevated in all the subjects after supplementation of DiaBliss Sugar during the study period. The baseline fasting blood glucose level (189.25±86.78) decreased to 152.31±40.92. The post-prandial blood glucose level decreased from 252.50 ± 106.88 to 227.00±60.04. Variation in the mean blood glucose levels during monthly intervals was tabulated. We noted both fasting and post-prandial blood glucose levels were decreased from baseline to day 60. The GI value of the herbal sugar was found to be 44.4 and therefore can be considered as a low glycemic nutrient/food. Long-term administration of DBS does not increase blood glucose and also showed the significant decrease in mean values of total cholesterol, LDL Cholesterol, VLDL, Triglycerides, Cholesterol/HDL Cholesterol ratio in the present study. We have noted decreased levels in HbA1c and serum alkaline phosphatase, but these initial findings need further investigations.

Conclusion: Consumption of DiaBliss herbal cane sugar has a predictive role in regulation of blood glucose levels and regular diet with DiaBliss herbal cane sugar may help in maintaining good cardiac health in normal individuals.

Keywords: Prediction of type 2 diabetes; Nutrition and diet; Health care delivery

PP26

Obesity as a risk factor for early-onset type 2 diabetes in adults aged 18-44 years

A P.V.
Sree Gokulam Medical College & Research Foundation, Trivandrum, India

Background and Aims: Diabetes is a global public health problem. Recently, there is an epidemiologic transition in the age of onset of diabetes, with an exponential increase in prevalence of type 2 diabetes in the young population. There is also a parallel increase in prevalence of obesity in this population. The loss of productivity, disability, decreased quality of life and early mortality due to diabetes create huge economic, social and personal burden warranting early and aggressive risk factor management in this population. Studies have shown that life style modification in the form of weight reduction and exercise can bring about improvement in risk for diabetes. This study was done to find the association of obesity and type 2 diabetes in the age group of 18-44 years.

To assess the role of obesity as a risk factor for type 2 diabetes in adults aged between 18 and 44 years.

Primary Objective: To assess the role of obesity as a risk factor for type 2 diabetes in adults aged between 18 and 44 years.

Secondary Objective: To describe the other selected metabolic factor's independent contribution of risk for early-onset type 2 diabetes in the same population.

To study the association of socio demographic variables for early - onset type 2 diabetes.

To assess the relative frequency of cardiovascular risk factors among subjects with early onset diabetes

Materials and methods

Study design: case control study

Setting: Sree Gokulam Medical College & Research Foundation, Venjaramoodu, Thiruvananthapuram - a tertiary care teaching hospital. Sample size :calculated for un matched case control model as 107 cases and 214 controls. (α error = 0.05, β error = 0.20, odds ratio = 2, case: control = 1: 2).

Methods: Socio demographic characteristics, anthropometric and biochemical measurements were carried out using standard techniques. Physical activity was measured using Global Physical Activity Questionnaire.

Results: Frequency of overweight -obesity was significantly different for cases (94.39 %) and controls (74.42 %) OR = 6.407 (95 % CI 2.667-15.393). On Logistic regression, overweight and obesity showed strong association with early-onset diabetes OR =4.167(95%CI 1.427-12.166) p 0.009. In the multivariate analysis, the seven variables that turned out with significant association with earlyonset type 2 diabetes mellitus were - overweight-Obesity, low physical activity, history of prediabetes, family history of diabetes, HDL -C < 35 mg % & or TG > 250 mg %.& age above 32 years.

Conclusion: Overweight and obesity increases the risk of early - onset type 2 diabetes mellitus. Those with EOD have 4 times more odds of obesity in young population.

Overweight people have similar risk as obese people for early -onset type 2 diabetes. Risk for early - onset type 2 diabetes increases significantly from 32 years age.

60 % of early - onset type 2 diabetes patients had at least 2 other cardio vascular risk factors at diagnosis.

Keywords: Epidemiology

PP27

A comparative study of sputum conversion rate among diabetic and nondiabetic patients with newly diagnosed sputum smear positive pulmonary tuberculosis

S Nagaraj[1], DK V[2]
1-Dr. B. R. Ambedkar Medical College and Hospital, Banglore, India, 2-Dr. B. R. Ambedkar Medical College and Hospital, Banglore, India

Background and Aims

Introduction

Diabetes mellitus and hyperglycemia influence the immune status and thereby clinical manifestaions of Pulmonary TB is related to glycemic control. The complications of hyperglycemia may have an impact on sputum conversion rate and outcome of TB treatment.

Objectives

To study the impact of chronic hyperglycemia on sputum conversion rate.

Materials and methods: A cross sectional study of 50 sputum smear positve Pulmonary TB patients with DM and 50 sputum smear positve Pulmonary TB patients without DM in outpatient and inpatient department of General Medicne in Dr B R Ambedkar Hospital.

All analysis were conducted using SPSS version 23, and binary logistic regression analysis was used to determine the predictors of sputum smear nonconversion.

Results: Results showed that the following factors were associated with sputum smear positivity after 2 months of intensive TB treatment: Diabetes mellitus, Under weight BMI, Non adherence to TB treatment. Multivariable analysis identified diabetes mellitus (p=0.003, OR=4.01, 95% CI= 1.61 - 9.96) as being independently associated with the risk of persistent sputum smear positivity after 2 months of intensive treatment.

Conclusion: This study emphasizes the importance of diabetes screening and implementation of intensive diabetes control strategies among TB patients in achieving better treatment outcome.

Keywords: Pathogenic mechanisms / complications

PP28

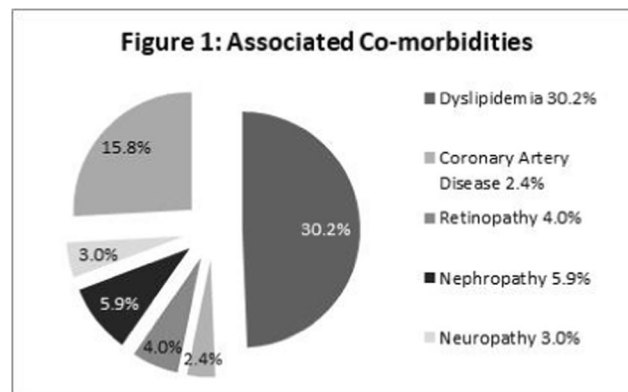# Prevalence of hypertension and co-morbidities in young diabetics in India

U Ayyagari[1], B TS[2], V S[3], D CS[4], J Gopal[5], A Behl[6], KG Seshadri[7]
1-Apollo Sugar Clinics, Chennai, India, 2- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 3- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 4- Apollo Sugar Clinics, Apollo Hospital, Bangalore, India, 5- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 6- Apollo Sugar Clinics, Apollo Hospital, Mysore, India, 7- Apollo Sugar Clinics, Chennai, India

Background and Aims: Prevalence of diabetes (DM) and associated co-morbidities are increasing in the young in India. The analysis was aimed to evaluate the comorbidities associated with young diabetes patients

Materials and methods: We undertook a retrospective data analysis for the prevalence of hypertension (HTN; newly diagnosed BP $\geq$140/90 or on medication for HTN) in young diabetics in Apollo Sugar Clinics across India (January 2016-June 2017; N=270000; verifiable lab results in n=13000)

Results: Data is presented as percent (%) or mean (median), 1315 diabetics (10.1%) were $\leq$40 years old. HTN was present in 635 (48.3%). Of these: T2DM 613 (96.5%), T1DM 17 (2.7%), GDM 5 (0.8%). Mean age 35.8 (37); male 68.4%, female 31.6%; BMI 27.9 (27); HbA1c 8.3% (8.0); FPG 175.2 (156) mg/dL; PPG 267.9 (245) mg/dl; Serum Creatinine 0.87 (0.8) mg/dL; Urine microalbumin 180.4 (15.3) mcg/mg; Lipid profile total cholesterol 194.8 (196.5) mg/dL, LDL 117.8 (121) mg/dL; HDL 39.8 (37) mg/dL; triglycerides 217.6 (221) mg/dL.

Graph/Table:

Figure 1: Associated Co-morbidities
- Dyslipidem ia 30.2%
- Coronary Artery Disease 2.4%
- Retinopathy 4.0%
- Nephropathy 5.9%
- Neuropathy 3.0%

Conclusion: Cardiovascular (CV) disease is a rising cause of mortality due to DM in India. Our data suggests 10% of our diabetics

are age ≤40, with diagnosed HTN in 48% of this population. Presence of CV risk factors (dyslipidemia, obesity, metabolic syndrome) in this poorly controlled group of hypertensive, young diabetics portends a tsunami of morbidity, healthcare expenditure, and mortality. Screening for diabetes and associated CV risk factors at a younger age with early, aggressive management is necessary in our ethnically high-risk community.

Keywords: Hypertension

PP29

Asymptomatic hypoglycemia detection by ambulatory glucose profile (AGP) in diabetic patients

S Gupta[1], K Gupta[2], S Gupta[3]
1-S. G. Diabetes Centre, Delhi, India, 2- SMS Medical College, Jaipur, India, 3- S. G. Diabetes Centre, Delhi, India

Background and Aims: Hypoglycemia is a major hurdle in achieving tight glycemic control in diabetic patients. Many patients have asymptomatic hypoglycemia often not detected timely by self monitoring of blood glucose (SMBG). Severe life threatening events can occur due to unidentified hypoglycemia. Newer technology like ambulatory glucose profile (AGP) provide long term glycemic assessment data and can potentially identify hypoglycemic events and trends. This study aims to evaluate the utility of AGP in detecting asymptomatic hypoglycemia in real life clinical situations.

Materials and methods: AGP data and clinical records of 100 patients attending diabetic clinic at Delhi were analysed retrospectively for hypoglycemic events (blood sugar values <70mg%). Patient reported hypoglycemic events were identified from diaries maintained during AGP monitoring and SMBG records. Correlation (both positive and negative) with the AGP data were analysed. Demographic details, presence of chronic kidney disease (CKD) with eGFR <60ml/min/1.73m2, number and types of oral hypoglycemic agents (OHA) and Insulin therapy were recorded and appropriate statistical analysis was done.

Results: Total of 100 patients were included in the study. The mean age was 54.46 years, with male 58% and female 42%. Mean duration of Diabetes was 13.98 years. The distribution of type of diabetes was T2DM 91%, T1DM 7% and GDM 2%.

CKD was present in 23% patients. 82% patients were on insulin while 61% patients were on both insulin and oral hypoglycemic agents (OHA) Hypoglycemia as identified by AGP was present in 81 % of patients. Number of hypoglycemic events during AGP monitoring were ranging between 1 to 25 events at an average of 6.01 events per patient for a period of 14 days of monitoring.

Total of 483 asymptomatic hypoglycemic events were identified by AGP This was statistically significant (P value 0.005) compared to patient identified hypoglycemic events. Patient reported hypoglycemic events were 118 of which 90.67% were positively correlated with the AGP data. Total of 7 events were uncorrelated between AGP and patient identified hypoglycemic events.

Conclusion: Asymptomatic hypoglycemic events are very common in diabetic patients. Ambulatory glucose profile (AGP) can identify asymptomatic hypoglycemia unreported by patients and may offer a very useful tool in detecting these events and can play an important role in better diabetes management.

Keywords: Hypoglycaemia

PP30

Clinical effectiveness and adherence of type 2 diabetes patients to glucagon-like peptide-1 receptor agonist dulaglutide: an evidence from real world settings of India

KG Seshadri[1], S Venkataraman[2], J Gopal[3], R Manikandan[4], N Narayanan[5], S Shah[6], S Tippisetty[7], VK Kolukula[8]
1-Apollo Sugar Clinics, Chennai, India, 2- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 3- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 4- Apollo Sugar Clinics, Apollo Hospital, Madurai, India, 5- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 6- Apollo Sugar Clinics, Mumbai, India, 7- Apollo Sugar Clincas, Hyderabad, India, 8- Apollo SUgar Clinics Limited, yderabad, India

Background and Aims: The use of GLP1 RA is increasing in clinical practice. Several guidelines position GLP1 RA as a first injectable in a subset of patients with T2DM. There is substantial randomized clinical trials evidence to support the use of GLP1 RA in clinical care. It will be important to substantiate this with real-world evidence of efficacy since cost and adherence to injectables are major issues to both adoption and persistence in clinical care. To assess efficacy and adherence to dulaglutide in a real-world setting

Materials and methods: A cross-sectional retrospective data analysis of T2DM patients initiated on GLP1 RA registered at Apollo Sugar Clinics, from March 2017 to December 2017. Apollo Sugar Clinics is a center of excellence for diabetes management with more than 35 clinics, 90 physicians with substantial EMR penetrance. Baseline demographics and clinical characteristics of patients were extracted from EMR and information on treatment adherence was obtained from patients through Quality of life questionnaire run over the phone. Descriptive statistics was used to present data and appropriate statistical tests was used to compare clinical outcomes between GLP1 RA groups.

Results: A total of 191 patients initiated on GLP 1 RA were selected. Mean age was 48.5 years, 54% were males and 46% were females, of these patients 40% were on dulaglutide. At baseline mean HbA1c was 8.5 (2.0) %, fasting blood glucose was 172.4 (70.5) mg/dL and prandial blood glucose was 252.6 (95.1) mg/dL, body mass index 35 (5.7) kg/m2, and weight 92.8 (16.5) kgs and 48.1% of patients were on concomitant insulin. At follow-up the average reduction in HbA1c was 1.0 (1.7) %, BMI was 1.2 (1.1) kg/m2 and weight 3.9 (3.2) kgs which were statistically significant, p <0.001. The mean change in BMI and weight in the dulaglutide group was higher when compared with other GLPs. Around 11% of patients were nonadherent to GLP1 RA; There was a numerically greater adherence with dulaglutide The most common reasons for discontinuation were side effects, hypoglycemia, weight gain and non-availability of drug.

Conclusion: Our analysis demonstrated a significant reduction in HbA1c when GLP1 RA is prescribed along with other anti-diabetes drugs. In the real world setting dulaglutide achieved weight reduction comparable to other GLP1 RAs.

Keywords: Incretin based therapies 43 Novel agents

PP31

Body composition analysis in type 2 diabetes mellitus and fibrocalculous pancreatic diabetes

A Biswas[1], S Channabasappa[2,3]
1-vydehi institute of medical sciences and research centre, bangalore, India, 2- Vydehi institute of medical sciences and research centre, Bangalore, India, 3-, India

Background and Aims: To investigate the relationship between body composition and metabolic parameters in patients with type 2 diabetes mellitus (T2DM) and fibrocalculous pancreatic diabetes (FCPD).

Materials and methods: We recruited a total of 120 patients with T2DM and 40 patients with FCPD between 25 to 75 years of age. Anthropometric data including height and weight were measured in all the subjects. Body composition was analysed using Maltron body composition analyzer based on the principle of bioelectrical impedance. A fasting blood sample was collected for the estimation of fasting plasma glucose (FPG), postprandial plasma glucose (PPG), glycated haemoglobin (HbA1c) and fasting lipid profile.

Results: The mean duration of diabetes was 8.01± 5.92 years for T2DM and 5.01± 7.06 years for FCPD respectively. The mean fasting plasma glucose (FPG), glycated haemoglobin (HbA1c) were 188.08±81.87 mg/dl, 8.67±2.37% and 213.90 ±86.33 mg/dl, 10.06± 3.07% for T2DM and FCPD respectively. Fat mass (FM), muscle mass (MM) and protein mass (PM) were significantly lower in FCPD as compared to T2DM. A significant positive correlation was observed between FM, MM and PM with body mass index (BMI) in T2DM patients. Fat free mass (FFM) negatively correlated with BMI in both T2 DM and FCPD. No significant correlation was observed between FM, FFM with metabolic parameters like FPG, HbA1c and lipid profile.

Conclusion: Fat mass was significantly lower in FCPD patients due to malabsorption. No significant correlation was observed between FM and FFM with metabolic parameters like FPG, HbA1c and lipid parameters. Malnutrition in FCPD may contribute to beta cell dysfunction and explain the higher HbA1c observed in them.

Keywords: Gastro-entero pancreatic factors; Pathogenic mechanisms / complications

PP32

"Ta-ta, bye-bye insulin/diabetes", ketosis prone diabetes - a clinically neglected entity

W Swaraj
Anugraha Diabetes & Endocrinology Center, KALABURGI, India

Background and Aims: One of the dreaded acute complication of diabetes is diabetic ketoacidosis (DKA). DKA has long been considered a key clinical feature of type 1 diabetes, an autoimmune disorder characterised by severe and irreversible insulin defeciency. In recent years, an increasing number of ketoacidosis cases are presenting without any precipitating factors in children, adolescents and adults with type 2 diabetes. Most of them are usually obese and have a strong family history of Diabetes and a low prevalence of autoimmune markers.

Materials and methods: The present case study is a descriptive and observational case series of six unprovoked cases of DKA. They were managed along the standard protocol of DKA management. They initially required a very high dose of insulin (1.8 - 2.4 units/kg) and over a period of three to six months were able to stop insulin and maintain normoglycemia only with metformin.

Results: We report six unprovoked cases of DKA, which followed a set pattern of very high insulin requirement at diagnosis and on followup, the insulin requirement progressively declined and all of the cases were managed only with metformin over a period of three to six months. None of the cases had any target organ damage at diagnosis. All of the cases had normal liver and renal functions. Autoantibodies were negative in all but one case.

Conclusion: Ketosis Prone Diabetes is often under recognised and under reported of all types of Diabetes. The recognition is of utmost

importance as the approach and treatment vary widely from the conventional type of diabetes. Proper followup, especially in unprovoked cases of DKA with obese phenotype, will uncover this rare entity of KPD where insulin can be stopped and patient may have a remission of diabetes.

Keywords: Prediction of type 2 diabetes; Insulin therapy; Other complications

PP33

HbA1c a major predictor of cardiovascular complication

T Kumar
Rohilkhand Medical College And Hospital, Bareilly, India

Background and Aims: To find the relationship between HbA1c levels with mortality, morbidity, and severity in patients with ACS.

Materials and methods: Prospective observational study was undertaken in Rohilkhand Medical College and Hospital, Bareilly including 100 patients in the medical wards from 1st June 2017 to 31st may 2018. Detailed clinical examination, routine investigations including HbA1c were done. The data was expressed as means+SEM and was statistically analyzed.

Results: Out of 100 patients, 58 were non-diabetic, 27 were diabetic and 15 had impaired gluse intolerance.50 patients had dyslipidemia, of which 70% of patients with diabetes had dyslipidemia where as 50% of impaired glucose tolerance and 41% of non-diabetic patients had dyslipidimia. Dyslipidemia was common in diabetic patients as compared to non-diabetics. 27 patients out of 100 patients had complications of which 12 were non-diabetics, 11 were diabetics while 4 had impaired glucose tolerance. The patients with complication had higher mean HbA1c level. (7.14 ±1.88 in patients with complications as compared 5.56 ± 1.30 in patients without complications) In Coronary Artery Angiography (CAG), multivessel disease involvement was significantly more in diabetics as compared to non-diabetic. (the mean HbA1c was found to be significantly more in patients with multivessel disease compared to those without multivessel disease)

Conclusion: ACS can bethe initial presentation of DM i.e patients of DM can have macrovascular complications of diabetes without having the usual symptoms of DM and can directly present with them lke ACS. HbA1c may be a useful indicator for Coronary Artery Disease (CAD) risk evaluation. HbA1c should be used as measure to label a patient as diabetic in patients of ACS over blood sugar levels. Patients with DM when compared to non-diabetics have increased morbidity and severity after an ACS.

Keywords: Cardiac complications

PP34

A study to assess clinical profile of Indian type 2 diabetes mellitus patients treated with teneligliptin

R DHEDIYA[1], M Chadha[2], G Saxena[3], S Naik[4]
1-EMCURE, PUNE, India, 2- Hope and Care Cente, Vashi, Navi Mumbai, India, 3- EMCURE, Pune, India, 4- EMCURE, Pune, India

Background and Aims: Teneligliptin is a DPP-4 inhibitor with unique chemical structure. Efficacy and safety of Teneligliptin is well established in the patients with type 2 diabetes mellitus (T2DM) in different

randomized controlled trials. However, limited real-world data is available for Teneligliptin pertaining to Indian T2DM patient profile such as demographics, duration of disease, currently prescribed anti-hyperglycemic drugs, initiation of Teneligliptin as monotherapy or as an add on therapy.

Materials and methods: A cross-sectional, multicenter, non-interventional study was conducted to understand the demographics and clinical profile of Indian T2DM patients (n=5019) who were prescribed Teneligliptin.

Results: Majority of patients were male (60.7%) with family history of T2DM present in 43.5 % of cases. Age at onset of T2DM was 47.6 ± 15.8 years. Among the T2DM patients, 36.2 % of patients were newly diagnosed and more than half of them (54.7 %) were uncontrolled with current anti-hyperglycemic drugs.

Mean HbA1c level among these patients was 8.09 ± 1.3 %. Mean fasting and postprandial blood glucose levels were 170.2 ± 46.9 mg/dl and 255.3 ± 69.3 mg/dl respectively.

Teneligliptin was prescribed as monotherapy in 43.1% of patients while as dual and triple therapy in 47.1%and 7.4% respectively. Among the patients on current anti-hyperglycemic treatment, most commonly prescribed drugs along with Teneligliptin were metformin (45%) followed by glimepiride (11%) and voglibose (3.42%).

Conclusion: Teneligliptin in Indian setting is preferred as combination with metformin and sulfonylurea (mostly glimepiride). Teneligliptin, prescribed as combination with other low cost oral antidiabetic drugs hold the promising role in the treatment of Indian T2DM patients.

Keywords: Oral therapies: metformin, sensitizers and other non-secretagogues

PP35

Post marketing surveillance study on hydroxychloroquine 400 mg in type 2 diabetes patients uncontrolled on metformin and sulfonylurea combination

M Agarwal

Medilink Hospital Research Centre, Ahmedabad, India

Background and Aims: Chronic inflammation plays a central role in pathogenesis and progression of type 2 diabetes (T2D) and its complications. The "Asian Indian phenotype" refers to a peculiar constellation of abnormalities, whereby for any given level of BMI, they tend to have higher total body fat, visceral fat, insulin resistance and prevalence of T2D compared to white Caucasians. Prevalence of CV mortality is also high in South Asians and is rising rapidly with chronic inflammation playing central role. Entry of several new anti- diabetic drugs like DPP IV inhibitors, SGLT2 inhibitors, GLP1 agonists, and insulin analogues; treatment goal of HbA1C <7% is not achieved in >30% patients in most settings. Most new agents are costly and have either no effects or modest effects on insulin resistance and CV outcomes. Hence, safe, effective, and affordable options are needed.

Considering the role of chronic inflammation, there is a need to explore potential of anti-inflammatory agents in prevention and treatment of diabetes and its complications. Hydroxychloroquine is the first antiinflammatory agent approved in India for management of T2D. We conducted a real-life surveillance study to assess safety and efficacy of hydroxychloroquine 400 mg in T2D patients.

Materials and methods: This was a 24-week open-label surveillance study. T2D patients receiving optimum doses of metformin and

sulfonylurea having HbA1c>7.5% were enrolled in study. Change in glycemic parameters (HbA1c, FBG, PPG), lipid profile and inflammatory markers (hsCRP, WBC, ESR) was assessed from baseline at Week 12 and Week 24. Patients were divided into 2 groups based at baseline based on hsCRP ($\leq$3 and >3 mg/l).

Results: Of the 100 patients enrolled, 53% females and 54% males had hsCRP>3. Both the groups were comparable at baseline with respect to demography, glycemic and lipid parameters. At Week 12 and Week 24, significant reduction was observed in glycemic parameters, lipid profile and inflammatory markers. This reduction (except in hsCRP) was not significantly different between treatment groups. Hydroxychloroquine was generally safe and well tolerated. No incidence of retinopathy or any other AE was observed.

Graph/Table:

Table Change in Glycemic Parameters

Parameter	Outcome	hsCRP = 3 (n = 47)	hsCRP > 3 (n = 53)	Total (n= 100)	P value
HbA1c (%)	Baseline[a]	8.74 ± 0.88	9.09 ± 1.01	8.93 ± 0.96	0.064
	Week 12[b]	8.03 ± 0.64 (-0.71 ± 0.51)	8.36 ± 0.71 (-0.73 ± 0.47)	8.20 ± 0.69 (-0.72 ± 0.49)	0.016
	Week 24[b]	7.64 ± 0.62 (-1.10 ± 0.51)	7.91 ± 0.71 (-1.21 ± 0.52)	7.78 ± 0.68 (-1.16 ± 0.52)	0.042
FBG (mg/dL)	Baseline[a]	157.47 ± 25.76	164.34 ± 26.61	161.11 ± 26.31	0.194
	Week 12[b]	129.21 ± 19.72 (-28.26 ± 14.22)	131.74 ± 18.14 (-32.60 ± 16.80)	130.55 ± 18.85 (-30.56 ± 15.71)	0.507
	Week 24[b]	114.49 ± 14.00 (-42.98 ± 17.56)	116.42 ± 12.70 (-48.92 ± 21.94)	115.51 ± 13.30 (-46.10 ± 20.10)	0.087
PPG (mg/dL)	Baseline[a]	251.28 ± 53.92	251.89 ± 48.94	251.60 ± 51.08	0.953
	Week 12[b]	189.30 ± 27.75 (-61.98 ± 37.88)	195.34 ± 33.20 (-56.55 ± 30.22)	192.50 ± 30.76 (-59.10 ± 33.97)	0.329
	Week 24[b]	164.06 ± 20.59 (-87.21 ± 44.06)	162.13 ± 24.11 (-89.98 ± 41.88)	163.05 ± 22.41 (-88.67 ± 42.73)	0.671

- a indicates mean ± SD compared using two sample t test.
- b indicates mean ± SD (Mean change ± SD). Mean ± SD compared using two sample t test.

Conclusion: Hydroxychloroquine, considered as the safest DMARD, is used in RA and lupus. It has pleiotropic benefits such as glucose-lowering, lipid-lowering, anti-platelet and anti-thrombotic effects. Unlike other anti-diabetic drugs, hydroxychloroquine improves beta-cell function. It has also shown CV benefits in RA and lupus patients.

Keywords: Insulin sensitivity and resistance; Inflammation in type 2 diabetes; Dyslipidaemia, lipoproteins

PP36

"Predicting peripheral arterial disease in type 2 diabetic patients using framingham risk score and UKPDS risk score"

S H.K

Dr.B.R.Ambedkar Medical College, Bangalore, India

Background and Aims: Type 2 diabetes mellitus is expanding in pandemic proportions in India. Patients with diabetes mellitus are prone to develop a range of systemic complications including heart diseases, stroke, renal failure, blindness and amputations. Diabetes mellitus poses 2 to 4 times higher risk for developing cardiovascular disease as compared to general population. Peripheral arterial disease, characterised by lower extremity arterial atherosclerosis, is a significant complication of Type 2 diabetes mellitus patients. Diabetes mellitus worsens the prognosis of patients with PAD.

To compare the Framingham Risk Score and United Kingdom Prospective Diabetes Study risk engine for predicting peripheral arterial disease in Indian Type 2 diabetic patients.

Materials and methods

INCLUSION CRITERIA:

Adult patients with Type 2 diabetes mellitus.

Duration of diabetes - 10 years or more.

Patients willing to participate in the study.

EXCLUSION CRITERIA:

Patients with prior history of: Cardiovascular disease

Stroke

Ankle branchial index : After at least 5-minute rest, the ABI was calculated clinically in the supine position, with cuffs around both the arms and ankles. If any of the ABIs were < 0.9, the patient was defined as having PAD.

FRS

Sex, age, total cholesterol or LDL, HDL, systolic blood pressure, treated for hypertension, diabetes mellitus, smoking.

UKPDS

Sex, Age at diagnosis of diabetes mellitus, total cholesterol, HDL, systolic blood pressure, diabetes mellitus duration, smoking, glycated haemoglobin, atrial fibrillation, ethnicity.

Results: The mean for FRS and UKPDS in subjects with ABI < 0.9 was 37.48 ± 18.036 and 30.25 ± 21.261 respectively with p values of 0.188 and 0.960 which is statistically insignificant.

Graph/Table:

ANKLE BRACHIAL INDEX

15: Comparison of ABI against each of the scoring systems

	ABI	N	Mean	SD	Min.	Max.	P value
FRS	<0.9	41	37.48	18.036	5.5	77.9	0.188
	>=0.9	59	32.35	19.721	8.2	81.9	
UKPDS	<0.9	41	30.25	21.261	2.8	75.1	0.960
	>=0.9	59	30.01	25.455	4.8	90.3	

Conclusion: The two risk scores did not predict the presence of peripheral arterial disease in our study.

Keywords: Macrovascular disease

PP37

Efficacy of comprehensive diabetes care (CDC) management program in elderly male patients of type II diabetes mellitus: a retrospective study

R Mandole

Madhavbaug, Thane, India

Background and Aims: Globally, Diabetes mellitus (DM) prevalence has created menace, being major culprit of increased mortality and morbidity and health care expenditures. India is 2nd country with maximum number of diabetic patients, with an estimated prevalence of around 10%. Comprehensive Diabetes Care (CDC) is a combination of Panchakarma and diet management. This study was conducted to evaluate the effect of CDC on glycosylated haemoglobin (HbA1c), body mass index (BMI), body weight, abdominal girth and dependency on conventional therapy in DM Patients.

Materials and methods: This retrospective study was conducted in from July 2017 to January 2018, wherein the data of elderly male type 2 DM patients (HbA1c >6.5%) who attended Madhavbaug clinics in Maharashtra, India were identified. Data of patients who were administered CDC (60-75 minutes) with minimum 6 sittings over 90 days (± 15 days) were considered. Variables were compared between day 1 and day 90 of CDC.

Results: Out of 48 enrolled elderly male patients, 34 were included for analysis. CDC showed significant improvement in HbA1c from 8.27 ± 0.96 to 7.1 ± 1.30; p=0.0001), BMI from 27.65 ± 3.20 to 25.91 ± 3.29, p< 0.0001), weight from 73.75 ± 10.76 to 69.46 ± 10.39, p<0.0001). Abdominal girth (from 100.0 ± 9.08 to 95.36 ± 9.10; p<0.0001), also showed significant reduction. Dependency on concomitant medicines was reduced, with number of patients on no concomitant medicines increasing from 3% to 15%.

Conclusion: CDC and allopathy both are found to be efficacious; but CDC acts dually, by reducing HbA1c as well as reducing dependency on allopathic medications.

Keywords: Nutrition and diet

PP38

Adherence and swallowing experience with a modified, smallersized formulation of glimepiride and metformin (SR) in Indian patients with type-2 diabetes mellitus

S Pathak[1], S Godbole[2], KN Modi[3]

1-Vijayratha Diabetes Diagnostic & Treatment Centre, Ahmedabad, Ahmedabad, India, 2- Sir Hurkisondas N Hospital, Mumbai, Mumbai, India, 3- Dr. Modi's Clinic, Hyderabad, Hyderabad, India

Background and Aims: Medication adherence is an important aspect for effective diabetes management and has been associated with improved glycemic control. Difficulty in swallowing tablets due to its size is often a major problem affecting patients' compliance. The objective of this study was to compare adherence, patientreported swallowing experience and satisfaction with smaller and oval shaped glimepiride-1mg/2mg and metformin-500mg/1000mg-sustained release tablets (Gluformin G1/Gluformin G2 SR; GM-new-SR) in Indian patients with type 2 diabetes mellitus (T2DM).

Materials and methods: This first analysis report comprises of data from 450 patients out of 1500 planned enrollments. In this post-marketing, observational study, T2DM patients who were on a stable dose of conventional combination of metformin+glimepiride tablet (GM-conventional) for at least 1 month and were prescribed with smaller, oval shaped GM-new-SR since a week based on physicians' discretion were recruited across 150 sites in India. Patients' adherence, swallowing experience, and satisfaction were assessed at baseline and month-3 by Adherence to Refills and Medication Scale (ARMS?12; adherent: ARMS?12 score=12; non?adherent: ARMS?12 score >12) and questionnaire based 5-point Likert scale, respectively. Safety was also assessed.

Results: About 447 (99.3%) out of 450 enrolled patients completed the study. At baseline, 413 patients (92.3%) reported non-adherence to GM-conventional (based on ARMS-12 score). However, at the end of 3 months, 328 [73.4%] patients reported adherence with small and oval shaped GM-new-SR tablets; with significant reduction in mean ARMS-12 score by 3 months (baseline: 16.7+4.29; month-3: 12.5+0.81; p<0.001). About 72.6% non-adherent patients (baseline) reported adherence at the end of 3 months. Majority of patients agreed that GM-new-SR was easy to swallow compared to GM-conventional, due to its size (87.6%) and shape (86.4%). Majority of patients also reported comfort (88%), better well-being (64.6%) and greater satisfaction (81.5%) with GM-new-SR tablets at the end of 3 months. Change from baseline to 3 months for glycemic indicators (HbA1c, FPG and PPG) was significant

in patients who shifted from non-adherence to adherence (p<0.001). GM-new-SR tablets were found to be well-tolerated.

Conclusion: Acceptability based on adherence, experience and satisfaction was better with smaller and oval shaped GM-new-SR tablets compared to GM-conventional tablet in Indian patients with T2DM. Sustained drugrelease along with its compactness in size and shape (oval) may facilitate easy swallowing without any discomfort, thereby impacting patient satisfaction and adherence. Considering the magnitude of the effect of declining treatment adherence on glycemic control, and the role of large size tablets in non- compliance, this study emphasizes on the need for novel formulations which could help in improving patient adherence, ultimately impacting the glycemic target.

Keywords: Oral therapies: metformin, sensitizers and other non- secretagogues; Health care delivery

PP39

Perspectives from training the care coordinators - a new cadre to support team-based diabetes and depression care: the independent study

BS B[1], P S[2], AR M[3], D Rao[4], L Chwastiak[5], N Tandon[6], SG R[7], AS R[8], R Shankar[9], R Sagar[10], MK Ali[11], M V[12]

1-Madras Diabetes Research Foundation (MDRF), CHENNAI, India, 2-MDRF, Chennai, India, 3-MDRF, CHENNAI, India, 4- University of Washington, Seattle, United States, 5- University of Washington, Seattle, United States, 6- All India Institute of Medical Sciences, New Delhi, India, 7-Endocrine and Diabetes Centre, Visakhapatnam, India, 8- DIACON Hospital, Diabetes Care and Research Center, Bangalore, India, 9- Fortis Malar Hospital, CHENNAI, India, 10- All India Institute of Medical Sciences, New Delhi, India, 11- Rollins School of Public Health, Emory University, Atlanta, United States, 12- MDRF, CHENNAI, India

Background and Aims: The INtegrating DEPrEssioN and Diabetes treatmENT (INDEPENDENT) study tests the sustained effect of a team based care model for comorbid diabetes and depression, in India. This model used task sharing to address the shortage of mental health professionals in India. The role of the Care Coordinator (CC) is one of the key components. The CC's were non-physician, health care professionals. In this study we describe the trainings received by the CC's.

Materials and methods: The intervention provided in this study was adapted from a clinical trial in the US, which provided collaborative care for comorbid diabetes and depression. Adaptations were based on a qualitative study, which obtained inputs from multiple stakeholders. Multidisciplinary teams from the participating sites - Delhi, Visakhapatnam and Bengaluru travelled to Chennai, for the initial training. Thereafter the CC's had regular webinars with a team from University of Washington (UW) consisting of a psychiatrist, a psychologist and a nurse, who had played pivotal roles in the TeamCARE study. During the annual investigator meetings, in-person refresher trainings were conducted for the CC's.

Results: During the study, 9 CC's were trained from 2014 to 2017. International and national faculty conducted the trainings. CC's were trained to administer the PHQ-9 along with behavior modification, problem solving, patient education and activation, to name a few. They also learnt to conduct systematic case reviews with the physician and psychiatrist, and to use the decision support-electronic health record (DS-EHR) system. The case reviews were to be completed in an hour's time and had to be comprehensive. Webinars were held every month by the team from UW. Case studies were presented and solutions were sought through peer discussions during these virtual interactions. A WhatsApp group was created as a support structure for CC's.

Conclusion: Given the paucity of mental health professionals in India, collaborative care and a team of trained CC's may help in care for co-morbid depression and diabetes and may help to fill the lacuna of mental health human resource scarcity.

Keywords: Health care delivery; Other complications

PP40

Association of cardiac autonomic dysfunction with glycemic status and disease duration in patients with T2DM

VC Deshmukh[1], DS Phadke[2]
1-Deshmukh Clinic & Research centre, Pune, India, 2- Smt Kashibai navale medical college and general hospital, Pune, Pune, India

Background and Aims: In T2DM patients, reduced heart rate variability (HRV) which denotes cardiac autonomic dysfunction and elevated HbA1c (>7%) are known risk factors for adverse cardiac events.[1,2] There are pointers that elevated blood glucose through its damaging effects on autonomic nerves affects the heart. Clinically however there is dearth of information on association of cardiac autonomic dysfunction with HbA1c levels and duration of diabetes.

Objectives: To explore the association of HbA1c and duration of diabetes with HRV indices in T2DM patients

Materials and methods: One hundred and twenty patients of type II diabetes mellitus between thirty five to seventy five years of age and of both genders were assessed. A thorough medical examination and relevant biochemical investigation including HbA1c was carried out. ECG sampled at1 KHz (1000 samples/sec) was recorded for five minutes in supine resting state for HRV analysis as per the HRV Task Force Standards.[3] Non parametric Mann-Whitney U test applied to compare HRV indices between controlled and uncontrolled (HbA1c>7%) diabetics

Results: Our results showed significant autonomic dysfunction in diabetic patients with disease duration of five years or more whose HbA1c >7% as reflected by reduction in overall variance SD of NN (Normal to normal) interval (p-value 0.04) and reduced low frequency (LF) and HF (high frequency) powers of HRV (p-value 0.01 and 0.05 respectively).

Conclusion: Uncontrolled glycemia with T2DM of more than five years duration is associated with significant cardiac autonomic dysfunction. Our results may have therapeutic implications in diagnosis of CAD and furthur cardiac prognosis in T2DM patients

Keywords: Neuropathy: autonomic, incl. erectile dysfunction; Cardiac complications

PP41

Change in glycemic excursions on continuous glucose monitoring system in patients with type-2 diabetes receiving voglibose as an add-on therapy

P Subramani[1], RA Mohan[2], K Selvam[3], S Jayvel[4], M Subramaniam[5], S Tariq[6], H Evangelin[7], V Mohan[8]
1-Madras Diabetes Research Foundation, 4, Conran Smith Road, Gopalapuram, Chennai 600 086, Tamil Nadu, India, Chennai, India, 2-Madras Diabetes Research Foundation, Chennai, Chennai, India, 3- Dr.

Mohan's Diabetes Specialities Centre (Dr MDSC), Chennai, India, 4- Dr. MDSC, Chennai, India, 5- Dr. MDSC, Chennai, India, 6- Dr. MDSC, Chennai, India, 7- Dr. MDSC, Chennai, India, 8- Dr. MDSC, Chennai, India

Background and Aims: Management of glycemic variability plays an important role in diabetes management. The aim was to determine daily glycemic excursions using FreestyleLibre Pro Flash Glucose Monitoring system in Indian patients with type-2 diabetes receiving voglibose as add-on therapy, who were on a stable dose of metformin+sulfonylurea.
Materials and methods: Patients with HbA1c concentration >7.0% (for ≥3 months prior screening), on a stable dose of metformin+sulfonylurea combination were enrolled in this prospective, multi-centric, open-label, single arm, interventional study. At screening (visit 1/day -14±2), Freestyle Libre Pro Sensor was initiated; HbA1c, lipid profile, fasting plasma glucose (FPG), and post-prandial plasma glucose (PPG) levels were assessed. Patients with ≥2 postprandial glucose excursions ?140mg/dl within 14-day period of using Freestyle Libre Pro were randomized to receive voglibose 0.2mg or 0.3mg tablet, two/three times daily during visit 2 (day 0±2). Freestyle Libre Pro Sensor was re-initiated during visit 2 and HbA1c, FPG, and PPG data was collected after 14 days (visit 3/day 14±2). After 12 weeks of treatment (visit 4/month 3 ±14 days), sensor was reinitiated and all the clinical/biochemical data were reassessed post 14 days (visit 5/visit 4 +14 days ±2 days). At follow-up phase (visit 6/month 6 ±14 days), all relevant clinical and biochemical data were collected again.
Results: Of 79 patients enrolled in Met+Sul+Vogl group (total=110), 73 (92%) completed the study. Significant decrease in glycemic excursions was noted at visit 3 (48.7±18.9; p<0.0389) and 5 (44.4±20.6; p<0.0276) compared to baseline (57.1±21.3). Significant increase in time spent in target glucose level at visit 3 (p<0.0001) and visit 5 (p=0.0003) compared with baseline was evident and commensurate reductions in time spent above target level (p<0.001). Significant change from baseline in day and night time mean glucose levels was evident at visit 3 (p=0.0125), but not at visit 5. Change from baseline in mean fasting glucose levels (at least 10-hour overnight fasting) was significant at visit 3 (p=0.0229), though not at visit 5. At visit 5, significant decrease in MAGE (p=0.0128) and HbA1c (p=0.0013) level of glucose was also evident compared to baseline. Change from baseline for FPG (p=0.0021) and PPG (p<0.05) was significant at both 3 and 6 months.
Conclusion: Voglibose reduces glycemic variability, thereby plays an effective role in type-2 diabetes management, especially in Indians. This study demonstrates the beneficial role of voglibose in decreasing glycemic excursions as observed on continuous glucose monitoring system.
Keywords: Oral therapies: secretagogues; Health care delivery

PP42

A comparative study of galvanic skin response machine with the subjective measure of stress among individuals with type 2 diabetes

V Ashok[1], P Subramani[2], AR Mohan[3], V Ulagamadesan[4], P Rajendra[5], D Mohan[6], M Viswanathan[7]
1-Madras Diabetes Research Foundation, Chennai, India, 2- Madras Diabetes Research Foundation, Chennai, India, 3- Madras Diabetes Research Foundation, Chennai, India, 4- Madras Diabetes Research Foundation, Chennai, India, 5- Madras Diabetes Research Foundation, Chennai, India, 6- Madras Diabetes Research Foundation, Chennai, India, 7- Madras Diabetes Research Foundation, Chennai, India

Background and Aims: The aim of the study is to validate the galvanic skin response machine and to assess its association with the subjective measure of stress using the 7 item scale from Depression Anxiety Stress Scales (DASS 21).
Materials and methods: A total of 100 participants with type 2 diabetes in the age group of 25 and 65 years attending a tertiary care clinic were selected randomly, for assessment of stress levels by means of a structured questionnaire (Stress Scale, DASS 21), as well as a GSR machine. The GSR machine which is a physiological measure of stress, was validated, (sample size - 30), and correlated with the stress scale from DASS -21, which is a subjective measure. Socio demographic characteristics, anthropometry, blood pressure measurements and biochemical parameters such as fasting plasma glucose as well as HbA1c were collected in all participants.
Results: The mean age of the clinic population was 49±8 years and 64 % were male. The GSR machine was validated on normative data; the mean (standard deviation) was 788 (± 397). The prevalence of stress was 48% (subjective) and 55 % (GSR). The area under the Receiver Operating characteristic (ROC) curve for identifying stress by GSR using DASS 21 as the gold standard was 0.63 (p<0.02). The regression coefficient between GSR and DASS 21 was -16.5, which shows an inverse relationship between the two measures.
Conclusion: The GSR machine and DASS 21 (stress component) provide quantitative as well as qualitative measures of stress, respectively. Measures of stress should integrate self reports with objective measures of stress, as stress is a multidimensional concept, and will help in devising techniques to reduce physiological arousal, as well as effective coping strategies.
Keywords: Psychological aspects

PP43

Effect of comprehensive diabetes care on pre-obese diabetic patients: a retrospective study

P Ghadigaonkar
Madhavbaug, Thane, India

Background and Aims: Diabetes mellitus (DM) is a known threat to healthcare worldwide, with increasing prevalence despite multiple treatment options. Comprehensive Diabetes Care (CDC), a combination of herbal treatment and allied therapies, has been advocated by ayurvedic physicians to treat DM. This retrospective study was conducted to evaluate the effect of CDC in pre-obese DM patients.
Materials and methods: This was a retrospective study; Data of pre-obese DM patients who had received 6 CDC sittings over 90 days in the out-patient departments (OPDs) at Madhavbaug clinics was identified between April 2017 to July 2017. Data of only those patients were included who had received the scheduled 6 sitting of CDC in a span of 90 days. In this study, the variables [HbA1c, body weight, body mass index (BMI), dependency on medications] were assessed on day 1 and day 90 of CDC.
Results: Out of the 23 patients, majority (15) were males. The mean HbA1c measured at day 90 was significantly lesser than that on day 1 (7.12±1.07 vs 8.53±0.89, p<0.001). The mean weight of the patients was reduced significantly on day 90 when compared to day 1. (62.40±7.82 vs 67.17±7.44, p<0.001). The mean BMI was significantly reduced on day 90 when compared to the baseline (24.75±2.18 vs 27.0±1.41, p<0.001). The abdominal girth was significantly reduced on day 90 compared to baseline (87.69±7.89 vs 93.05±7.90, p<0.001). Dependency on concomitant medicines was also reduced.
Conclusion: CDC treatment showed significant improvement in HbA1c and other metabolic parameters in pre-obese diabetic patients and decreased their dependency on allopathic medications.
Keywords: Nutrition and diet

PP44

Prevalence of hyperuricemia in Indian subjects attending hyperuricemia screening camps - a retrospective study

H Patel [1], D Shah [2]
1-Zydus hospitals, Thaltej, India, 2- Jaslok hospitals, Mumbai, India

Background and Aims: Prevalence of type-2 diabetes mellitus (T2DM) and hypertension (HTN) has been rapidly rising in India over the past few decades. Hyperuricemia is another condition which has drawn increasing attention in recent decades because of its high prevalence in the global context. Emerging data indicate an association between hyperuricemia and T2DM and/or HTN. However, about two-thirds of hyperuricemics remain asymptomatic, without any signs and symptoms of urate crystal deposition/gout. Hence screening for hyperuricemia may play a significant role in early detection, prevention, and management of complications associated with T2DM and HTN. Considering the paucity of data on the burden of hyperuricemia in Indian context, this study was conducted to determine the overall prevalence of hyperuricemia in India, and in patients with comorbidities such as T2DM and/or HTN.
Materials and methods: Retrospective analysis of patients who were screened for hyperuricemia in health clinics between June 2017 and May 2018 was carried out. Data regarding demographics, comorbidities (history and duration of T2DM and HTN) and uric acid levels (easy touch uric acid monitoring system) were recorded during the camps.
Results: Data from 150,000 screening camps was analyzed (N=1,97,097 patients [T2DM: 38,799; HTN: 27,742; T2DM+HTN: 42,585]). Mean age of the study population was 48.43 ± 13.38 years. Majority of the subjects were in 30-50 years' age group (51.04%), followed by 41.70% in >50 years' age group. Out of 1,97,097 subjects screened, 24.66% were found to have hyperuricemia (uric acid >7mg/dl). Prevalence of hyperuricemia was higher in HTN+ T2DM (29.85%) patients compared to patients with HTN (17.22%) and T2DM (22.82%). Prevalence of hyperuricemia was higher among patients >50 years (31.03%) followed by patients in 31-50 years' group (20.87%), denoting a trend towards increasing prevalence with age (p<0.0001). A trend towards increase in prevalence of hyperuricemia with increased duration of diseases like HTN and diabetes was also evident (p< 0.0001).
Conclusion: High prevalence of hyperuricemia was observed in T2DM and HTN and in patients with both co-morbidities. Age-wise analysis revealed an increasing trend of hyperuricemia with age. Further, the prevalence of hyperuricemia also increased with duration of T2DM and HTN. This first of its kind, large scale screening data would shed light on the overall burden of hyperuricemia in India, and in the presence of chronic metabolic disorders such as T2DM and HTN.
Keywords: Epidemiology

PP45

Foot care practices followed among diabetologists in India. A study by diabetic foot research India - DFRI

T Peter[1], C John[2], V Viswanathan[3]
1-Prof.m.viswanathan Diabetes Research Centre, Chennai, India, 2- Prof.M.Viswanathan Diabetes Research Centre, Chennai, India, 3- Prof.M.Viswanathan Diabetes Research Centre, Chennai, India

Background and Aims: The burden of diabetic foot complications poses a heavy challenge both to the patient and the physician, especially in developing countries like India. The most common causes of foot problems in people with diabetes are socio-cultural risk factors like barefoot walking, using improper footwear, and poor knowledge of foot care practices and lack of adequate and timely access to podiatry services. Hence the current ongoing study aims at determining the foot care practices followed by diabetologists from various parts of the country.
Materials and methods: A Cross-sectional study was conducted among the Diabetologists across India. A total of 89 Diabetologists, were participated in the study. A list of Diabetologists across India was prepared by the DFRI team and sent a personal invitation along with the study questionnaire to them to participate. The interested Diabetologists participated in the study by filling the questionnaire by an online process by registering in the website link provided. The questionnaire consisted of data regarding foot care practices, examination of the foot, infection and treatment procedures.
Results: Among 89 participants, 47(52.8%) of the respondents examined the patients who had past history of foot infection, once in 3 months. Only 9(10.1%) of the respondents examined the foot at every visit. Of the 89 respondents, 63(70.8%) were using tuning fork 128HZ to diagnose high risk foot. 74(83.1%) and 65(73%) were doing callus and wound debridement. 44(49.4%) of the respondents refer the patients having foot infection to general surgeon, 25(28.1%) were referring to podiatric surgeon and 29(32.6%) were treating the patients by themselves. About 54(60.7%) respondents were referring the patients to vascular surgeon when there was a history of claudication and ABI < 0.8. Majority of respondents i.e. 65(73%) of them were using only TCC as off-loading methods for patients with foot ulcer and only 4(4.5%) of them suggests modified foot wear. About 55(61.8%) respondents refer patients to qualified orthotist and prosthetist for offloading. Regretting to the usage of antibiotic in OP setting, 55(61.8%) respondents use empiric antibiotics. For the wound Healing, 37(41.6%) respondents use growth factor and 67(75.3%) were using the negative pressure wound therapy.
Conclusion: The interim analysis of this study revealed that there was lack of knowledge and awareness among diabetologists about the foot care practices, examination of the foot, infection and treatment procedures. Thus, it is quite obvious that if adequate preventive strategies are taken, it is possible to reduce the burden of foot ulcers and amputations in people with diabetes.
Keywords: Diabetic foot and skin disorders

PP46

Reasons for discontinuation of insulin therapy: results from the international diabetes management practices study (IDMPS)

P Aschner[1], JJ Gagliardino[2], H Ilkova[3], F Lavalle[4], A Ramachandran[5], G Kaddaha[6], JC Mbanya[7], M Shestakova[8], J Chantelot[9], JC Chan[10]
1-Javeriana University School of Medicine, Bogota, Colombia, 2- CENEXA, Center of Experimental and Applied Endocrinology, La Plata, Argentina, 3- Istanbul University, Istanbul, Turkey, 4- Facultad de Medicina de la Universidad Autónoma de Nuevo León, Mexico, Mexico, 5- India Diabetes Research Foundation, Chennai, India, 6- Dubai Health Authority, Dubai, United Arab Emirates, 7- University of Yaounde, Yaounde, Cameroon, 8- I.M. Sechenov First Moscow State Medical University, Moscow, Russia, 9- Sanofi, Paris, France, 10- The Chinese University of Hong Kong, Hong Kong SAR, China

Background and Aims: Adherence to insulin therapy is often suboptimal. Understanding patients' perspectives on drug adherence is essential for identification of barriers to therapy.

Materials and methods: The IDMPS is a global observational survey on the management of people with type 1 (T1D) and type 2 (T2D) diabetes in the developing world. In 2016-2017, participants were enrolled from 24 countries in the Middle East, South Asia, Eurasia, and Africa.

Results: In people with T1D (N=2000), 14% (273/1955) discontinued insulin for 1 month (median), without physician indication. The main reasons given were impact on social life, cost, fear of hypoglycemia, and lack of support (Table). In people with T2D (N=2595), insulin discontinuation for ≥2 months (median), without physician indication, was reported by 13.4% and 13.8% of people treated with insulin alone (n=642) or with an oral antihyperglycemic drug + insulin (n=1895), respectively. The most common reasons for discontinuation included impact on social life, fear of hypoglycemia, lack of support, and cost. The pattern of insulin [eg, a definitive or temporary stop, or missed injection(s)] was not documented.

Graph/Table:

Table 1: Reasons for insulin discontinuation

Reasons for discontinuation, %	T1D n=273	T2D Insulin alone n=86	T2D OGLD + insulin n=261
Lack of efficacy	3.3	5.8	9.2
Fear of hypoglycemia	26.7	24.4	29.1
Occurrence of side effects	8.4	12.8	10.3
Impact on social life	41.0	29.1	31.0
Lack of experience in insulin dosing	20.9	30.2	24.1
Lack of experience in insulin administration	9.5	16.3	14.2
Cost of medicine and strips	34.4	22.1	25.3
Weight gain	8.8	4.7	10.3
Lack of support	26.4	29.1	24.9
Occurrence of hypoglycemia	14.7	15.1	11.9

OGLD, oral glucose-lowering drug.

Conclusion: People with T1D and T2D share similar concerns regarding therapy. This calls for a multi-pronged strategy including patient education and access to therapy to improve treatment adherence and optimize outcomes.

Keywords: Insulin therapy

Supported by: Sanofi

Note: Data first presented at the 78th Scientific Sessions of American Diabetes Association, June 22-26, 2018, Orlando, USA.

PP47

Diabetic lung - another victim of the silent killer !!

S Sangli[1], T Mukherjee[2]
1-Kempegowda Institute Of Medical Sciences, Bangalore, India, 2-Kempegowda Institute Of Medical Sciences, Bangalore, India

Background and Aims: Diabetes mellitus is a systemic disease causing various complications attributed to physiological, biochemical and structural changes in different organs. Sustained hyperglycaemia leads to non-enzymatic glycosylation of proteins such as collagen, elastin etc leading to thickening of basement membrane as well as result in oxidative stress causing diabetic lung injury. The alveolar capillary network in lung is a large microvascular unit and may be affected by the above mechanisms. However, because of its large reserve, substantial loss of microvascular bed can be tolerated without developing dyspnoea. As a result, pulmonary microangiopathy may be underrecognized clinically. Hence, we hypothesized that alveolar gas exchange, measured in the form of diffusing capacity of lung for carbon monoxide (DLCO), and elastic properties of lung reflected by lung volumes, may be affected in diabetic patients. We also determined their correlation with HbA1c and duration of the disease

Materials and methods: This was case control study involving 50 type II diabetic patients and 50 age and sex matched non-diabetic healthy subjects. Smokers and patients with current or previous chronic cardiorespiratory illness were excluded from the study. The glycated haemoglobin (HbA1c) levels, Diffusing capacity of lung for carbon monoxide (DLCO), pulmonary function parameters such as Forced Vital Capacity (FVC), Forced Expiratory Volume in 1 second (FEV1) and Peak Expiratory Flow Rate (PEFR) were measured for all the participants using a single breath Carbon Monoxide (CO) diffusion test and computerised spirometer

Results: We observed that all pulmonary function parameters like FVC, FEV1 and PEFR except for FEV1/FVC were reduced in diabetic patients, showing a restrictive pattern. DLCO was also significantly low in diabetic patients compared to their matched controls. On analysing we found significant correlation between reduction in DLCO and duration of diabetes. Our study also demonstrated that patients with poor glycaemic control had reduced alveolar diffusion compared to the well-controlled ones

Conclusion: Lungs are indeed affected in diabetes. Alveolar gas exchange and pulmonary function parameters are significantly reduced in patients with type 2 diabetes mellitus. These are more pronounced with longer duration of illness and poorer glycemic control. These impaired respiratory functions may give way for the development of pulmonary complications. Hence spirometry may be used as a screening tool as an early measure for prevention.

Keywords: Endothelium

PP48

Predicting the need of liver biopsy in a patient of NAFLD with diabetes, by using non invasive screening tools from Rohilkhand region, India

AK Dwivedi[1], D Mehra[2]
1-Rohilkhand medical college and hospital, bareilly, India, 2- Rohilkhand medical college and hospital bareilly, Bareilly, India

Keywords: Non-alcoholic fatty liver disease (NAFLD)

Background and Aims: The aim of study was to predict the high risk and need of liver biopsy in a patient of NAFLD with diabetes by using non invasive screening tools i.e. NAFLD fibrosis score (NFS), AST and ALT ratio (AAR).

Materials and methods: This is a single centre study carried out in known diabetic patients attending the medicine out patient department and diagnosed with fatty liver on ultrasound.

Inclusion criteria:- Eligible patients were between 35 to 60 year of age and known diabetic and who were diagnosed as fatty liver on ultrasound and give a written consent for liver biopsy.

Exclusion criteria :- history of alcohol intake, HBsAg reactive, presence of antibody against HCV, HIV reactive, active hepatitis, biliary obstruction, history of cirrhosis, tuberculosis, malabsorption, chronic drug use, pregnancy, cardiorespiratory comorbidity.

Results: 98 patients of NAFLD with diabetes underwent for liver biopsy and it is seen that the value of AAR and NFS significantly increases with severity of liver fibrosis.

Conclusion: NFS and AAR are simple non invasive marker that can be utilized as a screening tools in a patient of NAFLD with diabetes who need liver biopsy.

Keywords:- NAFLD, liver biopsy, liver fibrosis, AAR, NFS.

PP49

Altered TNF-α secretion in diabetic subjects infected with latent tuberculosis (DM-LTB nexus)

A Bobhate[1], V Aravindhan[2], V Viswanathan[3]
1-Prof. M. Viswanathan Diabetes Research Centre and M.V. Hospital for Diabetes, CHENNAI, India, 2- Dept of Genetics, Dr ALM PG IBMS, University of Madras, Chennai, India, 3- Prof M. Viswanathan Diabetic Research Centre, Chennai, India

Background and Aims: Diabetic patients are at an increased risk of tuberculosis (TB). While few studies have looked at the role of cytokines in diabetic patients suffering from active tuberculosis, the role of cytokines in latent TB (LTB) reactivation among diabetic subjects is not known. TNF-α is a major cytokine which confers protection against latent TB activation.

Objective: Both serum of TNF-α levels and TB antigens (ESAT-6/CFP-10/TB-7.7) induced TNF-α secretion in whole blood cultures was quantified in the study subjects

Materials and methods: Both normal glucose tolerant controls (NGT) and diabetic (DM) subjects were stratified into LTB+ or LTBbased on Quantiferon TB-GOLD assay. Four study groups where included: NGT-LTB[+]; NGT-LTB[-]; DM- LTB[+] and DM-LTB[-]. The levels of TNF-α in the serum and whole blood culture supernatant was estimated by ELISA.

Results: Significantly altered levels of serum TNF-α was seen among diabetic subjects infected with LTB.

Similarly, TNF-α secretion following in vitro stimulation with TB antigens was also compromised among diabetic subjects with LTBI.

Conclusion: The altered levels of serum TNF-α and impaired secretion of TNF-α following TB antigen stimulation in diabetic subjects infected with LTB might explain their increased susceptibility to infection.

Keywords: Epidemiology; Clinical immunology; Inflammation in type 2 diabetes

PP50

Usage of dapagliflozin - a sodium glucose co-transporter inhibitor, in the management of type-2 diabetes mellitus: a real world evidence study in Indian patients (FOREFRONT)

V Viswanathan[1], KP Singh[2]
1-MV Hospital for Diabetes, chennai, India, 2- Fortis Med Centre, Chandigarh, India

Background and Aims: Type-2 Diabetes Mellitus (T2DM) is now endemic to India.[1] Metformin is a 1st line oral antidiabetic drug used for T2DM. Sulfonylureas (SU) are a frequent first add-on after the failure of metformin monotherapy.[2] Currently, there is very limited data and experience on effectiveness and safety of dapagliflozin in real-world scenario in larger group of subjects across India. Therefore, the present study was planned to generate real world evidence in Indian patients receiving Dapagliflozin.

Materials and methods: A non-interventional, multicentre, prospective, observational study conducted at 50 sites in India. The study enrolled T2DM patients who were inadequately controlled (HbA1c >7%) with existing anti-diabetic medications and who had been prescribed dapagliflozin three months prior to study initiation.

Results: A total of 1978 T2DM subjects (57.5% male) were enrolled in the study. The mean (±SD) age and BMI were 52.31 (±10.43) years 29.30 (±5.28) (kg/m^2) respectively. Majority of the subjects (88.6%) were on metformin. Dapagliflozin demonstrated statistically significant reductions in mean (±SD) HbA1c -1.49 (±1.18) % and body weight (BW) -1.86 (±3.04) kg after six months of treatment from baseline (p<0.001).

Further, in all baseline HbA1c (<8%, 8-10%, >10%) and BMI (<25, 25-30, >30 kg/m^2) categories, dapagliflozin demonstrated a statistically significant reduction in HbA1c and BW at Month 3 and 6 (p<0.001). The mean (±SD) reduction in systolic BP, diastolic BP, and heart rate at Month 3 was -3.24 (±11.44) mmHg, -1.13 (±7.67) mmHg and -0.51 (±6.22) beats/min, respectively. The reductions were maintained at Month 6. The study observed a total of 76 adverse events (AEs) in 58 (2.9%) subjects. The proportion of subjects who experienced vulvovaginitis and urinary tract infections (UTI) were 8/1978 (0.4%) and 4/1978 (0.2%), respectively over six months, out of which one serious UTI was recorded. This subject was hospitalized for the treatment of SAE. However, the subject completed the study. During the study period, subjects' vital signs were normal and Hb1Ac value decreased at month 3 (9.2%) and 6 (11.1%) compared to baseline Hb1Ac value (12.6%). Hypoglycaemia was observed in 3/1978 (0.2%) subjects.

Conclusion: This is the first nationwide study on T2DM patients with Dapagliflozin, which suggests dapagliflozin is a safe and effective therapeutic option in real world setting in India.

Keywords: SGLT inhibitors

PP51

Classification of digital solutions for diabetes management

O Pkhakadze[1], M Neborachko[2]
1-High-Tech Office Ukraine, Kyiv, Ukraine, 2- High-Tech Office Ukraine, Kyiv, Ukraine

Background and Aims: Diabetes mellitus (DM) treatment represents a classical model of chronic disease management. According to the latest research, 415 million persons in the world suffer from DM. By 2042, based on the prognosis of the International Diabetes Federation (IDF), this number will increase up to 642 million.

Costs of DM management in Europe make about 9% of total expenses on health care that is equivalent to 300B US dollars annually or 2,610.00 to 4,854.00 US dollars per patient during a year.

The market of mobile applications for medical purposes shows dynamics forecast is over 21,5B US dollars by 2018 (Deloitte Center for Health Solutions).

Materials and methods: Available solutions for DM management that are offered while searching in Google, App Store and Google Play were analyzed. The first search pages were estimated as a source of the most popular solutions and references to similar applications. Key words used for this search were DM, DM management, DM on-line coaching.

Results: In general, 53 different digital solutions for DM management were analyzed.

This analysis included websites and mobile applications for iOS and Android (less often - MS), that is, classic multifunctional platforms. Some services included separate components from this list.

The sources were ranked by their origin (professional - solutions designed by doctors; sponsor's - solutions designed as a result of cooperation of specialists

and pharmaceutical companies or specialist and manufacturers of medical equipment), popularity, product functionality, and the selected business model. The sources were classified by their functionality as:

traditional solutions - glycemic profile and its dynamic analysis, reminders, alarm; combined tracking glycaemia/meal sheet/physical loads; email, print or fax standardized reports, in various formats (CSV, XML, PDF); interactive prompts/reminders, alarm function;

connected solutions - compatibility with smart glucometers and insulin pumps;

advanced solutions - compatibility with the most popular mobile applications for health, integration of the solutions with insurance companies systems, electronic medical history made in a form of a patient's individual registration form and doctor's cabinet; tracking of psycho-emotional status, reminders of laboratory tests required, assistant for costs accounting and saving costs spent on DM, internet-shop and medicine delivery etc.

Conclusion: The current digital health revolution offers a considerable number of solutions for DM management that with their potential may claim revolutionary level of implementation and respective accompanying commercial success.

Keywords: Health care delivery

The authors' classification of available digital solutions for DM management was proposed.

PP52

Case study of calcaneal osteomyelitis in Type 2 DM

R Solanki[1], DL Shah[2]
1-Sonal hospital and diabetes clinic, surat, India, 2- Sonal hospital and diabetes clinic, Surat, India

Keywords: Diabetic foot and skin disorders
Background and Aims
Introduction

- Calcaneal osteomyelitis is complicated clinical scenario that is often very difficult to treat. It occurs in individuals of any age who are injured or immunocompromised and requires aggressive management.

- Treatment ranges from antibiotic alone to radical debridement or amputation.

- Conditions that may classify patient as an immuno compromised healer includes diabetes, old age, use of steroids, poor nutrition and PAD.

CASE REPORT:

- A 50 year old female, housewife residing at varachha, surat presented to our hospital with chief complaints of non healing ulcer in left foot since 5 months, pain and swelling in left lower limb since 10days, fever, vomiting, backache, burning micturation since 4 days.

HOPI:-5months before patient had cracks in heel which got infected and resulted in small heel abscess which was debrided by orthopedic surgeon leading to an ulcer. Despite continuous dressing, antibiotic therapy and re debridement it failed to heal and ultimately got severely infected with greenish discoloration and lead systemic involvement. She was advised below knee amputation.

Materials and methods
EXAMINATION:
GE-Conscious, well oriented to time, place and person, dehydration with toxaemia. Pallor present.
1.BP-80/50, Pulse -120, Temp-101F
LE-

- A wound with 5cm diameter and 2.5 cm depth, foul smelling with regular margins, punched out edges, greenish discharge, consisting white and yellowish fibrous tissue and necrotic slough in few areas. Hyperemia, pitting edema, erythema, swelling up to the knee noted. Pedal pulse palpable with neuropathic foot.

Lab Reports:
Culture report showed a pure growth of Pseudomonas Aeruginosa (sensitive to colistin and polymyxin B drugs).
Lab reports showed moderate anemia, severe leucocytosis with fairly controlled TYPE 2 DM.
Radio imaging with CT revealed soft tissue swelling with multiple small pathological fracture of cortical surface of calcaneum.
Results
As patient was not willing for below knee amputation we decided to treat conservatively.
1.IV Colistin and imipenem were started including NPWT (5mins ON/ 2mins OFF cycling) along with complete bed rest. Patient started improving and hence same t/t continued for 4 weeks.
At the end of 4 weeks wound was totally granulated with slopy edges. All the signs of inflammation and toxemia subsided.
Weekly monitoring of RFT was done to check possible adverse effects of colistin.
2.Emperically we started clindamycin and levofloxacin for next 4 weeks and then it totally healed with complete epithilization.
Throughout management glycemic control was achieved by adjusting insulin doses as per blood glucose reports.
The ulcer healed successfully and no relapse was observed at 3months.
Conclusion: While several guidelines recommend the radical debridement or amputation to eradicate osteomyelitis, in current case patient received long term antimicrobial therapy +NPWT (VAC Dressing) and successfully healed at 10weeks. So in selected cases, especially in diabetic foot long term anti microbial therapy after culture sensitivity may be helpful.

PP53

Impact of diabetes education among nursing student with intention to adopt this as diabetes educators

D Yagnik[1], R Shukla[2], B Ganguli[3], S Shukla[4], S Mishra[5], M Gupta[6]
1-Society for Prevention and Awareness of Diabetes, kanpur, India, 2- Center for Diabetes and Endocrine Diseases, kanpur, India, 3- Society for prevention and awareness of Diabetes, kanpur, India, 4- Center for Diabetes and Endocrine Diseases, kanpur, India, 5- Center for Diabetes and Endocrine Diseases, kanpur, India, 6- Center for Diabetes and Endocrine Diseases, kanpur, India

Background and Aims: "Diabetes education" is corner stone of diabetes management. It is nearly impossible for clinicians to educate patients due to lack of time. We need to create good number of diabetes educators to fulfil the demand. Therefore we tried to look for the possibility of creating diabetes educators among nursing students in this innovative study.

To evaluate knowledge about diabetes and interest in adopting a career of a Diabetes educator among nursing students.

Materials and methods: we have done a basic 10 module course for diabetes educator for 40 nursing students 1 year from a reputed Nursing college of city and during this course we have given a pre and post test questionnaire in each module.

Results: On looking the answers of pre test of each module about 67% students don't know about the basics of diabetes like -At what sugar level person has diabetes.

What is HbA1c

Some myths and facts about diet and exercise

Which body organs are affected by diabetes?

Right place for giving insulin injection

When we have done sub analysis of each pre test and compared it with previous one there is gradual increase in knowledge.

While looking for post test - improvement in knowledge was seen in 60% of people, 22% had still much confusion in giving right answers and 18% were not able to answer very simple questions.

At the end of the course only 20% student showed interest in adopting a career of diabetes educator while 45% choose to become a specialised nurse 20 % wish to become general duty nurse rest and 15% have shown their interest in OT assistant or some other technician field.

Conclusion: Majority of clinicians practicing diabetes have no infrastructure in terms of Dietician and educators therefore demand is very less in Northern part of the Country.

We as medical professionals should encourage role of diabetes educator as they are the integral part of diabetes management and a bridge between a busy practitioner and patients. This is one of the first study to look at reasons for having small number of diabetes educators in our country.

Keywords: Education

PP54

Study of serum testosterone concentration in men with type 2 diabetes and healthy control in North West Rajasthan

P Kumari[1], V Gehlot[2]
1-Sardar Patel Medical College, Bikaner, India, 2- Sardar Patel Medical College Bikaner, Bikaner, India

Background and Aims: Diabetes Mellitus refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. In recent years, androgen deficiency has captured interest of many researchers and they have associated not only with general health of men but also with certain common systemic disorders like abdominal obesity, type 2 diabetes mellitus and others. So we plan to assess serum testosterone concentration in men with type 2 diabetes.

Materials and methods: This was a cross sectional study. 150 cases of type 2 diabetes mellitus and 50 cases without type 2 diabetes mellitus matched for confounding factors were taken as controls. Serum total testosterone level is assessed by chemiluminiscence method.

Results: Mean total testosterone in diabetes was 281.67+-67.31ng/dl and in controls it was 555.16+-126.56ng/dl and the difference was found statistically highly significant (p<0.001).

Conclusion: We concluded that serum total testosterone is low in diabetics than non diabetics.

PP55

A study to evaluate association of celiac disease with insulin dependent diabetes and hypothyroidism in North-west Rajasthan

C Singh[1], S Kumar[2], S Meena[3]
1-sardar patel medical college, bikaner, India, 2- Sardar Patel Medical College, Bikaner, India, 3- Sardar Patel Medical College, Bikaner, India

Background and Aims: To study association of Celiac Disease with Insulin Dependent Diabetes and Hypothyroidism in young adults in North-Western Rajasthan.

Materials and methods: Total eighty-seven newly diagnosed adult patients of celiac disease were included.

Sera of all patients were tested for presence of IgA tissue transglutaminase (tTG) antibody by ELISA using commercially available kits. Three to four intestinal mucosal biopsies were obtained with GI endoscopy from the second part of duodenum in patients with presence of tTG antibodies. Fasting blood glucose (FBG) was measured after overnight fasting (8 hours of fasting overnight). Serum TSH testing was performed on automated immunoassay platforms employing advanced IMA technology.

Results: In our study, out of total 87 patients, 46(52.87%) were from serum TTG group 50-200 and 41(47.12%) from serum TTG group >200. Out of total 87 patients, 14 patients had their TSH >4.2 and out of them 12 and 2 patients were from serum TTG group 50-200 and >200 respectively and the difference was statistically significant (p<0.01). 15 patients were found with impaired glucose tolerance and out of them 11 and 4 were from serum TTG group 50- 200 and >200 respectively. Only 10 patients had their fasting blood sugar >125 and out of them 9 and 1 were from serum TTG group 50-200 and >200 respectively and the difference was found significant (p<0.01).

Conclusion: Our study concludes that there is significant association of CD with thyroid dysfunction and impaired glucose tolerance. All CD patients should be screened for thyroid dysfunction and impaired glucose tolerance. Early recognition of CD and hence early appropriate management may help in reducing severity of various autoimmune disorders, improving quality of life in these patients.

Keywords: Epidemiology

PP56

Reliability and validity of a physical activity questionnaire for indian children and adolescents

M Begum T S[1], R Harish[2], A C[3], J N[4], M Pratt[5], V Mohan[6], R Anjana[7]
1-Madras Diabetes Research Foundation & Dr Mohan's Diabetes Specialities Centre, Chennai, India, 2- Madras Diabetes Research Foundation & Dr Mohan's Diabetes Specialities Centre, Chennai, India, 3- Madras Diabetes Research Foundation & Dr Mohan's Diabetes Specialities Centre, Chennai, India, 4- Madras Diabetes Research Foundation & Dr Mohan's Diabetes Specialities Centre, Chennai, India, 5- Rollins School of Public Health, Emory University, Atlanta, Georgia, 6- Madras Diabetes Research Foundation & Dr Mohan's Diabetes Specialities Centre, Chennai, India, 7- Madras Diabetes Research Foundation & Dr Mohan's Diabetes Specialities Centre, Chennai, India

Background and Aims: In low and middle-income countries, physical inactivity is increasing at an alarming rate in the young which is predis-

posing them to chronic disease at an early age. Reliable and valid instruments are therefore essential for evaluating physical activity (PA) in children and adolescents to monitor and assess PA levels in a population. Hence, we aimed to develop an easy to use PA questionnaire for children and adolescents in a developing country like India and evaluate its reliability and validity objectively using accelerometer data.

Materials and methods: The Madras Diabetes Research Foundation-Physical Activity Questionnaire for children and adolescents (MPAQ (c)) was developed to assess the various dimensions of PA based on habitual and culturally relevant activities for children and adolescents. PA was also objectively assessed using actigraph (Actilife 5) GT3X+ triaxial accelerometer worn around the waist for 5 complete days (4 weekdays and 1 weekend). A total of 104 children and adolescents belonging to the age group of 10-17 years were purposively selected for the study. Test re-test reliability of the questionnaire, on two separate occasions, 2 to 4 weeks apart, is presented by age categories (10-12, 13-15 and 16-18 years) and gender using intra class correlation coefficient (ICC). Validity of MPAQ was measured against accelerometer using Spearman's correlation and Bland and Altman agreements.

Results: The test re-test reliability of the questionnaire revealed very good agreement with boys (ICC: 0.81 minutes per week) having a higher score than the girls (ICC: 0.74 minutes per week). The ICC values were higher among older participants aged 16-18 years (0.83 minutes per week) than the younger participants of age 13-15 years (0.70 minutes per week). The Spearman's correlation coefficients for sedentary behavior and moderate to vigorous physical activity (MVPA) for MPAQ against the accelerometer were 0.52 (0.36-0.64) and 0.41 (0.23-0.55) respectively. Bland and Altman plots showed good agreement between MPAQ and accelerometer for sedentary behavior (mean bias = -4.9 minutes/day, ±2SD -197.1 to 187.3 minutes/day) and heteroscedasticity was seen in MVPA which was logarithmically transformed to show good agreement between MPAQ and accelerometer (mean bias = 0.01 minutes/day, ±2SD -0.87 to 0.89 minutes/day).

Conclusion: The children and adolescent MPAQ is a valid, reliable, easy to use and cost effective instrument that can be widely used in epidemiologic research in developing countries like India. The tool can provide useful insights into the various domains of PA during school and outside school hours.

Keywords: Epidemiology; Weight regulation and obesity

PP57

Type 1 diabetes mellitus & periodontal disease-relationship with pubertal stage & glycaemic control

P Chakraborty[1], S Ghosh[2], K Bhattacharjee[3], A Chakraborty[4], S Chowdhury[5]
1- Institute of Post-Graduate Medical Education and Research, Kolkata, India, 2- Institute of Post-Graduate Medical Education and Research, Kolkata, India, 3- Biocon Limited, Bangalore, India, 4- Guru Nanak Dental College, Kolkata, India, 5- Institute of Post-Graduate Medical Education and Research, Kolkata, India

Background and Aims: A link between diabetes and periodontal disease in adults has been established. In fact periodontal disease has been considered as the sixth complication of diabetes. Diabetes increases the prevalence, severity, and progression of periodontal disease. It has also been suggested that periodontal disease may worsen glycemic control.

The present study has been designed with the aim to establish the relationship between diabetes mellitus and periodontal disease in children with type 1 diabetes and to identify predictors of periodontal disease, with particular reference to possible influence of pubertal stage on development of periodontal disease.

Materials and methods: Oral hygiene index (OHI), gingival index (GI), probing pocket depth (PPD) and clinical attachment loss (CAL) were recorded in subjects with type 1 diabetes (110) and healthy siblings (22). Duration of diabetes, age of diagnosis of T1D, glycosylated haemoglobin (HbA1c) and presence of microvascular complications was documented.

Results: Mean age of the case and control was 13.32 ± 3.96 years and 13.18 ± 5.58 years. GI (p=0.044) and PPD (p=0.013) was worse in the cases vs. the controls. No difference was found in the number of teeth and OHI. Greater PPD (p=0.026) in cases vs. the controls in stage II-IV puberty was seen and both worsening GI (p=0.038) and greater PPD (p=0.027) in the cases vs. controls in stage V despite better OHI (p=0.040). Pubertal staging revealed no difference in any of the studied dental parameters in stage 1. HbA1c but not duration of diabetes was seen as a significant predictor of PD. (OR=1.03, 95% CI-1.01-1.06). Positive correlation between HbA1c values with PPD (p=0.009) and GI (p=0.001) was seen. PD was significantly associated with markers of nephropathy and neuropathy.

Conclusion: Type 1 diabetes was more likely to develop PD compared to healthy siblings. Onset & progression of puberty & poorer glycaemic control, rather than duration of diabetes was associated with greater risk of PD. PD was more likely to be associated with markers of microvascular disease.

Keywords: Diabetes in childhood

PP58

Glycemic control with team approach in sub-rural diabetic patients

R MOHAMMED
Esani Diabetes and Multispeciality Center, Hyderabad, India

Background and Aims: To study the role of teamwork in achieving good glycemic control in sub-rural patients using a cost effective trident model.

Materials and methods: Of the 106 selected diabetic patients 30 subjects were eligible for the study. **Inclusion criteria:** 1) Age: men and women between 22 years to 67 years. 2) Type 2 Diabetes mellitus, 3) uncontrolled FBS & PPBS 4) HbA1c 7.0-10.5 %. **Exclusion criteria:** Type 1 DM, Pre-existing Cardiac, Hepatic or renal disease, Hba1c > 10.5 %. A triangle approach was established between our Center, local MPHW, and Diabetes educator.

Results: This study was an observational study for 6 months duration to see the impact of team work helping in getting better glycemic control or not. These enrolled 30 patients were randomly divided into two groups i.e. group A and B. each group was allotted 15 patients. Following parameters FBS, PPBS, HbA1c, TC TGL, Sr.Creatinine, BMI, were checked for the enrolled patient during the start of the study, after 3 months & 6months. Data obtained was analyzed with SPSS version 17 software the difference in mean was compared in both of the groups using independent t test. P value less than 0.05 was considered as significant. These 15 patients of Group A were monitored dialy by MPHW for diet intake, medicine intake without skipping for entire 6 months duration whereas the Group B were monitored on Day 1 and these patient of Group B were explained the about the drug dosage, frequency of drug intake, with complete diet explanation and Life style modification, these both groups were followed on monthly basis in OPD clinic for review.

In the present study it was observed that there was no statistically significant difference in the mean age, creatinine, FBS, PPBS, HbA1c, TC, and TGL BMI and gender p >0.05 (Table 1). On first follow up after 3 months it was observed that the mean FBS, PPBS were significantly low in the group of patients who had regular follow up. HbA1c was lower in patients who had regular follow up but the decrease was not found to be

statistically significant (Table 1). At 6 months it was observed that mean FBS, PPBS, HbA1c, TC, and TGL, was significantly low in the group of patients who had regular follow up (Table 1).

Graph/Table :

Table: 1	Group A		Group B		t value	p value
	Mean	SD	Mean	SD		
Age	42.2	10.6	40.4	11.8	.551	0.580
Serum Creatinine	0.9	0.2	1.0	0.1	-.466	0.643
Total Cholesterol	226.6	35.7	229.4	30.2	-.26	0.79
TGL	221.1	28.3	247.3	63.5	-2.03	0.045
FBS	177.5	25.3	188.2	40.1	-1.261	0.212
PPBS	228.9	45.9	247.1	43.4	-1.596	0.117
HbA1C	9.1	.6	8.8	.7	1.786	0.081
AFTER 3 MONTH						
FBS 3 month	168.9	27.5	201.8	39.9	-3.795	<0.001
PPBS 3month	209.2	52.9	272.7	47.4	-4.935	<0.001
HbA1C 3 month	8.6	.4	8.8	.5	-1.760	0.084
AFTER 6 MONTH						
FBS 6 month	139.7	19.4	210	45.8	-7.692	<0.001
PPBS 6month	169.9	28.6	261.4	50.4	-8.478	<0.001
HbA1C 6 month	7.4	.5	8.9	.6	-13.90	<0.001
Total cholesterol	192.9	20.6	229.4	33.8	-4.971	<0.001
TGL	186.8	19.0	250.9	54.7	-6.045	<0.001
BMI start study	24.7	1.9	25.1	2.7	.348	0.727
BMI 6 months	23.6	2.8	24.9	2.6	1.38	0.172

Conclusion: Diabetes is a chronic progressive disease. Major problem with the patients is adherence to therapy. Adherence to therapies is a primary factor that determines the success of therapy. A single contact with physician could not achieve good glycemic control as seen in group B when compared to a systematic approach and close monitoring that increased the adherence to medication and diet as demonstrated in group A.

Keywords: Health care delivery

PP59

Correlation of SYNTAX score with some cardiac parameters in the patients of coronary artery disease with or without type 2 diabetes mellitus

K Bhatt[1], D Naik[2], Mody[3], D Surati[4]
1-Government medical college surat, Surat, India, 2- GMERS Valsad, Valsad, India, 3- Government medical college surat, Surat, India, 4- Government medical college surat, Surat, India

Background and Aims: The pathophysiological relation between CAD and T2DM is not established. Furthermore, the phenotype of T2DM is changing. SYNTAX is used for prediction of prognosis.

Materials and methods: Following the Declaration of Helsinki, and registeted by our ethics committee, 200 patients diagnosed with Type 2 Diabetes Mellitus (WHO diagnostic criteria, 1999) and suspected with coronary artery diseade were enrolled in this study in GMERS valsad from December 2016 to March 2017

Based on angiography, patients were divided into group B (without cardiovascular complications, n=76) group C (non-CAD, n=124). The SYNTAX scores in group C were calculated with the help of professional website tool: http://www.syntaxscore.com/.

Results: The multiple linear correlation analysis between syntax scores and relative factors in group C show that the SYNTAX scores were significantly co related with CRP, MAGE, HbA1C in group C (p<0.05) and were significantly correlated with SBP (P<0.01).

Correlation Analysis between SYNTAX Scores and the Blood Glucose Excursion of different Time Sessions in Group C showed that significant correlations were found in 6:00-8:00 (p< 0.01) and 11:00- 13:00 (p< 0.05) between the SYNTAX scores and blood glucose excursion in group C.

Conclusion: The SYNTAX Scores in this study were significantly correlated with CRP, MAGE and HbA1C in group C (p<0.05) and were significantly correlated with SBP (p<0.01) (which may not hold true in high syntax score cases).

Significant correlations were also found in 6:00-8:00 (p< 0.01) and 11:00-13:00 (p< 0.05) between the SYNTAX scores and blood glucose excursion in group C.

Keywords: Prevention of type 2 diabetes; Cardiac complications

PP60

Profile of auto-antibodies in type-1 diabetes

M Basu[1], SA Mondol[2], S Pramanik[3], M Banerjee[4], K Pandit[5], P Mukherjee[6], S Ghosh[7]
1-Institute of Post Graduate Medical Education and Research, kolkata, India, 2- Institute of Post Graduate Medical Education and Research, Kolkata, India, 3- Institute of Post Graduate Medical Education and Research, Kolkata, India, 4- Institute of Post Graduate Medical Education and Research, kolkata, India, 5- Institute of Post Graduate Medical Education and Research, Kolkata, India, 6- Institute of Post Graduate Medical Education and Research, Kolkata, India, 7- Institute of Post Graduate Medical Education and Research, Kolkata, India

Background and Aims: Type 1 Diabetes is an autoimmune disease with selective destruction of beta cells of pancreas. It is associated with presence of auto-antibodies whose significance in the aetiopathogenesis is uncertain. Additionally Type 1 diabetes is associated with several other autoimmune disorders. Data regarding antibody status in patients with Type 1 diabetes in Indian is limited.

Materials and methods: In this observational study patients attending paediatric diabetes clinic of IPGME&R Kolkata were included. Subjects underwent clinical assessment and blood sampling. Fasting blood samples were collected for the assessment of C-peptide, Anti-TPO, Anti-Thyroglobulin by Chemiluminescence and AntiGAD antibody, Anti-Islet Cell Antibodies, Insulin Autoantibody, Anti-tissue transglutaminase antibody IgA, 21-hydroxylase, Zinc transporter 8, Anti Ovarian Antibody by ELISA.

Results: Total 91 subjects are included in the study among which 34 males and 57 females who are diagnosed during 2000-2017. The mean age of subjects is 15.37±4.46 and mean age of diabetes onset 8.11±3.5. In our study population the proportion of presence of anti-GAD, anti-Insulin antibody, Islet cell antibodies, ZNt8 are 78%, 67%, 54.95% & 8.8% respectively. 2.1% of study population have all the aforementioned antibody negative, 16% have one of them positive, 54% have any two of them 23% of them have any three positive and quadruple antibody positivity is found in 3.2% of subjects. Presence of other markers for organ specific autoimmune disease ie. Anti-TPO, Anti-Thyroglobulin, Anti-tissue transglutaminase antibody Ig A were found in 45.1%, 22%, 1.1% respectively. 21- hydroxylase and Anti Ovarian Antibody are not present in our study population.

Conclusion: There is a higher prevalence of GAD, IA2, TPO, TG auto antibodies, with anti?GAD being the most commonly detected one. Both TPO and Tg antibodies are higher which highlights the importance of regular thyroid screening in T1DM subjects.
Keywords: Prediction and prevention of type 1 diabetes

PP61

To compare the role of orthotics and prosthesis in reducing plantar pressures of the precious limb during gait post transtibial amputation in diabetic patients

JJ Rahmi[1], CT Thomas[2], S Devashayam[3]
1-Christian Medical College and Hospital, Vellore, India, 2- Christian Medical College and Hospital, Vellore, India, 3- Christian Medical College and Hospital, Vellore, India

Background and Aims: Individuals with Diabetes Mellitus have 10 to 30 times higher rates of lower extremity amputations than those without Diabetes. After a major amputation, upto 11% have a contralateral major amputation at the end of 5 years.
Aim: To compare the role of orthotics like crutches and walkers versus prosthesis in reducing plantar pressures during gait post transtibial amputation. Early identification of areas of high pressures to suggest appropriate modifications in the footwear or prosthesis so as to reduce pressure at those points and prevent ulcers and subsequent amputation in the precious limb.
Materials and methods: It is an observational study design approved by the Institutional review board with a financial grant for the same. A total of 51 Diabetic patients who had undergone below knee amputation and had been rehabilitated with a below knee prosthesis were recruited for the study. The tool used to measure the pressures was an in-house device in the form of pressure-sensing probes fitted into an insole which could be easily inserted into the patient's footwear. The device was connected to a computer showing waveforms suggestive of plantar pressure distribution. The readings were taken once with prosthesis and once without prosthesis using crutches or walkers.
Results: The dynamic plantar pressures were lower with prosthesis as compared to crutches or walkers. The mean plantar pressures with prosthesis was about 8.74 kilopascals whereas without prosthesis was 15.55 kilopascals. The maximum pressure difference was seen at the head of the first metatarsal.
Conclusion: Prostheses are more effective in reduction of plantar pressures in the precious limb post transtibial amputation as compared to orthotics like crutches or walkers. Hence Diabetic amputees must be encouraged to undergo prosthetic training and use prosthesis for ambulation. Also plantar pressure measurements can be done as a routine evaluation in Diabetic amputees during follow up and pressure changes can be detected early, resulting in early intervention in the form of footwear or prosthesis modifications, thereby reducing plantar pressures, ulcer formation and subsequent amputation in the precious limb.
Keywords: Diabetic foot and skin disorders; Other complications

PP62

Exocrine pancreatic insufficiency in type 1, type 2 diabetes & fibrocalcific pancreatic diabetes

S Dutta[1], I Ghosh[2], BA M[3], M Basu[4], K Pandit[5], P Mukherjee[6], S Ghosh[7]
1-Institute of Post Graduate Medical Education & Research, Kolkata, India, 2- Institute of Post Graduate Medical Education & Research, Kolkata, India, 3- Institute of Post Graduate Medical Education & Research, Kolkata, India, 4- Institute of Post Graduate Medical Education & Research, Kolkata, India, 5- Institute of Post Graduate Medical Education & Research, Kolkata, India, 6- Institute of Post Graduate Medical Education & Research, Kolkata, India, 7- Institute of Post Graduate Medical Education & Research, Kolkata, India

Background and Aims: Exocrine Pancreatic insufficiency occurs to a variable extent in all forms of diabetes including Type 1 Diabetes (T1D), Type 2 Diabetes (T2D) and Fibrocaculous Pancreatic Diabetes (FCPD). Estimation of Fecal-Elastase concentration (FEC) by Enzyme-Linked Immunosorbent Assay (ELISA) and has become a standard and widely accepted diagnostic test for exocrine pancreatic insufficiency. Fecal-Elastase test has been shown to have good correlation with a direct test for exocrine function, especially in moderate to severe cases. Data on the prevalence of pancreatic exocrine insufficiency in Indian patients with diabetes utilizing FEC concentrations is limited.
Materials and methods: Patient enrolled in the study underwent a physical examination (including patient's height, weight, and BMI). Biochemical parameters including fasting blood sugar, HbA1c, duration of diabetes, Fecal-Elastase concentration and BMI was documented. Fecal-Elastase concentration levels were measured using commercially available ELISA kit from stool samples. As per the validated cut-offs, levels of <100 μg/gm were considered as severe pancreatic insufficiency, 100-200 μg/gm were considered as moderate pancreatic insufficiency and >200 μg/gm were considered as a normal pancreatic function.
Results: Study included 24 T1D, 23 T2D, 11 FCPD Patients and 24 healthy non-diabetic individuals (control group). The prevalence of severe PEI in T1D (16.66%), T2D (21.73%) and FCPD (100%) was observed. The prevalence of PEI in controls was only 8.3% which was significantly lower than that of T1D, T2D and FCPD patients. A significant negative correlation was observed between Fecal-Elastase levels and HbA1c ($p<0.05$). A significant negative correlation was also observed between Fecal-Elastase levels and duration of diabetes ($p<0.05$). Whereas a significant positive correlation was found between Fecal-Elastase levels and BMI ($p<0.05$).
Conclusion: In conclusion, the prevalence of pancreatic exocrine insufficiency was significantly higher in FCPD, Type 1 and Type 2 patients.
Keywords: Gastro-entero pancreatic factors; Macrovascular disease

PP63

Clinical significance of asymptomatic bacteriuria in type 2 diabetes mellitus

M Banerjee[1], I Maisnam[2], A Mukherjee[3]
1-Institute of Post Graduate Medical Education and Research, kolkata, India, 2- RG kar medical college, Kolkata, India, 3- RG Kar Medical College, Kolkata, India

Background and Aims: Asymptomatic bacteriuria (ASB) in diabetes continues to be a subject of continuous debate. Aims of the study were:1) to estimate the prevalence of ASB and association with age, gender, renal and glycemic status, duration of diabetes; 2) to identify the microorganisms and sensitivity pattern as well as evaluate the usefulness of microbiolgical pattern & colony count in urine culture as a predictor of symptomatic urinary tract infection (UTI).

Materials and methods: A descriptive longitudinal study was performed over 80 otherwise healthy type 2 diabetes patients with a follow-up for 6 months.

Results: ASB, prevalent in 21.25% of type 2 diabetes population in our study, was associated with significantly higher risk of UTI. Patients with worse baseline HbA1C values were at greater risk, but diabetes duration and eGFR had no significant effect. Despite no association between ASB and HbA1C, colony count showed weak positive correlation with HbA1C. Majority of female ASB patients due to E. coli had even greater risk of UTI.

Conclusion: We recommend advising a higher degree of vigilance and genital hygiene to female type 2 diabetes patients. A large scale prospective study reproducing similar findings will genuinely obviate the need to review recommendations regarding treating ASB due to E. coli in this cohort.

Keywords: Epidemiology; Other complications

PP64

Randomized, multicentre, comparative study to evaluate efficacy, safety and tolerability of topical ayurvedic preparation in patients with diabetic foot ulcer

D Shah[1], M S[2], T E[3], S M[4], K M[5]
1-Indus Diabetes and Obesity Centre, India, Mumbai, India, 2-Micro Labs Limited, Bangalore, India, 3- Monika Diabetes Foundation, Erode, India, 4- Sushrutha Ayurvedic Medical College and Hospital, Bangalore, India, 5- Micro Labs Limited, Bangalore, India

Background and Aims: Wound management is continuously evolving with advancement in medicine. Continuous research in Ayurveda, is resulting in the development of newer drugs which are safe and effective. The objective of the study was to assess the efficacy, safety and tolerability of topical ayurvedic preparation containing Cayene + Cedar wood oil + Burdock oil + Golden seal extract + Haldi Oil + Gandhaka + Tankana Amla (Bucay[TM]) in management of Diabetic Foot Ulcers

Materials and methods: This was a randomized, multicentre, comparative study for 6 weeks. Subjects with diabetic foot ulcers were 1:1 randomized to receive study medication to be applied over the affected area once daily or conventional care dressings. Subjects were followed up every week for 6 weeks for wound healing (reepithelialization). Changes in wound area were confirmed through Clinical evaluation and comparison of photographs taken during previous visits

Results: A total of 100 subjects were included in the study. 61 subjects were men and 39 were women. Mean age was 54.28 ± 6.8 years and mean HbA1c was 8.28 ±1.78 %. Re-epithelialization of wound was observed in all subjects with study medication (fig. 1). The average wound area at baseline was 18.21 ± 7.34 cm^2 and 16.16 ± 5.93 cm^2 in Test arm (Bucay + conventional dressing) and Control arm (Conventional dressing alone) respectively. After 6 weeks of therapy, the wound area reduced to 11.1 ± 2.38 cm^2 and 13.83 ± 3.28 cm^2 in the test arm and control arm respectively which was clinically and statistically significant ($p < 0.05$) Fig. 2. Overall investigators grading (on the 5 point scale) was very good (46%) and excellent (54%) for study medication. The study medication was well-tolerated and no adverse events reported.

Graph/Table:

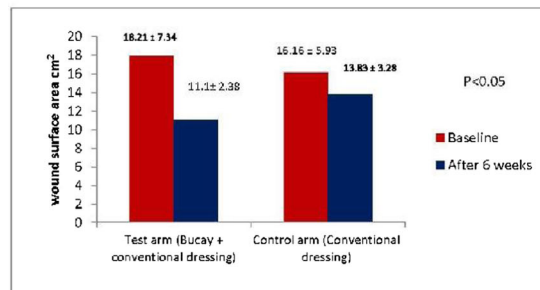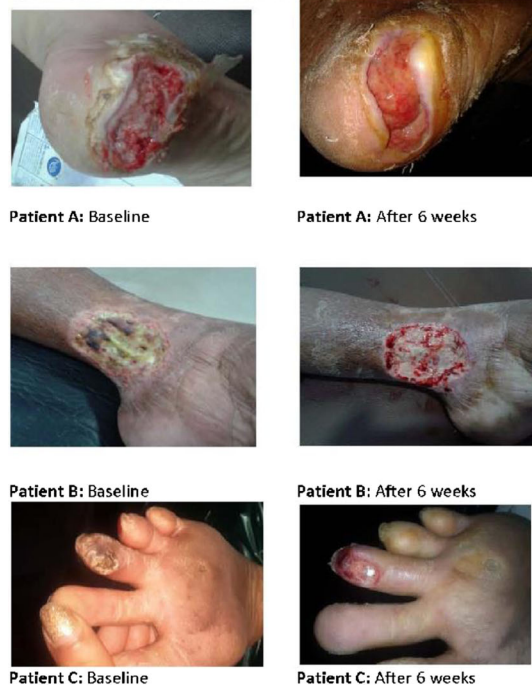Fig. 1 Images showing improvement in wound healing (re-epithelialization) on treatment with Bucay

Patient A: Baseline   Patient A: After 6 weeks

Patient B: Baseline   Patient B: After 6 weeks

Patient C: Baseline   Patient C: After 6 weeks

Fig. 2: Graph showing mean change in the wound surface area (cm^2 ± SD) before and after the treatment in test and control arm.

Conclusion: Topical ayurvedic preparation (Bucay™) was found to be effective in wound healing (re-epithelialization) and well-tolerated in patients with diabetic foot ulcers.

Keywords: Diabetic foot and skin disorders

PP65

Real world effectiveness of a digital therapeutic in improving SMBG and managing blood glucose levels among patients with type-2 diabetes in India

A Krishnakumar[1], M Shaikh[2], G Beswal[3], S Patange[4], S Shaikh[5], V Methil[6], V Shah[7], S Kolke[8], A Shah[9]
1-Wellthy Therapeutics, Mumbai, India, 2- Wellthy Therapeutics, Mumbai, India, 3- GoodHope Diabetes Specialty Clinic, Mumbai,

India, 4- Dr. Patange's Diabetes Clinic, Mumbai, India, 5- Dr Shaila Shaikh Clinic, Mumbai, India, 6- Sweet Clinics, Mumbai, India, 7- Zen Hospital, Mumbai, India, 8- Dr Kolke's Diabetes Clinic, Mumbai, India, 9- Wellthy Therapeutics, Mumbai, India

Background and Aims: The glycemic control and compliance to SMBG among patients in India is very poor. We evaluate the effectiveness of the Wellthy Diabetes (WD) digital therapeutic app in changing health behaviour to improve blood glucose levels and SMBG.

Materials and methods: We used de-identified data from 102 participants (Mean = 50.98 yrs [95% CI: 49.31-52.64]; 65.38% male) enrolled in a 16-week lifestyle modification program delivered through WD. The program was developed in lines with the AADE7 guidelines and included reminders for SMBG along with skilldevelopment through self-management education using artificial intelligence (AI) powered real-time feedback and coaching from a personal health coach (HC)

Results: 102 patients completed the 16 week program. There was a significant difference between the mean pre- and post-intervention FBS (145.38 mg/dl [95% CI: 135.44 to 155.33] vs 134.3 mg/dl [95% CI: 122.15 to 146.54], p = 0.0234) and PBS (187.84 mg/dl [95% CI: 172.47 to 203.21] vs 166.36 mg/dl [95% CI: 152.83 to 179.89], p = 0.0287) values. The average total per-patient per-week app engagement (AI and HC) instances and duration were 12.25 instances (95% CI: 9.1-15.4) and 11 minutes (95% CI: 8- 15.08), respectively. A total of 1288 blood glucose measurements were logged with an average of 12.38 measurements per patient (95% CI: 9.25-15.52) during the 16-week program. We investigated the relationship between app engagement and change in FBS and PBS. It was observed that there was a stepwise decrease in FBS and PBS levels as app engagement level increased. The lowest tertile of app engagers reduced their FBS by a mere 0.18 mg/dl and there was an increase in PBS of 2.35 mg/dl; the middle tertile of app engagers reduced their FBS and PBS by 7.25 mg/dl and 2.84 mg/dl, respectively; and those in the highest tertile of app engagers reduced their FBS by 21.4 mg/dl (p = 0.018, highest vs lowest), and PBS by 22.03 mg/dl (p = 0.023, highest vs middle; p = 0.0022, highest vs lowest).

Conclusion: A digital therapeutic like Wellthy Diabetes can enable patients to manage their blood glucose effectively and also improve compliance to SMBG.

Keywords: Nutrition and diet; Education

PP66

Serum Mg+2: marker of microvascular complications of diabetes mellitus

R Bhati
Sardar Patel Medical College, bikaner, India

Background and Aims: Multi-system effects of diabetes mellitus such as retinopathy, nephropathy, neuropathy and cardiovascular diseases are important public health concerns.
AIMS:- Estimating serum magnesium concentrations in patients with diabetes mellitus (T1DM and T2DM).
Correlating serum magnesium concentrations with complications of DM.

Materials and methods: The present study was conducted in the Department of Medicine, S.P. Medical College & Associated Group of Hospitals, Bikaner over a period of 6 months.
The study design was a cross sectional study.
152 patients were enrolled in study.
inclusion criteria nd exclusion criteria applied.

Results: In this study 50.4% of the patients were males and 49.6% were females. Overall, mean age of the study population was 48± 18 years.

The mean BMI of the study population was 26.43 + 5.11 kg/m2. In this study majority of the patients with hypomagnesemia Mg < 1.7mg/dl were having diabetic complication, mainly microvasclar complications.
Patient with hypomagnesmia were showing significant association with nephropathy (p <0.001, r= -0.48), neuropathy (p <0.009), retinopathy (p <0.007) and cardiovascular disease (p< 0.001).

Conclusion: Measurement of serum magnesium should be considered in patients whose blood sugar is not controlled with anti diabetic drugs or insulin, as hypomagnesemia may be a cause.
Supplementation of magnesium is also cost effective and should be done if patient is found hypomagnesemic.
Magnisium levels correlate with Micorovascular complications specially Nephropathy.

Keywords: Prevention of type 2 diabetes; Nephropathy

PP67

Histo-pathological profile of renal disease in patients with type 2 diabetes mellitus who underwent renal biopsy in a tertiary center in bangalore

A S[1], S R[2], N Lavanya[3]
1-Kempegowda institute of medical sciences and hospital, Bagalore, India, 2- Kempegowda institute of medical sciences and hospital, Bangalore, India, 3- Kempegowda institute of medical sciences and hospital, Bangalore, India

Background and Aims: The prevalence of diabetes mellitus (DM) has reached epidemic proportions in India, with an estimated 72 million cases in 2017, which is expected to grow to 134 million by 2025. India represents 49 percent of the world's diabetes burden. Chronic kidney disease is a major complication of DM and DM ranks as the leading cause of end stage renal disease requiring renal replacement therapy. Diabetic nephropathy (DN) is seen in as much as 40 percent of patients with DM more than 10 years of duration as per various studies. However many diabetic patients with renal disease can be falsely labelled as having DN but can have non diabetic renal disease (NDRD) or mixed forms with NDRD superimposed on DN. This can significantly modify the natural history of disease, including the appropriate intervention needed. This study aims to identify the incidence of the various forms of renal disease in diabetic patients on whom renal biopsy was done.

Materials and methods: Diabetic patients who underwent renal biopsy from January 2015 to December 2017 were included in the study. All biopsy specimens were assessed using light microscopy, immunofluorescence and were interpreted by renal pathologists. The major renal biopsy diagnosis provided were tabulated according to three potential categories: DN alone, DN with superimposed NDRD, and NDRD alone. DN is defined by the presence of suggestive glomerular lesions like nodular sclerosis, diffuse mesangial sclerosis, mesangial expansion, basement membrane thickening, arteriolar hyalinosis, micro aneurysms and exudative lesions. NDRD is defined by any histological alteration different from the above-mentioned and is suggestive of other renal diseases such as IgA nephropathy, membranous nephropathy (MN), focalsegmental glomerulosclerosis (FSGS), acute/chronic interstitial nephritis (AIN/CIN), focal global glomerulosclerosis (FGGS), vasculitis, nephroangiosclerotic lesions, etc.

Results: A total of 126 patients with diabetes underwent renal biopsy during this period. Of these, 21 (16.67%) were female and 105(83.33%) male. The mean age of patients being biopsied was 52.35 years and the average duration of diabetes in these patients was 12.37 years. 100 (79.37%)patients in the study group were hypertensive.

49(38.89%) were DN alone, 41(32.54%) were NDRD and 36 (28.57%)were mixed,. Amongst the patterns of non-diabetic renal disease, predominant cases were FSGS 12(15.58%), AIN 11(14.29%), FGGS 8(10.39%), CIN 8(10.39%), IgA nephropathy 8(10.39%). 41(48.24%) were DN class 4 and 39(45.89%) DN class 3 based on the Renal pathology society classification.

Conclusion: Renal biopsy being an invasive procedure with its own complications cannot be performed in every diabetic patient with impaired renal function. When features are not typical of diabetic nephropathy, it becomes necessary to probe for the cause and that is when biopsy becomes imperative. The biopsy results can then help modify the course of management in these patients.

Keywords: Nephropathy

PP68

Diabetes education and assessment radar (DEAR) application- a diabetes educational and risk scoring app for patients at apollo sugar clinics

S Das[1], S Shah[2], K Dash[3], U Ayyagari[4], R Manikandan[5], C Dwarakanath[6], T Boochandran[7], S Tippisetty[8], A Poornima[9], VK Kolukula[10]
1-Apollo Sugar Clinic, Apollo Hospital, Bhubaneswar, India, 2- Apollo Sugar Clinic, Mumbai, India, 3-Apollo Sugar Clinic, Raipur, India, 4- Apollo Sugar Clinic, OMR, Chennai, India, 5- Apollo Sugar Clinic, Madurai, Chennai, India, 6- Apollo Sugar Clinics, Apollo Hospital, Bangalore, India, 7- Apollo Sugar Clinics, Apollo Hospital, Chennai, India, 8- Apollo Sugar Clinics Limited, Hyderabad, India, 9- Apollo Sugar Clinics Limited, Hyderabad, India, 10- Apollo Sugar Clinics Limited, Hyderabad, India

Background and Aims: Diabetes education and assessment radar (DEAR) application is a patient engagement tool to educate patients visiting Apollo Sugar Clinics about the underlying diabetes risk and its complications through risk factor scoring. This tool may aid patients to foresee the occurrence of early onset of diabetes-related complications so that patients and physician can act proactively to avoid the condition or prevent complications and lead a better quality of life. Hence, we aimed to screen and identify patients having the risk of complications and associated abnormalities through the DEAR app.

Materials and methods: This is a prospective screening of individuals visiting Apollo Sugar Clinics for doctor consultation from June - August 2018. Apollo Sugar is a center of excellence for diabetes and endocrinology with more than 35 clinics and 90 healthcare experts pan India. The screening was done prior to doctor consultation. Patients were given a mobile tab with DEAR app that captures information through assessing various risk factors that finally gives a risk score. Age, body mass index, duration of disease, hypertension, HbA1c levels, type of medication, stress, and complications screening test were some factors that were considered for risk scoring. The scoring and classification of risk such as no (0-8), low (9-12), medium (13-16), high (17-20) and severe risk (21-25) were defined considering the standard ADA guidelines. All the variable were analyzed using descriptive statistics.

Results: A total of 3867 patients were screened and educated through DEAR app about the risk for complications. Of these 2707 (70%) of the patients were at medium to severe risk. The severity of score increased with increasing age (>65 years), BMI (>30 kg/m2), duration of disease (>5 years), type of medication (oral and insulin) and HbA1c (>9%). Nearly 42% of the patients had at least one associated abnormality (such as lipid, kidney, eye, or foot) and the most common abnormality that was observed in patients was lipid abnormality with respect to each category of age, BMI, HbA1c. Further, the percentage of patients with medium to severe risk was higher in oral+insulin medication group compared to only oral medication.

Conclusion: To the best of our knowledge across India, Apollo Sugar is the first to attempt to screen a large number of patients for risk of complication using a patient-friendly DEAR app. The scoring obtained enables the healthcare professionals for thorough investigations and can also serve as an early indicator for appropriate diabetes management program to achieve glycemic, blood pressure and lipid targets to delay complications for better patient outcomes. Patients with higher risk score can be educated appropriately by a health care team.

Keywords: Education

PP69

A prospective, randomized, controlled, clinical study comparing efficacy and safety of teneligliptin versus sitagliptin as add on therapy in type 2 diabetes mellitus

K Selvam[1], V Mohan[2], M Ramu[3], S Poongothai[4]
1-Madras Diabetes Research Foundation (MDRF), Chennai, India, 2- Madras Diabetes Research Foundation (MDRF) & Dr. Mohan's Diabetes Specialities Centre (DMDSC), Chennai, India, 3- Madras Diabetes Research Foundation (MDRF), Chennai, India, 4- Madras Diabetes Research Foundation (MDRF), Chennai, India

Background and Aims: Sitagliptin was the first Dipeptidyl Peptidase (DPP) IV inhibitor launched in India that followed introduction of numerous congeners, of which Teneligliptin is widely prescribed in India because of its economical pricing. However, there is no head-to-head comparison of Teneligliptin vs. Sitagliptin available in published literature. This study is aimed at comparing efficacy and safety of Teneligliptin versus Sitagliptin as an add-on to standard of care in the management of Indian type 2 diabetes mellitus (T2DM) patients.

Materials and methods: In this prospective, open-label, randomized, controlled, multicentre study, 76 patients aged 18 to 65 years with T2DM with inadequate glycemic control were randomized to either Teneligliptin 20 mg or Sitagliptin 100 mg tablets orally once daily as add on to ongoing metformin and/ or sulfonylurea for 12 weeks at 2 centres of MDRF. Institutional Ethics Committee approval was sought before starting the study. Informed consent was obtained from each subject before screening. Patients are being followed up for FBG & PPBG (at completion of 6 weeks and 12 weeks of treatment) and for HbA1c & lipid parameters (at completion of 12 weeks of treatment). Safety was monitored throughout the study period. This is an interim analysis of the first 54 completed datasets from the ongoing study.

Results: Twenty eight (28) patients on Sitagliptin and 26 on Teneligliptin completed the study as on date. Both groups were comparable at baseline (P>0.05) in terms of age, gender, metformin daily dose, sulfonylurea use, HbA1c, FBG and PPBG. At the end of 12 weeks, significant reductions (P<0.05) were observed from baseline in HbA1c (-1.2 ± 1.09% and -0.79 ± 0.93%), and PPBG (-39.7 ± 74.22 and -44.7 ± 77.81 mg/dL) for both Teneligliptin and Sitagliptin groups, respectively. Fair reduction from baseline was also observed for FBG (-15.9 ± 60.60 and -16.9 ± 44.82 mg/dL), however, owing to high variability, it was not statistically significant (p>0.05). Further, statistically there was no difference (P>0.05) between both groups in terms of these reductions in glycemic parameters. Adverse events were reported only in 4 study patients and none of the events was considered related to study treatment.

Graph/Table:

Figure 1: Change in HbA1c at 12 weeks in Teneligliptin arm vs. Sitagliptin arm
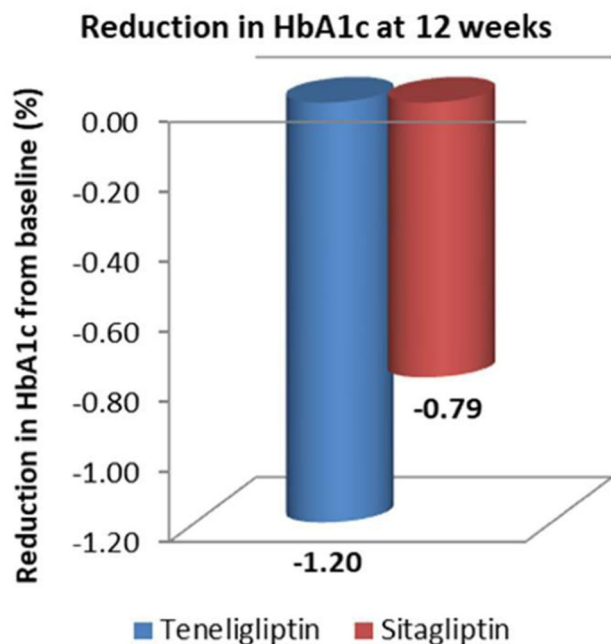
Conclusion: Teneligliptin was found to be comparable to Sitagliptin in terms of glycemic control and safety in Indian T2DM patients in our study. However, study with large sample size is required to validate these findings.
Keywords: Incretin based therapies 43 Novel agents

PP70

Study of neutrophil to lymphocyte ratio in controlled and uncontrolled type 2 diabetes mellitus patients

PS Tadkal[1], DV Acharya[2]
1-KMC, manipal, India, 2- KMC, Manipal, India

Background and Aims
Aim- To study neutrophil to lymphocyte ratio in controlled and uncontrolled type 2 diabetes mellitus patients
Objective- To study the association of Neutrophil to lymphocyte ratio and HbA1c in patients with Type 2 diabetes mellitus
Materials and methods
Study design : Prospective cross sectional
Study period: September 2016 to May 2018
Study location: Kasturba Hospital, Manipal
Study population: 201 patients
STUDY GROUPS
Patients with diagnosed Type 2 diabetes mellitus were included in the study According to ADA 2016 guidelines

The patients with type 2 diabetes mellitus in our study were divided into 2 groups-controlled diabetes mellitus patients (HbA1c ≤ 7%) and uncontrolled diabetes mellitus patients (HbA1c >7%)
Controlled type 2 diabetes patients- 95
Uncontrolled type 2 diabetes patients- 106
Total of 201 patients were included in the study.
Ethical clearance: Ethical clearance was obtained in September 2016, with IEC no- IEC 674/2016 before the commencement of the study
Complete blood count was analysed for WBC count, differential count to obtain absolute neutrophil count and absolute lymphocyte count. Fasting blood sugar, post prandial blood sugar, HbA1c were done. Renal function test and urine protein were obtained. Fasting lipid profile was done.
Statistical analysis: Statistical analysis was done using SPSS 23 version All quantitative and continuous variables were presented as mean with SD for normally distributed data. For skewed data, variables were expressed as median with interquartile range All qualitative data were presented as percentage and frequencies. NLR association with HbA1c was analysed using Mann Whitney U test
Results: 95 patients belonged to the group of controlled diabetics. Out of 95 patients, 61 were males and 34 were females.
106 patients belonged to the group of uncontrolled diabetics, of which 72 were males and 34 were females.
Total WBC count was 8163.89 ±2482.027 cells in controlled group and 8068.49 ± 2246.399 in uncontrolled diabetes group, with no statistically significant difference in the WBC count between the 2 groups
The mean Absolute neutrophil count was 4885.169 ±1791.436 cells in controlled diabetes group and 5019.372 ± 1943.021 cells in uncontrolled diabetes group. The ANC was higher in uncontrolled diabetic group compared to controlled diabetic group
The mean absolute lymphocyte count was 2287.281 ±785.504 cells in controlled group and 2054.508 ± 854.291 cells in uncontrolled group. The ALC was higher in controlled group compared to the uncontrolled group
The mean HbA1c was 6.35± 0.424%in controlled diabetes group and 9.430± 2.02% in uncontrolled diabetes group. The HbA1c was higher in uncontrolled diabetic group similar to the findings of Sefil et al 2014 (Mean HbA1c (%) levels were 6.3 ± 0.4% and 8.9 ± 1.1% in controlled and uncontrolled diabetes group respectively
Median with interquartile range was taken for Neutrophil to lymphocyte ratio. The Neutrophil to lymphocyte ratio was 2.160 (IQR- 1.07) in controlled diabetes group and 2.640 (IQR- 1.916) in uncontrolled diabetes group. The NLR was higher in the later group and was statistically significant with a p value <0.05
Conclusion: In our study, there was association between Neutrophil to lymphocyte ratio and HbA1c in patients with Type 2 diabetes mellitus patients.
Keywords: Inflammation in type 2 diabetes

PP71

To evaluate postprandial triglycerides for prediction of gestational diabetes mellitus

S Bhardwaj[1], M B K[2], H Srivastava[3], S Madhu[4]
1-Centre for Diabetes Endocrinology & Metabolism, University College of Medical Sciences University of Delhi & GTB Hospital, Delhi, India, 2- Centre for Diabetes Endocrinology & Metabolism, Delhi, India, 3- Centre for Diabetes Endocrinology & Metabolism, University College of Medical Sciences University of Delhi & GTB Hospital, Delhi, India, 4- Centre for Diabetes Endocrinology & Metabolism, Delhi, India

Background and Aims: Gestational diabetes mellitus (GDM) is a public health problem in our country and its prevalence varies from 3.8 to 21% in different parts of the country. GDM is also an important contributor to the rising number of T2DM cases in India. Early Detection and prompt

treatment of GDM will go a long way in reducing this burden. Postprandial hypertriglyceredemia is an emerging risk factor for T2DM, but no study evaluated its role as a predictor and risk marker for GDM. Therefore, this study was undertaken to evaluate postprandial triglycerides as a predictive risk marker for GDM.

Materials and methods: A standard fat challenge consisting of 2 plain paratha & 20 gm butter was given to 450 antenatal females with singleton pregnancy presenting in early gestation i.e. 11-13 weeks to assess their postprandial 4 hour Tg levels. At week 24-28, a standard oral glucose tolerance test was performed for GDM diagnosis. Forty five cases of GDM were compared with 45 matched non- GDM controls. Also BMI, HbA1c, Lipid profile and fasting serum insulin was measured.

Results: The mean age of females with GDM was 25.31 ± 3.12 years as compared at 24.16 ± 3.00 years for the non-GDM group. The mean BMI was 23.95 ± 2.83 kg/m^2 and 23.54 ± 2.69 kg/m^2 for the case and control groups, respectively. Fasting triglycerides in GDM and non-GDM group were 136.08 ± 88.00 mg/dl and 110.60 ± 41.42 mg/dl respectively which were not significantly different. Four hour postprandial triglycerides were significantly higher in GDM cases as compared to non-GDM controls (165.42 ± 73.41 mg/dl vs 133.88 ± 43.90 mg/dl ; P= 0.008). Logistic regression analysis revealed higher odds of GDM with increasing 4 hour postprandial triglyceride levels {OR=1.01(1.001-1.02), p=0.02}.

Conclusion: Four hour Postprandial triglycerides levels can be used as a predictor for Gestational diabetes mellitus.

Keywords: Pregnancy

PP72

Use of non-caloric artificial sweeteners among individuals living with diabetes: a study by corona sugar clinic

M Patra[1], R Selvarajan[2]
1-Corona Sugars, Bangalore, India, 2- Corona Sugars, Bangalore, India

Background and Aims: Non-caloric artificial sweeteners (NAS) are gaining steady popularity among people who want to prevent diabetes, pre-diabetes individuals and individuals with frank diabetes. Recent studies have indicated that NAS are considered safe and are deemed beneficial due to their low caloric content. On the other hand, it has also been demonstrated that NAS formulations lead to glucose intolerance through induction of compositional and functional alterations to intestinal microflora, increasing incidence of diabetes mellitus.

Materials and methods: The study subjects were drawn from patients visiting the clinic. A total of 202 individuals (42 % females age ranging from 17 years to 88 years, maximum in the age range of 30 years to 60 years) were selected. The use of artificial sweeteners, their consumption pattern, and the patients' dependency on the same were assessed using an interviewer administered structured questionnaire.

Results: Nearly 34.16% of the patients were using artificial sweeteners; however, only 9.4% of the patients were advised to take these substitutes. About 29.98% of the patients agreed to their dependency on these artificial sweeteners. The survey also found that 20.29% of patients started using NAS with the influence of television endorsements and the rest started using based on recommendation from friends or relatives.

Conclusion: The use of NAS among patients with diabetes remains high because of unregulated marketing and endorsements. This highlights the need for awareness and education on the use of NAS by dieticians and physicians. There are limited studies available on the demographics of NAS use among diabetics and general population, more so in understanding the long-term efficacy of the sugar substitute.

Keywords: Nutrition and diet

PP73

Echocardiac study of left ventricular diastolic dysfunction in normotensive asymptomatic type 2 diabetes mellitus

K Sihag[1], D Kochar[2], D Gupta[3]
1-S P Medical College, Bikaner, India, 2- S P Medical College, Bikaner, India, 3- S P Medical College, Bikaner, India

Background and Aims: To study the diastolic dysfunction of heart in type 2 diabetes mellitus (T2DM) patients who are normotensive asymptomatic and correlate it with duration of diabetes, diabetic retinopathy and glycosylated haemoglobin (HBA1C).

Materials and methods: Enrollment of normotensive (Blood pressure) asymptomatic diabetic patients reporting in our hospital to evaluate the presence of diabetic dysfunction through two dimensional transthorasic echocardiography and study the clinical history related biochemical investigation.

Results: on echocardiography evaluation of 100 patients,68 (68%) had diastolic dysfunction of which 54 cases had impaired relaxation, 9 cases had pseudonormal pattern and 5 cases had restricted filling. Diastolic dysfunction was highest in patients age 50-60 years (84.7%) compared to 59.3% and 49.4% in the age group 40-49 years and 25-39 years respectively. In patients who had HBA1C >7.5, 75.34% developed diastolic dysfunction which was statistically significant. In the study population 29% had retinopathy of which 93.01% developed diastolic dysfunction, also significant association of diastolic dysfunction was seen with duration of diabetes> 5 years.

Conclusion: The incidence of left ventricular diastolic dysfunction is higher in T2DM who are free of clinically detectable heart disease. The diastolic dysfunction found statistically significant with age, duration of diabetes, diabetic complications especially retinopathy and in those with HBA1C level >7.5.

Keywords: Cardiac complications

PP74

Case series report of acute movement disorders in diabetic hyperglycemia

NR Kiruthika[1], BA Philip[2]
1-Tirunelveli Medical College, Tirunelveli, India, 2- Tirunelveli Medical College, Tirunelveli, India

Background and Aims: Diabetes Mellitus affects Central Nervous system in many ways. Non ketotic hyperglycemia is an acute complication of uncontrolled diabetes mellitus in older patients. Non ketotic Hyperosmolar state presenting as involuntary movements is rare. Acute Hemichorea and Epilepsia partialis continua has been attributed to be the two most common movement disorder associated with Nonketotic hyperglycemia now.

Materials and methods: We report seven cases with movement disorder as presenting feature in diabetic patients who recovered well with control of blood sugar levels. All cases were investigated with imaging studies, screened for all diabetic complications and were followed up, counselled for strict diabetic control and lifestyle modifications.

Results: A series of seven cases, 5 cases of acute hemichorea and 2 cases of epilepsia partialis continua were seen in diabetes patients whose age ranges from 57 to 75 years. 5 among them were male and 2 were female. Their blood sugar on admission ranged from 490 t0 790 mg/dl, In all of them urine acetone were negative. MRI in acute hemichorea showed hyperintensities in contralateral basal ganglia and epilepsia partialis continua showed hyperintensities in nonspecific areas such as insula etc. They all are treated with insulin and supportive measures for adequate control of blood sugar. With adequate control of blood sugar, their symptoms of acute hemichorea and epilepsia partialis continua resolved completely within a period of 40 hours to 7 days. They are stable during their follow up period.

Conclusion: These case reports illustrate the importance of distinguishing this hyperglycemia as cause for acute hemichorea and epilepsia partialis continua from other intracranial pathologies as prompt glycemic control leads to complete resolution of the symptoms and signs. It is likely that patients with existing complications of diabetes are more prone for reversible neurologic complications. Hence these aspects must be taught and demonstrated in diabetic community education programmes.

Keywords: Prediction of type 2 diabetes; Education; Retinopathy; Other complications

Poster Discussion

PD01

Indications for IDegLira in Indian clinical practice- insights gained from our experience

J Kesavadev[1], A Shankar[2], A David[3], G Krishnan[4], S Jayanthi[5], L Ramachandran[6], S Jothydev[7]

1-Jothydev's Diabetes Research Centre, Trivandrum, India, 2- Jothydev's Diabetes Research Centre, Trivandrum, India, 3- Jothydev's Diabetes Hospital & Research Centre, Trivandrum, India, 4- Jothydev's Diabetes Research Centre, Trivandrum, India, 5- Jothydev's Diabetes Research Centre, Trivandrum, India, 6- Jothydev's Diabetes Research Centre, Trivandrum, India, 7- Jothydev's Diabetes Research Centre, Trivandrum, India

Background and Aims: IDegLira is a fixed-ratio combination of insulin Degludec and Liraglutide, approved for treating type 2 diabetes Mellitus (T2DM). Trials have demonstrated its efficacy across a range of baseline HbA1c, FBS and BMI tested, as well as, in individuals with uncontrolled T2DM treated with OHAs, OHAs+/- insulin, GLP1-RAs etc. This combination has also demonstrated superiority in terms of lowering CV death and hypoglycemic events.

Aim of the study was to evaluate the indications for and characteristics of T2DM individuals who were initiated on IDegLira in a real-world setting of Indian clinical practice, and to assess the clinical outcomes.

Materials and methods: Clinical characteristics and demographics of all T2DM individuals who had been prescribed with IDegLira at our clinic till July 2018 were extracted from our EMRs.

Results: n=44; age= 54.63±11.93 years, majority (61.36%) between 45 and 65 years of age; males= 72.73%; T2DM duration= 7.81±6.34 years; BMI= 28.76 ±3.80 kg/m²; HbA1c= 7.81±1.17 % (32.35% <7%, 26.47% 7-7.9%, 23.53% 8-8.9%, 17.65% >9%); IDegLira treatment duration= 6.88±4.17 months.

Previous medications before prescribing IDegLira: 9.09% on OHAs, 22.73% on OHAs+basal insulin, 20.45% on OHAs+basal bolus insulin, 18.18% on OHAs+biphasic insulin, 2.27% on OHAs+basal insulin+GLP1 RA and 2.27% on OHAs+GLP1 RA; 22.73% of patients started on IDegLira and 2.27% of patients started on IDegLira+insulin within 1 year of diabetes onset.

IDegLira dose: initial= 10.63±4.85 dose steps, current= 12.66±5.55 dose steps; Insulin TDD of those patients (28.57%) on IDegLira+insulin: initial= 24.7±12.11U, current= 24.7±12.52U. IDegLira treatment resulted in significant improvements in FBS, PPBS and HbA1c.

Graph/Table:

Parameter	Initial	Final
FBS, mg/dL	147.10±60.61	129.50±39.23*
PPBS, mg/dL	162.20±32.69	136.70±26.49**
HbA1c, %	7.81±1.17	7.18±1.07*
LDL, mg/dL	75.00±20.42	74.08±21.12
HDL, mg/dL	44.69±10.92	46.63±9.42
TG, mg/dL	145.10±52.93	150.50±89.79
TC, mg/dL	148.60±25.68	140.80±22.35
BMI, kg/m²	28.76±3.80	28.66±3.65
Body Weight, kg	83.41±14.12	83.11±13.57
**indicates p<0.01, *indicates p<0.05		

Conclusion: Analysis of prescription data of IDegLira indicated that the combination was used across a range of clinical profiles. Outcomes confirm that IDegLira could be an option in any stage of T2D and can be intelligently positioned along with other oral therapies (except DPP-4 inhibitors). In our experience, we have successfully combined IDegLira with metformin, SGLT2i, rapid-acting insulins, IDegAsp and other OHAs with commendable improvements in glycaemic parameters, hypoglycemic episodes etc.

Keywords: Incretin based therapies 43 Novel agents

PD02

A new body shape index - better marker of cardiovasular risk in type 2 diabetic north indian population

R Kapoor

Care Well Heart & Super Speciality Hospital, Amritsar, India

Background and Aims: Obesity, typically quantified in terms of Body Mass Index (BMI) exceeding threshold values, is considered a leading cause of premature death worldwide. For given body size (BMI), it is recognized that risk is also affected by body shape, particularly as a marker of abdominal fat deposits. ABSI has been also shown to be linearly and positively associated with visceral fat mass. This study is conducted to ascertain its relation with cardiovascular risk markers in T2D North Indian Punjabi Population.

Materials and methods: The study comprised of 2288 Type 2 diabetic patients (1006 female/ 1282 male), who were classified according to their ABSI z-score. A Body Shape Index (ABSI), which is defined as waist circumference (WC)/(body mass index (BMI)(2/3)×height(1/2)), is unique in that ABSI is positively correlated with visceral adiposity and is supposed to be independent of BMI. Data on Anthropometric as well as metabolic parameters (HbA1c, HDL, LDL, total cholesterol, TG & baPWV (Arterial stiffness index) were analyzed.

Results: 64.3% patients were found to be having Average mortality risk according to ABSI z-score whereas 22.6% were in High risk category. ABSI z-score was found to be significantly correlated with HbA1C (P<0.0001), PWV (P<0.001), Total Cholesterol (p<0.001) and HDL (P<0.0001). ABSI had little correlation with height, weight and BMI.

Conclusion: ABSI appears to reflect visceral adiposity independently of BMI and to be a substantial marker of cardiovascular risk markers in T2D North Indian Punjabi Population.
Keywords: Epidemiology

PD03

Prevalance and factors associated with erectile dysfunction in a diabetic population

N Gupta[1], D Gupta[2], VA Kothiwale[3]
1-KLE University, belgaum, India, 2- KLE University, belgaum, India, 3-KLE University, belgaum, India

Background and Aims: Erectile dysfunction (ED) has been reported to be associated with type 2 diabetes mellitus, as many studies in the past have reported significantly higher prevalence of ED, as compared to non-diabetic men. But ED is often the ignored aspect of diabetes management in India, as there are limited number of studies documenting its burden. Also, the understanding about the factors associated with ED among diabetic patients is still inadequate.
Objectives: To assess the prevalence of Erectile dysfunction and factors associated with it in sexually active males with type 2 diabetes mellitus and factors associated with it.
Materials and methods: The study was a cross sectional study, conducted in the general medicine department of tertiary care teaching hospital in south India. The study included 509 sexually active men aged > 20 years, with type 2 diabetes mellitus attending the study setting between January 2016 to June 2017, by convenient sampling. Subjects of spinal cord injury, H/o pelvic surgery / pelvic fracture or H/O pelvic radiation, patients with drug abuse and people with psychiatric disorders on mood elevators or antipsychotic drugs were excluded. International Index of Erectile Function (IIEF-5) was used assess ED. ED was classified into five categories based on the IIEF-5 scores: severe (5-7), moderate (8-11), mild to moderate (12-16), mild (17-21), and no ED (22-25). Univariate and multivariate logistic regression analysis was used to assess the factors associated with ED.
Results: The mean age was 51.08 ± 9.40. The prevalence of Erectile dysfunctionwas 59.53%. ED was mild in 139 (27.31%), Mild-moderateED was seen in 98 (19.25%), Moderate ED was seen in 27 (5.30%) and Severe ED was seen in 39 (13.16%) subjects. The mean ED Duration was 4.719 ± 5.434 years. In multivariate analysis, the factors associated with ED were higher age of Individual, married status, and poor glycemic control.
Conclusion: There is a need to carry out further large-scalemulticenter studies on the subject, to understand the strong risk factors for ED among diabetic population. There is need to assess the impact of erectile dysfunction on psychological health, quality of life of individual.
Keywords: Epidemiology; Neuropathy: autonomic, incl. erectile dysfunction

PD04

Role of artificial sweeteners in the process of Glycation and aggregation

A Ali[1], D Kumar[2]
1-University of Mumbai, Mumbai, India, 2- University Of Mumbai, Mumbai, India

Background and Aims: Diabetes is a metabolic disorder which is manifested in the form of glucotoxicity and hyperglycemia. Accumulation of sugars leads to the generation of deleterious products. Amadori and Advanced Glycation End products (AGEs) are formed as a result of the interaction between carbonyl groups of reducing sugars and amino groups of proteins and other macromolecules during Glycation. Artificial sweeteners have replaced the natural sugars in the food and beverage industry because of many reasons such as hyperglycemia and cost. Acesulfame-K, Aspartame, Saccharin, and Sucralose are the most commonly used sweeteners. The objective of this study was to investigate the influence of artificial sweeteners on the formation of AGEs and protein oxidation in an in vitro model of glucose-mediated protein glycation.
Materials and methods: In the present study, all these sweeteners were used to assess their glycating properties by established methods like fructosamine assay, determination of carbonyl content, protein aggregation and measurement of fluorescence.
Results: The results indicated that most of the artificial sweeteners used in the study did not affect the process of glycation. However it was found that Acesulfame potassium has antiglycating potential as it caused decreased formation of Amadori products and AGEs in a duration-dependent manner. It was also observed that Acesulfame potassium prevented the glycation induced aggregation of BSA.
Conclusion: All these results indicate the antiglycating and anti0aggregating role of acesulfame potassium. This study is significant in understanding the probable role of artificial sweeteners in the process of glycation and the subsequent effect on macromolecular alteration.
Keywords: Nutrition and diet

PD05

Effect of yoga asanas on sleep pattern and glycemic control among subjects with type 2 diabetes - a preliminary report from South India

S Avasarala[1], S Sivakumar[2], S Kumpatla[3], V Viswanathan[4]
1-Prof.M.Viswanathan Diabetes Research centre, Chennai, India, 2-Prof.M.Viswanathan Diabetes Research centre and M V Hospital for Diabetes, Chennai, India, 3- Prof.M.Viswanathan Diabetes Research centre and M V Hospital for Diabetes, Chennai, India, 4- Prof.M.Viswanathan Diabetes Research centre and M V Hospital for Diabetes, Chennai, India

Background and Aims: Exercise plays a pivotal role in the management of diabetes along with diet and medication. Yoga has been shown to have beneficial effects on regulation of blood pressure, glycemic control and weight reduction. This study aimed to see the effect of yogaasanas on sleep pattern and biochemical parameters among subjects with type 2 diabetes (T2DM).
Materials and methods: This present case-control study was done among 145 (M: F 92:53) T2DM subjects attending a tertiary care Centre for diabetes between (Feb 2017- April 2018) in Chennai, Tamil Nadu. Among the 145 subjects recruited in the study, 17.2 % were dropped out from the study due to various reasons and 120 (M: F 76:44) subjects were included for final analysis. The subjects were randomized into two groups. Group 1, control group (n=60) were advised on walking and loosening exercise. Group 2, study group (n=60), where subjects are advised and trained on practising yogaasanas and Pranayama. Intervention in both the groups is for a period of one hour per day. Diabetes treatment was unchanged in both the groups during the study period. The subjects of both the groups were followed up after 3months. Sleep patterns were assessed using Pittsburgh sleep quality questionnaire, it is related to their usual sleep habits during the past month. The 19 self -rated items are combined to form seven component scores, each

of which has a range of 0-3 points, the scores are then added to yield one global score, if the score is above 5 it was considered as poor quality of sleep. Anthropometric and biochemical parameters were recorded at baseline and follow up. Statistical analysis was done using SPSS software version 20.

Results: The mean age of the study and control group subjects was (49.1 ±7.2) (52±6) years. There was a reduction in BMI in the study group when compared with the control group (p=0.008). Slight reduction in glucose levels was observed among the study group subjects. HbA1c % showed the greater reduction in the study group as compared to control group (Baseline Vs Follow up 7.54±0.30; 7.23±0.56; p<0.001 Vs 7.45±0.27; 7.4±0.74; p=0.62). Blood pressure did not differ significantly at follow up in both the groups. Non-HDL cholesterol alone improved in the study group (Baseline Vs Follow up 111.6±36.3; 95.9±33.2, p=0.002 Vs110 ±37.6; 103 ±36.4; p =0.075). In the study group, subjects having normal sleep quality at baseline (60.8%) improved to (72 %) at follow up; (p =0.031) whereas in the control group there was no improvement noted in the sleep quality (p=0.5).

Conclusion: Regular practice of yoga improves glycemic control and sleep pattern among subjects with T2DM. It is evident from the current study that yogaasanas can be used as an adjuvant therapy for managing T2DM.

Keywords: Exercise physiology

PD06

Non alcoholic fatty liver disease and carotid artery intima medial thickness in type 2 diabetes mellitus as a predictor of atherosclerosis

RR Revankar[1], V Chail[2]
1-Dr.B.R Ambedkar medical college, Bengaluru, India, 2- Dr.B.R Ambedkar medical college, Bengaluru, India

Background and Aims: Non alcoholic fatty liver disease (NAFLD) is a growing epidemic worldwide due to obesity and insulin resistance and is considered as hepatic component of metabolic syndrome (MS). Therefore these patients are at increased risk of atherosclerosis and cardiovascular mortality. Carotid intima medial thickness (CIMT) is useful non invasive tool for detection of subclinical atherosclerosis.

To determine relationship between NAFLD and carotid intima medial thickness

Materials and methods: A total of 100 cases with Type II Diabetes mellitus were selected. Fifty patients with NAFLD, confirmed on ultrasound as cases and 50 controls with normal liver parenchyma underwent carotid artery Doppler for measurement of CIMT. Informed consent taken and ethics committee approved the study.

Inclusion criteria: Non-alcoholic patients above age of 18 years with type 2 diabetes mellitus

Exclusion criteria: Patients with hepatitis, chronic liver disease, on hepatotoxic drugs, acute/chronic kidney disease, pregnancy, malignancy, smokers & alcoholics.

Age, gender, body mass index were recorded. Fasting & postprandial plasma glucose, lipid profile, glycosylated hemoglobin, SGOT &SGPT were done. B-mode ultrasonography done to detect fatty changes in the liver. CIMT was measured in both common carotid arteries one centimeter below bifurcation. Mean of maximum values was calculated and the averages of both values were taken.

Data was analyzed on SPSS 20.0 and results were compared for the two groups.

Results: We assessed 50 patients with NAFLD (32 males, 18 females) and 50 controls (25 males, 25 females). Mean patient age in NAFLD group was 59.34 years & 58.14 years in control group. Mean body mass index (BMI) of NAFLD group was slightly lower as compared to the controls. In NAFLD group 27 had Grade 1 NAFLD and 23 cases had Grade 2. Mean

CMIT in NAFLD group was 0.84±0.10 mm and in control group 0.78 ±0.15 mm (p=0.025) Both SGOT and SGPT levels were found to be higher in cases compared to controls with p value <0.01. FBS and PPBS levels were higher in cases

Graph/Table:

Variables	Group	N	Mean	SD	p- value
BMI	Control	50	29.00	2.38	0.11
	Cases	50	28.28	2.00	
FBS	Control	50	125.22	16.27	0.29
	Cases	50	128.44	13.58	
PP2BS	Control	50	189.88	21.25	0.01
	Cases	50	202.90	28.85	
HbA1c	Control	50	8.54	1.35	0.24
	Cases	50	8.28	0.80	
SGOT	Control	50	24.80	5.65	<0.01
	Cases	50	29.72	4.72	
SGPT	Control	50	33.94	4.67	<0.01
	Cases	50	41.88	8.39	
Variables	NAFLD	N	Mean	SD	p- value
CIMT	I	27	0.82	0.13	0.345
	II	23	0.86	0.16	

Conclusion: In our study, incidence of NAFLD was found higher in males and increased CIMT was found in cases compared to controls although not statistically significant. However both SGOT and SGPT were elevated in cases compared to control which was significant statistically (p<0.01), indicating the routine use of these enzymes for early detection of NAFLD. NAFLD and CIMT can be detected by ultrasonography which is simple non-invasive test that will help in early diagnosis and treatment of cardiovascular complications.

Keywords: Non-alcoholic fatty liver disease (NAFLD)

PD07

Treatment of NAFLD by SGLT 2 inhibitors - a promising approach

S Panchal[1], R Gupta[2], P Saxena[3], A Rajani[4], B Aich[5]
1-Janssen pharmaceuticals, Mumbai, India, 2- Fortis Hospital, Delhi, India, 3- SMS hospital, Jaipur, India, 4- Janseen Pharmaceticals, Mumbai, India, 5- Janssen Pharmaceuticals, Mumbai, India

Background and Aims: Non-alcoholic fatty liver disease (NAFLD) is highly prevalent (50-70%) in patients with type 2 diabetes mellitus. There is a complex interplay of disordered glucose regulation, dysregulated lipid metabolism, insulin deficiency, obesity, insulin resistance that results in occurrence of NAFLD in T2DM. Diabetes is not only cause but also a consequence of NAFLD. Also, NAFLD has been associated with an increased prevalence of both micro- and macrovascular complications in patients with type 1 or 2 diabetes. SGLT2 I with an insulin independent action, decreases glucotoxicity, body weight, insulin resistance, blood pressure might help preventing occurrence as well as progression of NAFLD in diabetes.

Materials and methods: All relevant articles describing use of SGLT2i in NAFLD were searched on Pubmed and google scholar. Data obtained was described in results.

Results: In study conducted in 56 DM patients with NAFLD by Cusi et. al, use of canagliflozin 300mg for 24 weeks showed higher reduction in intrahepatic triglyceride (IHTG) level compared to placebo (38% vs 20%) as measured by gold standard magnetic resonance and spectroscopy. This

decreased IHTG might be attributed to improved insulin sensitivity and significant weight loss seen in Cana 300 arm.

In E-LIFT trial involving 50 patients with NAFLD & DM, group receiving empagliflozin 10mg for 20 weeks showed significant reduction in primary outcome of reduction in liver fat as measured by MRI-derived proton density-fat fraction (MRI-PDFF) method (mean difference between empagliflozin and control groups: -4.0%, p = <0.0001). Compared to baseline, there was significant difference in end-of-treatment MRI-PDFF for the empagliflozin group (16.2% to 11.3%, p = <0.0001) as compared with the control group (16.4% to 15.5%, p = 0.057).

Shibuya T et al in 32 T2DM patients with NAFLD showed that luseogliflozin significantly reduced liver fat deposition as compared to metformin, which may indicate clinical relevant benefits for NAFLD

Conclusion: SGLT 2 inhibitors can be a novel class of promising agents for the treatment of T2DM patients with NAFLD. Prospective randomized controlled trials are warranted to confirm their impact on T2DM with NAFLD.

Keywords: SGLT inhibitors; Non-alcoholic fatty liver disease (NAFLD)

PD08

Evaluation of insulin sensitivity and beta cell function in fibrocalculous pancreatic diabetes patients

A Yalamanchi[1], S Channabasappa[2]
1-Vydehi institute of medical sciences and research centre, Bangalore, India, 2- Vydehi institute of medical sciences and research centre, bangalore, India

Background and Aims

Background: Fibrocalculous pancreatic diabetes (FCPD) is a secondary form of diabetes associated with exocrine and endocrine pancreatic insufficiency. Insulin deficiency plays a major role in etiopathogenesis of FCPD. Limited data suggests role of insulin resistance in pathogenesis of FCPD. There are sparse data on measures of insulin sensitivity and beta cell function in patients with FCPD.

Aims: To estimate insulin resistance and beta cell function in FCPD using OGTT based indices and compare with T2D and controls.

Materials and methods: We recruited 80 patients with FCPD, 36 patients with T2D and 36 healthy control subjects.

Hyperglycemia was corrected for 24hrs prior to the test by multiple short acting insulin injections. Long acting and intermediate acting insulins were withheld 24hrs prior to the test. Oral anti diabetic medications were withheld 36 hrs prior to the test. After 10-12 hr overnight fast, patients were advised to ingest 75g anhydrous glucose in 300ml of water over a period of 5mins. Blood samples were collected at 0, 30, 60, 90 and 120min for determination of plasma glucose and serum insulin levels. Insulin sensitivity was estimated using HOMA-IR, QUICKI and ISI-K indices. Beta cell function was estimated using HOMA-B, Insulinogenic index and oral disposition index.

Results: The mean BMI was 22.12 ± 3.77 for controls, and 18.87 ± 2.86, 23.64 ± 3.39 for patients with FCPD and T2D respectively. Mean FPG was 202.24 ± 86.67, 204.08 ± 93.52, 81.97 ± 6.49 for patients with FCPD, T2D and controls respectively. HOMA-IR was significantly higher in patients with T2D and FCPD as compared to controls. Similarly ISI-K and QUICKI indices suggested the presence of insulin resistance in both FCPD and T2D patients. HOMA-B, Insulinogenic index and oral disposition index showed insulin deficiency in patients with FCPD and T2D. Patients with FCPD had significantly lower beta cell function compared to T2D as evidenced by significantly lower HOMA-B and insulinogenic index.

Conclusion: FCPD is associated with insulin resistance as assessed by OGTT based indices. Greater degree of insulin deficiency was observed in FCPD than T2D. Insulin resistance may play a role in the pathogenesis of FCPD.

Keywords: Pancreas and islet transplantation; Insulin sensitivity and resistance

PD09

Dapagliflozin suppresses plasma hepcidin concentrations

P DANDONA
University at Buffalo, New York, United States

Background and Aims: Dapagliflozin and other SGLT2 inhibitors are known to increase hematocrit. One possible mechanism is glycosuria and polyuria and the loss of fluid from the vascular compartment. However, since type 2 diabetes is a pro-inflammatory state and since hepcidin, a known suppressor of erythropoiesis, is increased in pro-inflammatory states, we investigated the possibility that dapagliflozin suppresses hepcidin concentrations and thus increases erythropoiesis.

Materials and methods: Twenty-two patients with type 2 diabetes and normal renal function (mean age: 62.1±1.7 years) were randomly treated with placebo or dapagliflozin 10 mg daily for 12 weeks. In the dapagliflozin group, there was a fall in HbA1c from 7.1±0.2% to 6.7±0.2% (p<0.05), increase in hemoglobin concentration from 13.2±0.8g/L to 13.8±0.4g/L (p<0.05) and in Hct from 40.2±1.3% to 41.9±1.8% (p<0.05). Plasma concentration of hepcidin fell from 265±26ng/mL to 215±24ng/mL (p<0.05).

Results: There was no significant change in any of these indices in the placebo group. Since one of the mechanisms through which hepcidin inhibits erythropoiesis is the suppression of the expression of ferroportin, which transports iron from iron storage cells into plasma, we also measured ferroportin expression in peripheral blood mononuclear cells. The expression of this transporter was not altered.

Conclusion: We conclude that dapagliflozin suppresses hepcidin concentrations significantly, consistent with an increase in erythropoiesis and hematocrit but by a mechanism not involving ferroportin expression.

Keywords: SGLT inhibitors

PD10

Prevalence of depression in indian patients with type-2 diabetes mellitus and/or hypertension: DEPTH study

R Lalwani[1], JD Shah[2], T Chatterjee[3], PN Rao[4], S Erande[5]
1-P.G Medical Centre, Delhi, India, 2- Sharada Medical Nursing, Ahmedabad., India, 3- Dr. Tapas Chatterjee Consultancy, Kolkata, India, 4- Icon Hospital, Hyderabad, India, 5- Akshay Hospital, Pune, India

Background and Aims: Patients with type-2 diabetes mellitus (T2DM) and hypertension (HTN) are at increased risk of depression which eventually worsens the symptom perception, negatively impact self-care behaviour and produce detrimental effect on clinical outcomes. Hence the objective of this study was to determine the prevalence of depression in Indian patients with controlled and uncontrolled T2DM and/or HTN. The association of depression with socio-demographic profile and clinical risk factors was also assessed.

Materials and methods: About 1829 eligible patients with T2DM and/or HTN were included in this cross-sectional clinico-epidemiological pan India study conducted across 54 sites in India. The primary outcome measure was to determine the prevalence of depression in T2DM, HTN and T2DM + HTN patients. The other outcome measures were to identify the association between depression and patients' demographic profile, socio- economic status, lifestyle parameters, co-morbidities, disease duration, anxiety, and clinically diagnosed insomnia.

Results: All 1829 patients (T2DM: 631; HTN: 573; T2DM+HTN: 625) completed the study. The prevalence of depression in T2DM, HTN and T2DM+HTN patients was 37.9%, 46.1% and 48.4%, respectively. A higher proportion of patients with uncontrolled T2DM and HTN reported depression than those with controlled T2DM and HTN (T2DM: 31.1% vs. 6.8%; HTN:33.8% vs. 12.3%). Association between higher monthly family income and socioeconomic status with depression was evident in patients with T2DM and HTN (p<0.05). There was a significant association between anxiety and depression across all indications (p<0.0001). The most common comorbidity reported was dyslipidemia (T2DM: 24.22%, HTN: 14.87%, T2DM+HTN: 27.3%). Among the complications, angina (13.01%) and heart failure (11.15%) were most common in HTN patients, diabetic neuropathy (13.35%) in T2DM and angina (12.50%) and diabetic foot ulcers (2.30%) in T2DM+HTN patients. There was no significant association between depression and comorbidities/complications in T2DM and/or HTN cases.

Conclusion: Depression is quite prevalent among Indian patients with T2DM and/or HTN. Our results indicate that patients with controlled T2DM/HTN have less odds of depression. A direct significant association between depression and various socio-demographic variables was also noted in this study. Further, patients with depression tend to have high chance of comorbid anxiety.

Keywords: Epidemiology

PD11

The effect of flaxseed supplementation on body weight and glycemic control

P Trueman[1], U Mageshwari[2], D Krishnan[3], V Viswanathan[4]
1-Prof M Viswanathan Diabetes Research Center and M V Hospital for Diabetes, Chennai, India, 2- Prof M Viswanathan Diabetes Research Centre and M V Hospital for Diabetes, CHENNAI, India, 3- D V Living Sciences Pvt Ltd, CHENNAI, India, 4- Prof M Viswanathan Diabetes Research Centre and M V Hospital for Diabetes, CHENNAI, India

Background and Aims: Dietary fibres are linked to a reduced risk of life style diseases. The aim was to examine whether flaxseed in the diet reduces weight and brings about glycemic control.

Materials and methods: The study was a randomized trial. Participants visiting a tertiary care centre were screened whose ages were between 25 and 55 years, meeting the inclusion criteria. About 100 participants were recruited for the study i.e. 56 men and 44 women. All the participants were on OHA and did not change their medication during the trial period. They were divided into two groups' control and trial group with 50 participants each. Both groups received intense diet counselling and were asked to maintain their normal diet with 30 mins of brisk walking daily. The trial group was counselled to include 2 levelled tablespoons of powdered whole flax seed in 100ml of water as an adjunct to the control group. The duration of the study was for 3 months.

Results: The initial weight of the control and trial group was measured in kilograms i.e. 77.75±11.99 and 79.44±12.28 respectively. After the three month intervention period the weight was 78.45±12.01 and 75.62±11.73 respectively. The loss in weight in the trial group was highly significant. The p value for the control group was 0.007 and that for the trial group was 0.000.

The HbA1c values for the control group was 7.67±1.09 at baseline and 7.95±1.16 after the intervention period with a p of 0.026 while the baseline HbA1c of the trial group was 7.75±0.94 and 6.76±0.68 after the intervention period with a p value of 0.000.

Conclusion: These findings suggest that flaxseed supplementation helps reduce weight and helps in glycemic control.

Keywords: Weight regulation and obesity, Nutrition and diet

PD12

The association of post-prandial hypertriglyceridemia and carotid intima-media thickness in patients with type 2 diabetes mellitus

C M.G.A.[1], S BR[2], A Visweswar[3]
1-Dr. B.R. Ambedkar Medical College and Hospital, Bangalore 560045, Bangalore, India, 2- Dr. B.R. Ambedkar Medical College and Hospital, Bangalore 560045, Bangalore, India, 3- Dr. B.R. Ambedkar Medical College and Hospital, Bangalore 560045, Bangalore, India

Background and Aims: The carotid intima-media thickness (CIMT) is increased in patients with post-prandial hypertriglyceridemia despite normal fasting triglyceride (FTG) levels. To investigate the role of post-prandial hypertriglyceridemia in early atherosclerosis, there is a need to correlate between post-prandial triglyceride (PPTG) levels and carotid intima-media thickness values.

Aims:

1. To estimate the levels of fasting and post prandial triglycerides in patients with type 2 Diabetes Mellitus

2. To estimate the carotid intima media thickness by Doppler ultrasonography

3. To correlate postprandial triglyceride levels and CIMT with other risk factors in these subjects

Materials and methods: Prospective, cross-sectional study was done among 50 type 2 diabetes mellitus patients aged >35 years of either sex of >1 year duration of disease in inpatient and outpatient departments of Dr. B.R. Ambedkar Medical College and Hospital. The study group was divided into three groups based on their FTG and PPTG values into Normo-normal (NN) group, Normo -Hyper (NH) group and Hyper-Hyper (HH) groups

Results: The mean CIMT in NN group was 0.866mm, 1.474 mm in NH group and 1.751 mm in the HH group. The comparison of CIMT among the three groups showed statistical significance in the groups NN vs NH (p value - 0.001) and NN vs HH (p value - < 0.001). FTG showed moderate correlation (r = 0.59) as compared to PPTG which showed strong correlation (r= 0.71). PPTG turned out to be an independent and strong predictor of CIMT and hence atherosclerosis with a p value of < 0.001 (statistically significant)

Conclusion: This study suggests that levels of both the FTG and PPTG correlate well with CIMT. Hence can cause atherosclerosis in patients with Type II Diabetes Mellitus. PPTG is an independent risk factor for atherosclerosis. Hence, FTG and PPTG level in patients with type 2 diabetes is important and should be made routine in the evaluation of diabetic dyslipidemia.

Keywords: Lipid metabolism, Macrovascular disease

PD13

Women with maternal history of diabetes are at high risk of developing type 2 diabetes - a family study from South India

R Parveen[1], S Stanson[2], S Kumpatla[3], V Viswanathan[4]
1-Prof M Viswanathan Diabetes Research centre and M V Hospital for Diabetes, Chennai, India, 2-Prof.M.Viswanathan DRC and M V Hospital for Diabetes, Chennai, India, 3- Prof.M.Viswanathan DRC and M V Hospital for Diabetes, Chennai, India, 4-Prof.M.Viswanathan DRC and M V Hospital for Diabetes, Chennai, India

Background and Aims: Diabetes has a high rate of morbidity and mortality towards global health. The risk factors associated with diabetes to be well studied for its early detection and prevention. Familial transmission of diabetes from parents to offspring plays a vital role and is a established risk factor. The aim of this study was to investigate the family transmission of type 2 DM in South Indian population

Materials and methods: A total of 3094 subjects (M:F 2044:1049) aged ≥15 years were selected for this study from a tertiary care center for diabetes in south India, Chennai between June 2017-May2018. Anthropometric and details on family history of diabetes, treatment details, age, age at onset of diabetes are collected using a well designed questionnaire. The subjects are divided into three groups based on the family history risk categories maintained as registries. Group1 (n=1414) (M:F 928:486) with no parent diabetes, Group2 (n=1216) (M:F 808:408) with one parent diabetes and Group3(n=463) (M:F 308:155) with both parents diabetes. The history of diabetes in siblings was also recorded. Diagnosis of diabetes was confirmed based on the history of treatment and by the results of OGTT. SPSS version 20 was used for statistical analysis.

Results: There were (66.1%) of males and (33.9%) of females subjects. In Group2, genderwise comparison showed higher transmission of diabetes from mothers than fathers. In particular, women had more maternal history of diabetes than paternal history [228(55.9%) vs 171(41.9%); p<0.001]. However, in men it was non significant [406(50.2%) vs 384(47.5%); p=0.296]. In men, while comparing the history of diabetes in siblings, number of brothers affected by diabetes was higher than the number of sisters (78% vs 29% ;p<0.001) whereas in women, sisters affected was higher than brothers (70.3% vs 45.7% ;p<0.001) In Group2, the mean age at onset of diabetes in fathers was (51.6 ± 12.3) and in mothers (53.1 ± 11.9) years (p=0.046) whereas in subjects it was (42.6 ± 10) years. In Group3, mean age at onset of diabetes was similar in fathers and mothers (50.3 vs 50.5) whereas in the subjects it was 40.1 ± 10 years. In Groups 2 and 3, the mean age at onset of diabetes in the subjects was one decade earlier than the mean age at onset of diabetes in parents. Age at onset was much younger in Group3 subjects as compared to Group2 (40.1 vs 42.6;p<0.001).

Conclusion: In this family study, women with maternal history of diabetes are at high risk of developing type2 DM.
Men had higher percentage of brothers affected by diabetes whereas women had higher percentage of sisters affected by diabetes. The mean age at onset of diabetes in subjects with a history of diabetes in parents was a decade earlier than the mean age at onset of diabetes in their parents.

Keywords: Prediction of type 2 diabetes

PD14

Yoga helps in improving glycemic variability in type 2 diabetes mellitus - results of pilot study

V Vijayakumar[1], R Mavathur[2], S Kannan[3]
1-Madras Diabetes Research Foundation (MDRF), Chennai, India, 2-Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA), Bengaluru, India, 3- Narayana Health (NH) City, Bengaluru, India

Background and Aims: Glycemic variability is associated with cardio-vascular complications and diabetic neuropathy in type 2 diabetes mellitus (T2DM). Yoga is a moderate intensity physical activity, which is considered to be beneficial for patients with T2DM. The aim of the study is to find the effect of yoga in reducing glycaemic variability.

Materials and methods: Ten participants were recruited in this pilot study using convenient sampling method from a private hospital in Bengaluru. Glycemic variability was measured using Flash glucose monitoring system from Freestyle Libre Pro©, Abbott, Oxon, UK. During the first 7 days, baseline glycaemic variability was established, followed by 7 days of yoga intervention. A traditional validated yoga module including asanas, pranayamas and meditation was delivered by a certified yoga professional, one hour everyday from day 8-14. Data was obtained on day 1, 7 and 14.

Results: Nine participants completed the study. Data analysis was done using statistical package for social sciences (SPSS)- version 24.0. Earlier, the glycemic variability was extracted from the raw data obtained from flash glucose monitoring device, using EasyGV software (version 9.0). Mean reduction in average glucose level of 0.68 mmol/L (p=0.007) was observed after one week yoga practice. A significant (p<0.05) reduction in the glycaemic variability (CONGA: 7.38 ± 2.29 vs 6.744 ± 1.99; MODD: 1.97 ± 0.71 vs 1.67 ± 0.56; SD: 2.30 ± 0.86 vs 1.99 ± 0.66) and higher percentage of time within the target (GRADE: 6.21 ± 5.85 vs 4.79 ± 4.92 (p<0.05); ADRR: 19.73 ± 12.25 vs 15.33 ± 9.25 (p=0.01); J Index: 39.44 ± 23.18 vs 32.23 ± 18.07 (p<0.05)) was also observed.

Graph/Table:

Table 1: Comparison of changes in ambulatory glucose profile before and after yoga

	Pre	Post	Difference	p value	Correlation co-efficient (pre &post) r
Mean daily glucose (mmol/L)	8.35±2.33	7.67±2.05	0.68±0.65	0.014*	0.96
S.D.	2.30±0.86	1.99±0.66	0.31±0.36	0.036*	0.92
MODD	1.97±0.71	1.67±0.56	0.3±0.38	0.048*	0.85
CONGA	7.38±2.29	6.74±1.99	0.64±0.73	0.031*	0.95
GRADE	6.21±5.85	4.79±4.92	1.42±1.74	0.04*	0.96
ADDR	19.73±12.25	15.33±9.25	4.4±4.67	0.022*	0.94
J INDEX	39.44±23.18	32.23±18.07	7.21±8.90	0.041*	0.94

*p < 0.05

S.D. – Standard deviation; **MODD** – Mean of daily differences; CONGA – Continuous overlapping of net glycaemic action; GRADE – Glycemic risk assessment in diabetes equation; ADRR – Average daily risk ratio

Conclusion: Short term yoga practice has shown a statistically significant reduction in the glycaemic variability.
Adequately powered randomized controlled trials (RCTs) with active control group are required to confirm the findings.

Keywords: Devices; Cardiac complications

PD15

To study relationship between baseline serum hs-CRP and subsequent risk of development or progression of diabetic nephropathy in type 2 diabetes

V Gehlot
Sardar Patel Medical College Bikaner, Bikaner, India

Background and Aims: To study baseline hs-CRP levels and to correlate hs-CRP and changes in urinary albumin creatinine ratio among type 2 diabetes mellitus patients.

Materials and methods: This was a prospective cohort study done between July 2016 to December 2017. In present study we selected total 215 patients according to inclusion criteria. Out of them 14 cases were excluded from the study because they did not come at follow up. Finally 201 patients were included in the study and out of them 95 were females and 106 were males. Data thus collected were analysed in following steps by using SPSS17.0, considering p value <0.05 as statistically significant.

Results: Mean hs- CRP in initial UACR group < 30 was 1.76+-1.37mg/l and in >=30 it was 6.12+- 3.36mg/l and this difference was found statistically highly significant (p<0.001). Mean change in UACR in hs- CRP group <3mg/l was 42.16+-48.20, in hs -CRP group 3-6mg/l, mean change in UACR was 158.76+-80.41, in hs-CRP group >6-9mg/l it was 204.05+-88.13 and in hs-CRP group >9mg/l it was 220.80+-119.01. on applying ANOVA test, the difference was found statistically highly significant (p<0.001).

Conclusion: Recent evidence suggests that chronic subclinical inflammation may play a key role in the initiation and progression of diabetic nephropathy. C-reactive protein (CRP), an acute phase reactant, is a highly sensitive marker of inflammation. We found hs-CRP is high in microalbuminuria group compared to normoalbuminuria group. It was also found in our study that diabetic nephropathy is associated with hs- CRP level.

PD16

Study of correlation of CD4/CD8 count and its ratio with tuberculous pneumonia and non tuberculous (bacterial) pneumonia in type 2 diabetes mellitus

A Chakranarayan[1], S Kumar[2], R Lakhiwal[3]
1-Sardar Patel Medical College, Bikaner, India, 2- Sardar Patel Medical College, Bikaner, India, 3- Sardar Patel Medical College, Bikaner, India

Background and Aims: Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distinct types of DM are caused by a complex interaction of genetics and environmental factors. disease states which increase the risk of developing tuberculosis includes HIVchronic lung disease, alcoholism and diabetes mellitus. The relative risk of developing bacteriologically confirmed Pulmonary Tuberculosis (PTB) is five times greater in diabetic patients. Therefore, DM remains a well-established risk factor for TB and TB can worsen glycemic control in patients with diabetes. The CD4:CD8 ratio is a measure of balance immune function.

Materials and methods: Present study was conducted from June 2017 to December 2017 in S.P. Medical College & Associated Group of P.B.M. Hospitals, Bikaner. The present study was a case control study. It included 150 subjects, which includes a group of 50 type-2 diabetic patients having tuberculous pneumonia, a group of 50 type-2 diabetic patients having non tuberculous pneumonia attending Medical Outdoor & those Admitted in Hospital IPD Wards And 50 patients of type 2 diabetes as a Control group. Healthy volunteers wereM included as control after matching age and sex.

Results: In tuberculous pneumonia, the mean CD4, CD8, and CD4/CD8 ratio of male diabetics were 971.26, 658.95, 1.5 respectively, and 1006.06, 650.29, 1.61 were of female diabetics. Whereas, in non tuberculous pneumonia, the mean CD4, CD8, and CD4/CD8 ratio of male diabetics were 792.43, 451.29, 1.79 respectively, and 740.24, 448.81, 1.71 were of female diabetics. On statistical comparison the difference was found to significant (p value-0.001) when the diabetics of tuberculous pneumonia were compared with the diabetics of non tuberculous pneumonia and when the controls were compared with the diabetics of non tuberculous pneumonia.

Conclusion: Tuberculosis in persons with DM is characterized by elevated numbers of CD4 and CD8 cells, indicating that DM is associated with an alteration in the immune response to tuberculosis, leading to a induction of CD4 and CD8 mediated cellular responses and likely contributing to increased immune pathology in M. tuberculosis infection

Keywords: Epidemiology

PD17

Effect of Vitamin D supplementation on microalbuminuria in normotensive pre-diabetics with vitamin d deficiency: a randomized controlled trial

A Rana[1], N Dev[2], J Sankar[3]
1-VMMC & Safdarjung Hospital, Delhi, India, 2- VMMC & Safdarjung Hospital, Delhi, India, 3- AIIMS, Delhi, India

Background and Aims: Prediabetes is an important metabolic condition associated with progression of both micro vascular and macro vascular complications including nephropathy, retinopathy and neuropathy. Microalbuminuria is one of the various markers that has been studied to identify these complications at an early stage and has been shown to be associated with various modifiable factors including Vitamin D. Various studies have explored the effect of Vitamin D supplementation on proteinuria in diabetic population and results have been encouraging. However, there is dearth of literature about the role of vitamin d supplementation on Microalbuminuria in Prediabetes. With the above-mentioned research lacunae, the present study was undertaken to assess the effect of Vitamin D supplementation on Microalbuminuria in vitamin D deficient normotensive pre-diabetic patients.

Materials and methods: In this randomized, double blind, placebo-controlled clinical trial, Sixty normotensive, Vitamin-D deficient adults with pre diabetes and Microalbuminuria presenting to the out-patient department of a tertiary care Institute, were randomized to 60000 IU Vitamin-D (n = 30) or placebo (n = 30) weekly for 8 weeks. Microalbuminuria was measured using Albumin Creatinine ratio (ACR) along with other parameters including fasting plasma glucose (FPG), post-prandial blood glucose (PPBG), HbA1c and vitamin-D levels at the end of 8 weeks. Data was analyzed using STATA 11. The study was approved the Institutional ethics committee and is registered with Clinical trial registry of India (CTRI/2018/03/012538).

Results: In the Vitamin-D group, median serum Vitamin D (nmol/lit) levels increased from a mean (SD) of 26.5 (6) to 68(12) at the end of 8 weeks while the levels remained unchanged in the placebo group [28 (6) and 27 (7) at baseline and 8 weeks respectively) (**p<0.0001**). The reduction in Microalbuminuria was also significant in the Vitamin-D group as the mean (SD) ACR levels decreased from 108 (58) to 57 (28) (mg/gm) (**p=0.0001**) at 8 weeks as compared to 108 (60) to 116 (61) (p=0.92) in

the placebo group. The HbA1c levels decreased from 5.5 (0.45) to 5.4 (0.28) (**p=0.012**) in the Vitamin-D group and from 6 (0.47) to 5.5 (0.44) (**p<0.0001**) in the placebo group. The reduction in post prandial blood sugar was also significant in the Vitamin-D group [138 (15) to 125 (12), **p=0.0004**)] as compared to Placebo group [138 (14) at baseline and 133 (15) at 8 weeks; p=0.71)]. Other outcomes such as fasting blood glucose or BMI were not different between the groups.

Conclusion: Oral vitamin-D supplementation at 60000units/week for 8 weeks in normotensive vitamin-D deficient prediabetics seemed to decrease Microalbuminuria in these individuals as compared to placebo.

Keywords: Nutrition and diet; Nephropathy; Other complications

PD18

Prevalence of insulin resistance in non-obese, euglycemic and normotensive first degree relatives of obese individuals

R Kumar[1], N Dev[2], J Sankar[3]
1-VMMC & Safdarjung Hospital, Delhi, India, 2- VMMC & Safdarjung Hospital, Delhi, India, 3- AIIMS, Delhi, India

Background and Aims: Insulin resistance (IR) is an important etiology for development of prediabetes and type-2 diabetes with evidence suggesting that in addition to being caused by obesity, it can contribute to the development of obesity. It is important to identify IR in such populations as it is an independent risk factor for development of metabolic and cardiovascular disorders. While most studies have focused on the prevalence of IR in obese, diabetics and hypertensive individuals, there is scarcity of literature focusing on the first-degree relatives of these populations. The study was undertaken with an aim to estimate the prevalence of IR in Normotensive, euglycemic, non-obese first- degree relatives of obese individuals.

Materials and methods: This cross-sectional study was conducted in the outpatient department of a tertiary care teaching Institute in North India. The study group included 35 first degree non-obese, euglycemic and normotensive relatives of obese individuals compared with 35 age, sex and body mass index matched first degree relatives of non-obese individuals. The enrolled individuals were subjected to history, clinical examination and investigations including blood glucose, lipid profile and serum insulin. Insulin resistance was defined as Homeostasis model assessment-estimated insulin resistance (HOMA IR) value exceeding the 75th percentile of the total study group.

Results: The prevalence (95% CI) of insulin resistance was 34% (21 to 51) in the study group as compared to 14% (6 to 9%) in the comparison group (p=0.05), (Odds ratio (OR) 95% CI: 2.4 (0.94 to 6.09). The corresponding mean HOMA IR levels were 2.5 and 2.2 respectively. Impaired fasting glucose levels were seen in 26% in study group as compared to 11% in the comparison group (OR: 2.25 (0.76 to 6.62)). Higher proportions of subjects in the study group had impaired glucose tolerance compared to the comparison group (23% vs. 9%; OR: 2.67 (0.77 to 9.23)). The mean fasting as well as postprandial glucose levels were higher in those with IR as compared to those without (98 vs. 88, p=0.002 and 128 vs. 121, p=0.05 respectively). All individuals with IR had increased serum insulin levels and the corresponding mean serum insulin levels were 184 as compared to 114 in those without IR (p <0.0001). The differences in lipid parameters were not statistically significant between the groups.

Conclusion: The study demonstrates significant burden of Insulin resistance in healthy relatives of obese individuals with more than one

third of the study population at risk. These apparently healthy individuals should be closely followed up and monitored so that early interventions by means of life style and diet modifications can be done. Our findings are hypothesis generating and exploratory which needs further confirmation by larger studies.

Keywords: Epidemiology; Insulin sensitivity and resistance

PD19

Anaemia in diabetics and non diabetics with normal renal function

S Rajeevan[1], D -[2]
1-Kasturba Medical College, Mangalore, India, 2- Kasturba Medical College, Mangalore, India

Background and Aims: Prevalence of diabetes is ever increasing with an estimated 415 million affected worldwide. In India there are a total of 69.2 million diabetics. That number is expected to increase to 123.5million in 2040. Generalized fatigueability is a common symptom of Diabetes Mellitus. The presence of undiagnosed anaemia can further worsen the fatigueability. Multiple studies have shown that the correction of anaemia slows down the progression of complications of diabetes. Our study was undertaken to determine whether diabetics who have normal renal function have a higher prevalence of anaemia as compared to non diabetics.

Materials and methods: It was an analytical cross sectional study, with comparison of diabetics (cases) and non diabetics (comparison) involved. Samples were chosen by simple random sampling: 50 for cases and 50 for comparison group. A random blood sugar test was done to see whether the patient was diabetic or not. Age and weight were noted. Haemoglobin and creatinine value were determined. The estimated glomerlular filtration rate (eGFR) was then calculated using the Cockcroft-Gault Equation. Only those with eGFR>60 ml/min/1.72m^2 were considered for the study. WHO criteria for anaemia was used and prevalence of anaemia was checked for. Glycated Haemoglobin was also sent. Statistical analysis was done after data collection.

Results: Among the diabetics 34 %(n=17) were females and 66% (n=33) were males. Among the non- diabetics 46% (n=23) were female and 54% (n=27) were males. The average age in the diabetic group was 56.34 years and in the non-diabetic group was 54.18 years. It was seen that anaemia was more prevalent in the diabetic group as compared to the non diabetic group. 56 % (n=28) of the diabetics were anaemic as compared to only 30 % (n=15) of the non diabetics who were found to be anaemic. The p value as calculated by the Chi-square test was found to be 0.0001. The odds ratio calculated showed that diabetics were 2.97 (CI:1.304-6.764) times more likely to have anaemia as compared to non diabetics. It was seen that the anaemic patients had an average of 9.68 years of diabetes. This was significantly more than the non anaemic patients who had diabetes for 6.32 years on an average. The p value calculated by the Chi square test/ Fisher's exact p test was found to be 0.038, which is significant. The mean glycated haemoglobin amongst the anaemic patients was 7.175. Amongst the non anaemic patients the mean glycated hamoglobin was 6.9. The p value as calculated by the Chi square test/ Fishers exact test was 0.450 which is significant.

Conclusion: In our study it was seen that even in the absence of renal failure, the prevalence of anaemia was higher amongst patients with diabetes as compared to those without diabetes. Anaemia was more prevalent amongst those patients who had a longer duration of diabetes.

Furthermore patients with a poorer glycaemic control, as indicated by a higher glycated hamoglobin value, were seen to have a higher prevalence of anaemia.

Keywords: Inflammation in type 2 diabetes; Other complications

PD20

Half year of safety and efficacy of insulin glargine 300 IU/ml: a retrospective observational study in western Indian patient population

P Goswami[1], J Nagar[2], V Abhichandani[3], N Patel[4], M Kinariwala[5]
1-Ayush Diabetes Clinic, himmatnagar, Gujarat, India, 2- Narbade Shiddhivinayak Hospital, Deesa, India, 3- Bodyline hospital, Ahmedabad, India, 4- Samarpan Hospital, Ahemdabad, India, 5-Shreeji diabetes & Heart clinic, Ahemdabad, India

Background and Aims: Diabetes is considered as global epidemic and number of newer treatment options are emerging nowadays due to extensive research and development in clinical trials. However, real world evidences can help immensely to evaluate the long term safety and effectiveness such molecules in patients requiring insulin therapy in routine clinical practice in particular geography. This study was planned with this aim keeping in mind.

Materials and methods: This retrospective observational study was planned form Feb '2018 to Aug '2018 with help of electronic data based record of Ayush Diabetes Clinic, Himmatnagar (Guj). All the patients with use of Glargine-300 at least once in their routine clinical treatment were included in the study. Data were analyzed primarily for change in HbA1c, FPG, and PPG from baseline to last follow-up visit for efficacy and occurrence of hypoglycemia or any other adverse event for safety purpose. Addition parameters were analyzed for change in weight/BMI, dose requirement of Glargine-300 from base line. Data analysis was done using Microsoft excel 2013 version for change in Mean with Standard deviation.

Results: During the whole study period total of 62 patients required to use Glargine-300 for at least once with average duration of treatment till last follow-up visit was 66.1 ± 32.8 days. The average number of follow- ups were 2.9 ± 1.5. The primary endpoints showed, 1.4% reduction in HbA1c from baseline ($9.6\pm1.8\%$ vs $8.2\pm1.2\%$). There was 61.1 mg/dl reduction in FPG (185.9 ± 50.9 vs 124.8 ± 40.7 mg/dl) and 79.3 mg/dl reduction in PPG (259 ± 70.9 vs 179.7 ± 53.9 mg/dl). Coming to the safety part, No confirmed or symptomatic hypoglycemia event were recorded in EMR database and only 2 cases were reported for lipodystrophy. Both this patients were 8 and 20 years of diabetic and were on other insulins before initiation of Glargine-300. For additional parameters, we did not observed any change in weight (70.6 ± 13.0 vs 70.3 ± 12.3 kg) and BMI (26.9 ± 4.6 vs 26.8 ± 4.2 kg/m^2). We observed 1.6 IU increase of mean dose of Glargine-300 from baseline to last follow-up (14.4 ± 3.1 vs 16 ± 4.3 IU).

Conclusion: In-clinic experience study with Insulin Glargine-300 IU revealed it is highly efficacious in controlling blood glucose with shorter duration of therapy without causing hypoglycemia or weight gain kind of adverse effects.

Keywords: Insulin therapy

PD21

Total Adiponectin and risk of systematic lower extremity peripheral vascular disease in diabetes mellitus

C Bhandiwad[1], S Kumar[2], A Gupta[3]
1-Sardar Patel Medical Collage, Bikaner, India, 2- S P M C, Bikaner, India, 3- S P M C, Bikaner, India

Background and Aims: Lower concentrations of adiponectin have been linked to subsequent risk of coronary heart disease in healthy individuals. Whether similar relationships exist for the development of systemic atherosclerosis, such as peripheral vascular disease (PVD), is uncertain. We investigated the association between total adiponectin and risk of lower extremity PVD.

Materials and methods: We performed a case control study among 60 diabetic patients in tertiary center, who were free of diagnosed cardiovascular disease. Using risk set sampling, controls were selected and matched on age, no smoking status, fasting status. To find out the association between total adiponectin and risk of lower extremity PVD in otherwise healthy patients, on distributing cases according to Adiponectin level in relation to PVD, total of 60 patients were included in study and distributed in two groups of either decreased or normal adiponectin level.

Results: Among 60 patient, 6 developed PVD. A total of 6 patients had PVD of which adiponectin levels were decreased in 5 patients and normal in 1, and on application of test of significance they were found to be statistically significant with p value of 0.01. Corelation of PVD was also found with Pulmonopathy, total of 60 patients were included in study and distributed in two groups according to presence or absence of PVD, a total of 6 patients had PVD of which pulmonopathy was present in 5 patients and absent in 1, and on application of test of significance they were found to be statistically significant with p value of 0.02.

Conclusion: Total adiponectin is inversely associated with risk of symptomatic lower extremity PVD in diabetes patients.

Keywords: Macrovascular disease

PD22

Increasing PPAR-alfa expression by oleoylethnolamide administration- a novel way of reducing appetite and body weight in obese people

A Verma
Index Medical College, Indore, India

Background and Aims: Obesity incidence and associated various metabolic disturbances are on a rise. Weight gain is increasingly seen in male, females of all ages and growing rapidly in kids. This has been attributed to a trend towards more westernized dietary and lifestyle patterns which is the biggest concern of our modern society. There is an urgent need of antiobesity therapies which are safe in all age groups, can be given safely with other drugs and are effective. In India very few approved drugs are available for weight reduction. We did a prospective study to evaluate the

efficacy and safety of naturally occurring gut derived fatty acid ethanolamides (FAE) oleoyethanolamide (OEA) that exerts anorectic effects mainly through peripheral mechanism. Obesity incidence and associated various metabolic disturbances are on a rise. Weight gain is increasingly seen in male, females of all ages and growing rapidly in kids. This has been attributed to a trend towards more westernized dietary and lifestyle patterns which is the biggest concern of our modern society. There is an urgent need of anti-obesity therapies which are safe in all age groups, can be given safely with other drugs and are effective. In India very few approved drugs are available for weight reduction. We did a prospective study to evaluate the efficacy and safety of naturally occurring gut derived fatty acid ethanolamides (FAE) oleoyethanolamide (OEA) that exerts anorectic effects mainly through peripheral mechanism.

Materials and methods: A prospective study of two months duration was done on approximately 80 people coming to our OPD for treatment of obesity. Both male and female participants with a BMI >28 kg/m^2 & <35 kg/m^2 and between age range of 18-65 years were selected. These participants were already on diet control and doing regular exercise under guidance and was continued same. Anthropometric measurements and body composition like bodyweight, BMI (kg/m2), waist circumference (cms), Fat percentage were done for all at baseline and after 2 months of therapy. The desires to eat and hunger were also asked during each visit. Participants were given capsules (a blend of Oleoylethanolamide, Pantethine and Valine) once daily before major meal for two months. Participants were called monthly intervals for 2 months and any side effects or complaints were noted.

Results: Out of 80 people, 53 were females and 27 were males. Age ranges in females was 30-56 years and males 40-62 years. Most of these individuals had decreased appetite and ate 2-3 meals per day. After 60 days of therapy, BMI reduced from 32.6 +1.1 to 31.3 +0.9. Weight decreased from 79 +1.4 kgs to 74 +1.3 kgs. Waist circumference reduction was from 110 +1.5 cms to 105+1.3 cms and Fat % reduced from 34 to 31 %. Significant decrease in hunger and desire to eat was seen in all participants. None of the participants dropped or had any side effects.

Conclusion: Use of OEA as a complementary approach along with lifestyle changes seems to be promising strategy in terms of decreasing weight and controlling appetite.

Keywords: Weight regulation and obesity; Nutrition and diet

PD23

Serum osteocalcin and parameters of glucose metabolism in type 2 diabetes mellitus

V Kumar[1], D Vidyasagar[2], M Holla[3]
1-Kasturba Medical College, Manipal, India, 2- Kasturba Medical College, Manipal, India, 3- Kasturba Medical College, Manipal, India

Background and Aims: Osteocalcin, also known as bone Gla protein is a marker of bone formation. As per the data available so far, osteocalcin apart from being a bone marker, has effect on glucose and fat metabolism and beta cell function; but the strength of association remains unclear. Further there is paucity of data on the novel mechanisms of role of serum osteocalcin in type 2 diabetes mellitus. However it's role in clinical practice needs to be evaluated, so we undertook this study.

Materials and methods: A prospective cross sectional study was conducted at Kasturba Medical College, Manipal, Karnataka from May 2018 onwards.40 type 2 diabetic subjects aged ≥ 18 years after excluding the confounding factors that affect serum osteocalcin levels were considered eligible for the study. In every patient detailed history was asked, basic anthropometry measurement including height, weight, waist & hip circumference was done; and detailed physical evaluation was carried out in a structured manner.

Fasting plasma glucose, post prandial plasma glucose, glycated Hb, fasting insulin and serum osteocalcin were measured. Fasting insulin and osteocalcin ware measured by ELISA method.

Association of serum osteocalcin with parameters of glucose metabolism (FPG, PPG and HbA1C), fat metabolism (BMI and waist/hip ratio), beta-cell function (HOMA-β) and insulin resistance (HOMA-IR).

Results: Out of 40 diabetic subjects with mean age of 60.83±10.22 years being studied, male subjects (55%) were more than female (45%); the mean BMI was 27.13±4.81kg/m^2 and mean waist/hip ratio was 0.95 ±0.09. The mean FPG, PPG & HbA1c were 125.9±48.5mg/dL,199.2 ±68.2mg/dL & 8.2±1.5% respectively.

Fasting insulin was assessed in all subjects, but however serum osteocalcin was assessed only in 24 subjects and as the data was not normally distributed, median values were taken. The median value (interquartile range) of fasting insulin was found to be 10.1(7.97, 16.12) and that of serum osteocalcin was 1.74(0.70, 3.34).

There was weak positive correlation of serum osteocalcin with BMI (r= 0.067, p<0.743) & waist/hip ratio (r= 0.184, p<0.369). With respect to parameters of glucose metabolism there was a weak negative correlation between serum osteocalcin and FPG (r= -0.182, p<0.374) & PPG (r= -0.299, p<0.138); no correlation was found with HbA1c (r=0.046, p<0.823). There was a mild positive correlation between serum osteocalcin and beta cell function [HOMA-β](r=0.262, p<0.197), weak negative correlation with insulin resistance [HOMA-IR](r= -0.080, p<0.699).

Conclusion: It was found that as the serum osteocalcin level increases β-cell function increases and IR decreases, and FPG and PPG decreases in type 2 Diabetes mellitus, which points at the better glycemic control and may have a therapeutic role in the same. Further studies with better sample size would yield better results.

Keywords: Prediction of type 2 diabetes; Beta cell damage, degeneration and apoptosis; Insulin sensitivity and resistance; Lipid metabolism

PD24

Utility of the first generation artificial pancreas and the factors influencing the frequency of sensor use: an Indian real-world data

A Shankar[1], A David[2], G Krishnan[3], R Jose[4], AL Anilkumar[5], L Ramachandran[6], S Jothydev[7], J Kesavadev[8]

1-Jothydev's Diabetes Research Centre, Mudavanmugal, Konkalam, Poojapura, Trivandrum, India, 2- Jothydev's Diabetes Research Centre, CSI Mission Hospital Campus, Attingal, Trivandrum, India, 3- Jothydev's Diabetes Research Centre, Mudavanmugal, Poojapura, Trivandrum, India, 4- Jothydev's Diabetes Research Centre, Mudavanmugal, Poojapura, Trivandrum, India, 5- Jothydev's Diabetes Research Centre, Mudavanmugal, Poojapura, Trivandrum, India, 6- Jothydev's Diabetes Research Centre, Mudavanmugal, Poojapura, Trivandrum, India, 7- Jothydev's Diabetes Research Centre, Mudavanmugal, Poojapura, Trivandrum, India, 8- Jothydev's Diabetes Research Centre, Mudavanmugal, Poojapura, Trivandrum, India

Background and Aims: The latest integrated sensor augmented pump therapy system MiniMed 640G, is one step closer to Artificial Pancreas (AP) and can automatically suspend insulin delivery when sensor glucose levels are predicted to approach hypoglycemic range and resumes insulin delivery once sensor glucose levels recover.

The study assessed the utility of this first generation AP among our patients and the factors/ concerns influencing the frequency of sensor use.

Materials and methods: A brief survey was conducted among our T1DM (n=12) and T2DM patients (n=10) and our clinicians (n=4) to access the utility of the first generation AP system.

Results: Patients recounted many positive experiences with the use of AP and appreciated many of its features.

59.09 % of the patients (75% T1DM and 40% T2DM) used the sensors continuously.

Advantages Recounted by the Patients (% Responses):

- Enhances confidence in managing diabetes with minimal fear of hypoglycemia (95.45%)
- The glucose meter wirelessly links to the pump's Bolus Wizard$^{(TM)}$ calculator, eliminates manual entry error, allows convenient and discreet remote bolusing, and automatically calibrates the sensor (90.90%)
- Better glycaemic picture provided by the personal software enabling improved diabetes management (86.36%)
- Features like colour screen, easier navigation around menus than the previously available pumps (81.82%)
  Factors influencing the frequency of sensor use as recounted by the less-frequent users are provided in Table 1.

Graph/Table:

Factors /Concerns influencing the frequency of sensor use	Feasible Recommendations Identified
Many users were initially uncomfortable to learn the techniques of sensor use	With frequent feedbacks from our diabetes care team, patients became more motivated and were willing to use it continuously
Patients with a history of severe hypoglycemia	Patients started using the sensors more frequently to avoid hypoglycemia
Fear and discomfort with sensor needle insertion	Patients were advised to adopt proper insertion techniques like using a "pinchable" area for insertion, to use a local anesthetic cream or a cool pack to the numb tissue just prior to sensor placement.
Alert or alarm fatigue	Setting the alert ranges at appropriate values. e.g. better not to set any alerts at all or to set only low glucose alerts in the initial few weeks to allow the users to get comfortably accustomed to using the device.
Cost concerns	To take initiatives to make the government and policymakers aware of the utility of the device so that appropriate reimbursement policies are implemented for the deserving patients.

Table 1. Factors influencing the frequency of sensor use

Conclusion: The AP system assessed has tremendous clinical utility both for T1D and T2D individuals when used as recommended. The barriers associated with frequent sensor use could be overcome by taking appropriate measures such as providing individualised training, implementation of reimbursement policies for the deserving candidates etc.

Keywords: Devices