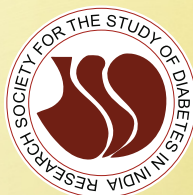


# International Journal of **Diabetes** in Developing Countries

Official Publication of  
**Research Society for the  
Study of Diabetes in India**

Abstracts of The 47th Annual Conference  
of Research Society for the Study of Diabetes in India

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# International Journal of Diabetes in Developing Countries

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International Journal of Diabetes in Developing Countries targets a readership consisting of clinicians, research workers, paramedical personnel, nutritionists and health care personnel working in the field of diabetes. Original research work and reviews of interest to the above group of readers is considered for publication in the journal.

The journal has a goal of serving as an important resource material in diabetes for its readers, mainly in the developing world.

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## Abstracts of The 47th Annual Conference of Research Society for the Study of Diabetes in India

BBT01

### Prof. B.B. Tripathi Nutrition Symposium

#### Diet And Inflammation - Epidemiological And Clinical Evidences From Southern India

V Sudha • R Mohan Anjana • S Shanmugam • M Ramya Bai • R Gayathri • N Lakshmi Priya • G Geetha • N Kalpana • K Krishnaswamy • R Unnikrishnan • V Mohan

**Background and Aims** Inflammation is an integral feature of atherosclerosis, cardiovascular disease (CVD), many cancers, type 2 diabetes (T2D) and obesity. Chronic exposure to hyperlipidemia, hyperglycemia, smoking, obesity, hypertension, and poor dietary habits mediates the onset of endothelial dysfunction leading to chronic inflammation. Current dietary practices characterized by unhealthy nutrition choices could possibly increase the risk of chronic disease through activation of the innate immune system, by excessive production of pro inflammatory cytokines and concomitant reduced production of anti-inflammatory cytokines. Evidence indicates that consumption of foods rich in dietary fiber including whole grains, legumes, fruits and vegetables and nuts;  $\omega$ -3 PUFAs, MUFAs, flavonoids, and carotenoids is associated with decreased levels of inflammatory markers in serum, whereas intake of refined carbohydrates with higher glycemic index and glycemic load, and a high SFA, TFA,  $\omega$ -6/ $\omega$ -3 PUFA ratio are associated with increased levels of inflammation. Holistic dietary approaches seem to be an important and practically feasible strategy to reduce inflammation and prevent chronic disease. There is a need to understand the quality of current Indian diets and its possible link to inflammation. This talk will focus on the epidemiological evidences and clinical studies from Madras Diabetes Research Foundation associating Indian dietary pattern to inflammatory properties of metabolic syndrome (MS), and T2D.

**Materials and methods** Chennai Urban Rural Epidemiological Study (CURES) reported that almost half of the dietary calories in urban population are derived from refined grains and a meagre 1-2% of the calories from wholegrains. The median refined grains intake (mainly in the form of polished white rice) in the population was 337g/day in urban and 444g/d in the rural adults. The consumption of whole grains that are rich in several antioxidant and anti-inflammatory phytochemicals was as low as 10g/day. Consumption of pulses was low in both urban and rural Tamil Nadu (53g/d and 17g/day). Total dietary carbohydrate, glycemic load (GL) and refined grain intake were positively associated with the risk of T2D (OR 5.31 (95% CI 2.98, 9.45);  $P < 0.001$ ), while dietary fibre intake was inversely associated with T2D (OR 0.31 (95% CI 0.15, 0.62);  $P < 0.001$ ). Higher refined grain consumption was also significantly associated with components of MS such as higher waist circumference, systolic and diastolic blood pressure (% Difference between Quartile 1 & 4: 2.9%  $P$  for trend  $< 0.0001$ ; 1.7%  $P$  for trend = 0.03), fasting blood glucose (7.9%  $P$  for trend = 0.007), serum triglyceride (36.5%  $P$  for trend  $< 0.001$ ) low HDL (-10.1%,  $P$  for trend  $< 0.0001$ ) and insulin resistance (13.6%  $P$

$< 0.001$ ). On the other hand, higher fruit and vegetable intake (418 g/d) showed a significant inverse association with systolic blood pressure, BMI, waist circumference, total cholesterol and LDL-cholesterol concentration. Reducing the intake of refined cereals and inclusion of whole grain pulses (rich in proteins and slow digesting carbohydrates), fruits and vegetables (richer sources of several micronutrients and health beneficial phytochemicals with several functional properties including antioxidants) can help to reduce the dietary GL and prevent diet induced inflammation and related chronic diseases such as CVD and T2D. Apart from carbohydrates, the quality of fat (second major source of calories in Indian diet) also plays a vital role in attenuating the risk of MS. Data from CURES showed a positive association of MS with use of sunflower oil compared to traditional (groundnut and gingelly) oil among urban as well as rural Indian adults. We also showed that concomitant high intake of refined grains and n6 PUFA (mainly from sunflower oil) further increased the risk for MS. This underlines the pro inflammatory aspect of n6PUFA.

**Results** Our recent study has shown that progressive polishing of rice reduced the dietary fibre content with a concomitant increase in the available (glycemic) carbohydrates. In addition, total polyphenol contents (with antioxidants and anti-inflammatory properties), vitamin E levels, gamma oryzanol and the total antioxidant and free radical scavenging capacity of the rice decreased with polishing. Yet another clinical study showed that many of the commonly consumed Indian white rice varieties are high in glycemic index (GI). Conversely, brown rice (BR, unpolished rice) showed a lower GI and 20% reduction in the 24 hr glycemic response (measured as incremental area under the curve- IAUC) compared to white rice (WR, polished rice) in overweight Asian Indians. In addition, a randomized Control trial (RCT) substituting white rice with brown rice over 12 weeks reported a significant reduction in HbA1c among participants with MS [-0.18 (SE 0.08) %] relative to those without MS [0.05 (SE 0.05) %]. Improvements in HbA1c, total and LDL- cholesterol were observed on substituting WR with BR in participants with BMI  $\geq 25$  kg/m<sup>2</sup> compared with those with BMI  $< 25$  kg/m<sup>2</sup>. We also reported a significant increase in c- reactive protein (hs-CRP) in the brown rice group compared to white rice group [BR Vs.WR (mean $\pm$ SD): 0.63 $\pm$ 0.12 Vs 0.63 $\pm$ 0.35mg/l;  $p = 0.04$ ].

In addition, a recent RCT studying association of dietary advance glycation end products (dAGE) content (low vs high dAGE diets) with insulin sensitivity in overweight adults showed significantly lower blood glucose and insulin levels in low dAGE diet compared to high dAGE diet. The insulin sensitivity assessed as oral disposition index was found to be significantly higher at the end of 12 weeks intervention with low-dAGE diet (baseline: mean $\pm$  SD= 3.3  $\pm$  3.2; post 12 weeks: mean $\pm$  SD 7.6  $\pm$  14.3). This possibly reveals the positive effect of low dAGE foods on blood glucose and insulin levels, markers of early diabetes risk.

**Conclusion** Thus, in conclusion, Indian diets are rich in refined carbohydrates and low in fruits and vegetables, wholegrains, nuts and hence are devoid of many anti-inflammatory dietary constituents. Hence, improving the overall diet quality may help to reduce diet

induced inflammation leading to insulin resistance, MS, T2D and CVD and further arrest the soaring epidemic of chronic diseases in Asian Indians.

## BBT02

### Food Molecules And Unsaturated Fatty Acids For The Management Of Diabetic Complications

V Baskaran

**Background and Aims** Diabetes is a chronic disorder mainly characterized by poor or no production of insulin by the body. In most peoples diabetes is not curable, but has limited promising treatments including medication, lifestyle adjustments and management of diabetes. We at CFTRI, developed functional food for the management of diabetes which is based on cereals and spices/herbs - barley (*Yava*, *Hordeum vulgare*) or wheat (Godhuma, *Triticum aestivum*) flours (base material) were blended separately with spices/herbs triphala [(Ayurvedic herb mix – Haritaki (*Terminalia chebula*), bibhitaki (*Terminalia bellirica*) and Amalaki (*Emblia officinalis*), sesame oil, ghee, turmeric, and black salt (for taste). The developed products are highly nutritive with  $\alpha$ -amylase,  $\alpha$ -glucosidase inhibition and bile acid binding property and can be therapeutic food for management of diabetes. The stimulation of adenosine monophosphate<sup>2</sup>activated protein kinase (AMPK) is a prime target to decrease the hyperglycemic condition. Hence, lutein and oxidised lutein were studied against this target molecule for the treatment of type II diabetes. The phosphorylation of AMPK increased by 1.3<sup>2</sup> and 1.5<sup>2</sup>fold with lutein and oxidised lutein treatment, respectively, in high glucose induced HepG2 cells. The activation of PGC<sup>2</sup>1 $\alpha$  is significant ( $P < 0.05$ ) in oxidised lutein group than lutein. Further increase in SOD2 and mtDNA, confirmed the efficacy of lutein and oxidised lutein in restoring the mitochondrial biogenesis in high glucose induced cells through AMPK, PGC<sup>2</sup>1 $\alpha$  and TFAM. Lutein is a major antioxidant and blue light filter present in the lens and retina. Increased oxidative stress and inflammation precedes lens opacification. Lutein in combination with n-3 fatty acid down regulated oxidative stress markers, proinflammatory cytokines and eicosanoids and restored the antioxidant potential in cataract induced mice model. Serum eicosanoids (PGE2, LTB4, and LTC4) and cytokines (CRP, TNF- $\alpha$ , IL1-b, and MCP-1) were significantly ( $p < 0.05$ ) increased in cataract. The activity of cPLA2 and Cox-2 in cataract lens was higher ( $p < 0.05$ ) compared to other groups. Inflammatory markers EP-1, NOS-2 and NF-kb expression were higher ( $p < 0.05$ ) in cataract. Group administered with lutein + unsaturated fatty acids (EPA-DHA) exhibited highest cataract prevention compared to lutein + fatty acids linoleic acid and oleic acid. Also, lactucaxanthin, an antioxidant carotenoid found in lettuce (*Lactuca sativa*) is gaining importance owing to its anti-diabetic property. The free radical scavenging activity, total antioxidant activity and reductive capability of the lactucaxanthin prove its antioxidant potential. We developed a process for the purification of lactucaxanthin from green lettuce for its effective use in food and pharma application as anti-diabetic and eye protective nutraceutical like lutein.

## BBT03

### Modulation Of Signaling Mechanisms In Diabetic Complications By Micronutrient Status

G Bhanuprakash Reddy

**Background and Aims** Diabetes has become a threat to public threat globally. Chronic diabetes can lead to various secondary complications which represent the main cause of morbidity and mortality in diabetic patients. Apart from many other signaling mechanisms, activation of polyol pathway and accumulation of advanced glycation end-products (AGE) and homocysteine

(Hcys) have been implicated in the pathogenesis of secondary complications. Multiple factors are likely to be involved in predisposing diabetic patients to diabetic complications, as evidenced by the fact that many but not all diabetic patients develop diabetic complications. Though, studies have focused on the genetic susceptibility of diabetic complications, information on nutritional status particularly micronutrients are meager. Thus we have evaluated the micronutrients status in complications: diabetic retinopathy (DR), diabetic nephropathy (DNe) and diabetic neuropathy (DNe) and the influence micronutrient deficiency on biochemical pathways implicated in these complications. In a hospital based cross-sectional case-control study, we have analyzed the blood levels of micronutrient (vitamins and trace elements) of type-2 diabetic subjects with retinopathy (DR), nephropathy (DNe), neuropathy (DNe) and without any complications (DNC) along with normal control (CN) subjects by along with the dietary intake of these micronutrients. In addition to Hcys, polyol pathway and protein glycation was assessed by aldose reductase (ALR2) activity, AGE index as these biochemical pathways are known to be influenced by B-vitamins. Among trace elements, an inadequacy in blood levels of manganese, cobalt and zinc was found in DR patients compared to CN and DNR. Excepting the vitamins B6, B9 (folate), B12 and D, blood levels of all other vitamins were not different between the groups. While, the levels of vitamin B1, B9 and D were significantly lower in diabetic groups as compared to controls, there was no difference between diabetic groups. This study revealed a significantly lower level of plasma vitamin-B12 in DR patients, vitamin B6 in DNe & DNe patients compared to CN subjects and DNC patients. While plasma homocysteine levels were found to be higher in diabetes patients compared to control subjects, homocysteine was further higher in DR, DNe group. Most importantly, there was an inverse correlation between vitamin B1, B6 and B12 levels and ALR2 activity, AGE and homocysteine, respectively. These results suggest an association between B-vitamins and hyperhomocysteinaemia, AGE and ALR2 activity in diabetic complications and preliminary results in animal models further confirm these findings. Together, these studies indicate that B-vitamin deficiency could enhance the risk of development of diabetic complications.

## BBT04

### Nutraceuticals And Functional Foods In The Management Of Diabetic Complications

G Bhanuprakash Reddy

**Background and Aims** Chronic diabetes can lead to various secondary complications. Further, persistence progression of diabetes-induced complications during subsequent period of normal glucose conditions suggest that exclusive management of glucose might no longer be sufficient for the control of long-term complications such as retinopathy, nephropathy, neuropathy and cataract. Multiple biochemical pathways have been implicated in the pathogenesis of secondary complications. These mainly include enhanced polyol pathway, formation of advanced glycation end-products (AGE), and activation of protein kinase C etc. Accumulation of sorbitol due to activation of polyol pathway and accumulation of advanced glycation end-products (AGE) upon increased non- enzymatic protein glycation bring about the alterations leading to complications. Aldose reductase (ALR2) is the rate-limiting enzyme in the polyol pathway and reduces glucose to sorbitol leading to osmotic stress. The glycation reaction occurs between the carbonyl group of sugars and the amino group of proteins, which finally results in the formation of AGE. Therefore, inhibition of AGE formation and ALR2 may prevent and arrest the progression of diabetic complications. Hence,

agents that can act on these molecular targets, irrespective of glycaemic control, need critical evaluation in the management of secondary complications. Natural sources such as nutraceuticals, dietary agents and traditional foods could have the potential to control diabetic complications. We investigated a large number of functional foods for their potential to prevent the activation of polyol pathway and arrest AGE formation using model systems. Based on these studies we have isolated and characterized a few novel compounds as promising inhibitors of protein glycation and polyol pathway from these functional foods. We have isolated and characterized beta-glucogallin from amla (*Emblica*) as novel and selective ALR2 inhibitor. Further, we show that beta-glucogallin effectively inhibits sorbitol accumulation under hyperglycemic conditions in an ex-vivo organ culture model of lenses excised from transgenic mice overexpressing human ALR2 in the lens. Similarly, procyanidine-B2 from cinnamon has been characterized as the active component that inhibits protein glycation. We have also validated the potential of these bioactive compounds and their sources in diabetic rodent models. We demonstrated that procyanidine-B2 delayed diabetic cataract and ameliorated diabetic nephropathy and diabetic retinopathy in rats. Together these results provide a basis for exploring nutraceuticals and functional foods in alleviating diabetic complications.

#### BBT05

##### Study To Evaluate The Effect Of High Fat Indian Meal On Post Prandial Lipid Profile And It's Impact On Inflammatory Markers In Type 2 Diabetics From Central India.

K Gupta • S Gupta • S Vali

**Background and Aims** Hypertriglyceridemia is one of the risk factors for atherosclerosis in type 2 diabetes (T2DM). Post-prandial hypertriglyceridemia (PPTG) and hyperglycemia may jointly trigger spikes of oxidative stress causing undetermined risk of atherosclerosis. Conventionally, lipid profile is done in the fasting state, however post prandial increase in lipoprotein is inadequately addressed. India is facing a rapid transition of traditional balanced diet to high calorie, fat rich fast food culture.

**Aim:** To study the effect of standardized high fat, calorie dense Indian food on lipids and glucose amongst type 2 diabetics and non-diabetics.

**Materials and methods** After meeting the inclusion and exclusion criteria, 46 subjects were screened from a tertiary care diabetes centre of Central India for an interventional study, following the approval of an Institutional Ethic's committee. Two did not give consent due to time constraint. Finally, 44 subjects with 22 type 2 diabetics of more than six-month duration (Male-11, Female-11), non- alcoholic, HbA1c less than 8%, not on lipid lowering medication (DM group) and 22 non- diabetics (Male-11, Female-11) age and BMI matched (Non-DM group) were selected. Clinical history, examination, demographics and anthropometry data was collected. Baseline fasting (with 8-14 hours fast) blood sample was collected for biochemical parameters. Postprandial lipid and glucose response were observed at 2hr, 4hr and 6hr through fat tolerance test (FTT) using weight-adjusted Indian meal. A standardized high fat Indian meal (approximately 0.9-1gm fat /kg body weight) was formulated and the subjects were asked to consume the meal within 15 mins under supervision. The statistical significance of difference of parameter between two groups at each time point and across time points was tested using *t-test of independent samples* and using *repeated measure ANOVA respectively*. The significance was tested at 5% level.

**Results** Age, BMI, S.Creatinine, eGFR were homogeneous across two groups. However, WHR, blood glucose, and HbA1c were significantly higher in DM group compared to Non-DM group ( $P < 0.001$ ). Mean blood glucose in DM group was significantly higher than Non DM group at baseline, 2 hr, 4hr and 6 hr ( $P <$

0.001). Mean total cholesterol (TC), LDL-C, HDL-C between two groups differed insignificantly at each time point ( $P > 0.05$ ) and when studied across times they revealed insignificant difference in both the groups. Mean TG between two groups differed insignificantly at baseline and 2hr; however, at 4 hr and 6 hr, TG was higher in DM versus Non- DM group, which was statistically significant with  $P=0.033$  and  $0.047$  respectively. Across time points in Non DM group, the mean difference of TG was statistically significant with  $P < 0.001$ . Pair wise analysis in this group revealed that the difference between all the time pairs was statistically significant ( $P < 0.05$ ), except 2 hr and 4hr ( $P=0.127$ ). In DM group, the mean difference of TG across times was significant with  $P < 0.001$ . Paired analysis in this group revealed that the difference between all the time pairs was significant, except between 2 hr and 6 hr ( $P=0.99$ ). In other words, in this group, at 6 hr, the mean TG level (209.59 mg/dl) was close to 2 hr (208.73 mg/dl), but still significantly higher than the baseline level (130.14 mg/dl) ( $P < 0.001$ ). In Non-DM group also, the mean TG level at 6 hr (164.77 mg/dl) was significantly higher than baseline (121.73mg/dl) level with  $P=0.005$ ; however, it was close to acceptable level of 150 mg/dl, as compared to that of DM group. Similarly, the mean change in TG between baseline and 4 hr in Non DM group (109.45 mg/dl) differed significantly from that of DM group (154.77 mg/dl) with  $P=0.048$ . However, the mean change between 4 hr and 6 hr in Non DM group (66.41 mg/dl) insignificantly differed from that of DM group (75.32 mg/dl) with  $P=0.697$ . The study has been extended to look into the impact of hypertriglyceridemia on inflammatory markers in selected subjects.

**Conclusion** Postprandial hypertriglyceridemia occurs after ingestion of high fat meal in diabetics and non diabetics. The increase is at it's peak at four hours followed by fall at 6hrs. Type 2 diabetics showed significantly higher rise in PPTG at 4 hours and slower fall at 6 hours compared to non diabetics. Post-prandial hyperglycemia at two hours and hypertriglyceridemia at fours might pose additive cardiovascular risk amongst Indian type 2 diabetics versus non-diabetics. The data of Indian high fat meal induced hypertriglyceridemia related response on various inflammatory markers is awaited.

#### BBT06

##### Water Pollution And Its Nexus With Food And Health

B K Bhavana • S Sreevathsan • S N Mudliar

**Background and Aims** India is presently a water-stressed country and by 2025, will become a water-scarce country with per capita consumption likely to fall upto half of the present value. Water pollution is a major issue as multiple chemicals find their way into water bodies due to their widespread use in domestic, agricultural and industrial applications. The increasing use of personal care and pharmaceutical products in day-to-day life along with limited (<30%) domestic wastewater treatment capacity and water scarcity have resulted in use of untreated domestic wastewater, containing emerging micropollutants, for agriculture. There is also sufficient evidence regarding uptake of water pollutants such as heavy metals, pesticides and emerging micropollutants in edible plants such as Carrot, Palak, Baby corn, etc. The increasing water pollution poses great risks regarding the contamination of food sources and its potential impact on human health. Studies have indicated bioaccumulation potential of water contaminants in humans via food chain. The talk will cover the water pollution issues relevant to India and its nexus with food and health. Model case studies will be discussed related to heavy metal, pesticides and other emerging micropollutants in water, their uptake in food sources (plants and animals) and its implications on human health. The advanced water/wastewater treatment technologies for removing and mineralizing emerging contaminants in water will also be discussed.



## Research Grant Oral Presentations

### RGO01

#### Clinical Significance of Circulating Secreted Frizzled-related Protein 5 (Sfrp5) and Wingless Type MMTV Integration Site Family Member 5a (Wnt5a) Levels in Metabolic Syndrome

K Usman

**Background and Aims** Metabolic Syndrome is a multifactorial heterogeneous disorder resulting in a variety of clinical manifestations and considered as a leading global health threat. Secreted frizzled-related protein 5 (Sfrp5), an endogenous inhibitor of Wnt signaling, is a new adipokine with anti-inflammatory properties that has beneficial effects on metabolic dysfunction. The biological activity of Wnt5a and Sfrp5 is poorly understood. This study was conducted on 100 subjects with 1:1 ratio of case and control to find out possible role of Sfrp5 and Wnt5a in metabolic syndrome. Clinical investigations and anthropometric measurements were done using standard procedures. In patients major risk factors of metabolic syndrome like waist circumference (WC), fasting blood glucose and lipid profile was altered. Serum level of Sfrp5 and Wnt5a was determined by ELISA method. Study showed that serum Sfrp5 level in MetS cases was significantly lower than control group ( $9.81 \pm 6.83$  ng/mL Vs  $12.77 \pm 9.49$  ng/mL  $p < 0.05$ ). Whereas serum Wnt5a level between cases ( $2.41 \pm 1.24$  ng/ml) and control ( $1.95 \pm 0.72$  ng/ml) was statistically nonsignificant. In our study Wnt5a was not correlated with metabolic risk factors. Serum levels of Sfrp5 was inversely correlated with MetS components including SBP, DBP, FPG, WC and triglyceride. This might showed probable role of Sfrp5 in pathophysiology of MetS.

### RGO02

#### Serum Osteocalcin And Parameters Of Glucose Metabolism In Type 2 Diabetes Mellitus

V Kumar • S Vidyasagar • A Holla

**Background and Aims** Osteocalcin(OC), also known as bone Gla protein is a marker of bone formation which has effect on glucose and fat metabolism. There is paucity of data on the role of OC in type 2 diabetes mellitus, and it's role in clinical practice is unclear. So we undertook this study to see the relationship between OC and parameters of glucose metabolism in type 2 Diabetes mellitus.

**Materials and methods** Ours was a cross sectional observational study, conducted at Kasturba hospital, Manipal, Karnataka, and included in-patients and out-patients from January, 2018 to June, 2019.

120 type 2 diabetic subjects aged  $\geq 18$  years after excluding the confounding factors that affect serum osteocalcin levels were included. Detailed history was asked in all patients, and basic anthropometry including height, weight, waist & hip circumference was done and physical evaluation was carried out. In each subject, fasting insulin, serum osteocalcin, fasting plasma glucose (FPG), post prandial plasma glucose (PPG), glycated Hb (HbA1c), fasting lipid profile (FLP), urine protein (24 hour urine protein/ spot microalbumin) were measured. HOMA 2.0 model was used to measure insulin resistance (HOMA-IR),  $\beta$ -cell function (HOMA- $\beta$ ). Each subject was evaluated for diabetic retinopathy and diabetic nephropathy. Then, serum osteocalcin was correlated with BMI, waist to hip ratio, fasting insulin, HOMA-IR, HOMA- $\beta$ , FPG, PPG, HbA1c, FLP, diabetic retinopathy and diabetic nephropathy.

**Results** OC had no correlation with BMI & negative correlation with waist/hip ratio only in females ( $r=0.41$ ,  $p=0.001$ ). FPG ( $r= -0.14$ ,

$p=0.12$ ) & PPG ( $r= -0.123$ ,  $p=0.18$ ) were negatively correlated though insignificant, and HbA1c was lower in patients with higher OC ( $r=0.208$ ,  $p=0.025$ ) showing better glycemic control. Fasting insulin levels increased with decreased OC ( $r=-0.103$ ,  $p=0.26$ ), and insulin resistance increased significantly, HOMA-IR ( $r=-0.274$ ,  $p=0.004$ ). HOMA B was not affected by OC. There was no difference in OC levels in individuals with and without microvascular complications (both retinopathy and nephropathy).

#### Conclusion

Our findings suggest that serum osteocalcin has a definite association with glucose metabolism in type 2 diabetes mellitus. So, any lifestyle modifications and interventions that increases serum osteocalcin levels may lead to novel targets for prevention and treatment of diabetes mellitus.

### RGO03

#### Mechanism And Clinical Profile Of Steroid Of Steroid Induced Diabetes

A Holla

**Background and Aims** Steroid induced diabetes being well reported so far the impact of its development and risk factors are poorly quantified. And also 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 osteoblast derived protein osteocalcin. Further the relative contributions of both  $\beta$ -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 317 non diabetic subjects aged  $\geq 18$  years started on steroids were considered eligible for the study. In every case after detailed examination, fasting plasma glucose(FPG), post prandial glucose (PPG), glycated Hb, fasting insulin and total osteocalcin was measured prior to starting steroids and repeated in first week (day 3/4) after starting steroids. Based on glycemic level post steroid therapy subjects were divided into normoglycemic, prediabetes and diabetes groups. FPG and PPG were repeated periodically during follow up of the patients for three months to look after persistence of diabetes after stopping or tapering of steroids. The utility of Indian Diabetic Risk Score (IDRS) in predicting SID was assessed.

**Results** Out of 317 patients, SID was seen in 132(42%) patients, prediabetes in 105(33%) patients. It was found to be more in females than in males. We found increased age ( $p$  value=0.04), and dose of steroids ( $p$  value  $<0.001$ ) had significant association with steroid induced diabetes. IDRS was found to be useful SID ( $p$  value  $<0.001$ ). 69% of patients had an elevation of PPG with or without FPG, but only 7% 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) in diabetes group. There was decreased serum osteocalcin level after starting steroids and it is statistically significant ( $P$  value $<0.01$ ) compared to normal group. In 11.3% of the patients, steroid induced diabetes persisted even after three months of stopping steroids.

**Conclusion** Monitoring of PPG as compared to fasting sugars is essential for the screening of SID. Cumulative dose of steroid may not be important to precipitate steroid diabetes as most patients developed SID in first week. Reduced Serum Osteocalcin may be the new target for research in future to correct steroid induced diabetes.

## RGO04

**Assess The Effectiveness Of Meditation To Promote Quality Of Life (QOL) And Metabolic Control Among Diabetic Patients In Selected Settings**

G Venugopal

**Background and Aims** Non-communicable diseases (NCDs) are the leading cause of death globally. World Health Organisation has projected that diabetes will be the 7th leading cause of death by 2030. The major risk factors for diabetes are lifestyle factors such as lack of exercise, poor eating habits and increased stress, which leads to non-compliance to diabetes management. Management of diabetes is multicentric, a meticulous holistic approach like healthy eating, increased physical activity, weight control, proper medications, regular monitoring, controlling blood glucose levels and stress management are vital. A better managed diabetic life will lead to achievement of good quality of life (QOL). Rajyoga meditation is a simple and scientific technique to elicit the physical and mental relaxation response, to change one's attitude towards illness and transform lifestyle. Meditation provides a complete satisfaction, peace, happiness and balance between body and mind. The psycho-physiological benefits of meditation can create a balance between the sympathetic and parasympathetic system. Rajyoga meditation is a form of meditation that is simple, cost effective and accessible to all people.

**AIM OF THE STUDY:** The current study aims to impart Rajyoga meditation, as a cost-effective adjunct therapy along with routine management for diabetes to promote quality of life and metabolic control among diabetic patients.

**Materials and methods** A quantitative research approach with a quasi-experimental research design was used to assess the effectiveness of meditation on QOL and metabolic control. The setting of the current study was in the community area of 25 kilometers in and around study setting, Rajasthan. Ten villages were allotted in each group using the lottery method. According to the sampling criteria 254 diabetic patients were recruited through convenient sampling technique. The tools used for the study were validated and reliability established. Data were collected using 1) structured proforma to collect demographic data and clinical parameters, 2) World Health Organization Quality of Life (WHOQOL)-BREF questionnaire to assess the QOL, 3) diabetes self-management (DSM) questionnaire to assess the compliance to diabetic management and 4) blood investigations like fasting blood sugar (FBS), postprandial blood sugar (PPBS) and glycosylated haemoglobin (HbA1c) to assess the metabolic level of diabetes patients at 0, 3rd and 6th months of intervention. For the experimental group, basic Rajyoga meditation was taught and encouraged to practice every day morning and evening for 6 months and the control group followed the routine diabetes management. The collected data were analyzed using descriptive and inferential statistics.

**Results** The study findings revealed that multiple comparisons of all four QOL domains scores in experimental group using repeated measures ANOVA F-test and Bonferroni t-test revealed very high statistically significant difference at  $p \leq 0.001$ . The overall mean difference between experimental and control group metabolic variables scores showed statistical significant difference in the post-test 2 for FBS and PPBS at  $p \leq 0.05$  and HbA1c at  $p \leq 0.01$ . The correlation coefficient of overall QOL gain scores with metabolic variables in experimental and control group showed very high statistical significance at  $p \leq 0.001$ . The mean percentage of overall QOL gain scores after Rajyoga meditation practice in experimental group revealed 22.5% gain in QOL scores. Comparison of mean and standard deviation of clinical parameters and DSM showed statistical significance in experimental group for body weight at  $p \leq 0.001$ , BMI at  $p \leq 0.001$ , WC at  $p \leq 0.001$ , WHR at  $p \leq 0.05$ , SBP at  $p \leq 0.01$ , DBP at  $p \leq 0.01$  and DSM at  $p \leq 0.001$ . Odds ratio between overall QOL gain scores and influencing demographic variables of diabetic patients in experimental group revealed that male patients with more than 50

years of age, those who have completed above school education with earnings more than Rs. 5000/- per month and having diabetes for less than one-year, also who have no habits of smoking or alcohol had better level of QOL than others. There was statistically significant association between overall FBS, PPBS and HbA1c reduction score and demographic variables at  $p \leq 0.05$ .

**Conclusion** The present study concludes that practicing basic Rajyoga meditation has improved QOL, better metabolic control, improvement in the level of clinical parameters and better compliance towards diabetes self-management among diabetic patients. Continuous Rajyoga meditation practice enhances physical, psychological, spiritual and socio-environmental well-being. Hence, the study results suggested that basic Rajyoga meditation practice is an effective adjunct therapy in the management of diabetes to improve QOL and metabolic control among diabetic patients within a short period of practice.

**Keywords :** Diabetes, Quality of Life, Metabolic Control, Meditation, Diabetes Self Management, Clinical Parameters, Fasting Blood Sugar, Post Prandial Blood Sugar, Glycosylated Haemoglobin.

**Oral Presentations**

## OP01

**Psycho-social Morbidity Among Children With Type-1 Diabetes Mellitus**

S Chatterjee • AK Bakhla • P Biswas • S Singha • S Dubey • CB Sharma • S Chowdhury

**Background and Aims** Although psychosocial impact of type-1 diabetes mellitus (T1DM) patients is well recognized, data about its exact prevalence in India is scant. To determine the prevalence and spectrum of psychosocial morbidities among pediatric T1DM patients and to determine if there is significant difference between psychologically distressed and non-distressed groups across various socio-demographic and disease-specific variables.

**Materials and methods** Among 39 pediatric T1DM patients an observational cross-sectional questionnaire-based study was carried out. Psychological distress was measured by applying childhood psychopathological measurement schedule (CPMS) questionnaire. Psychological distress was analyzed across various socio-demographic factors and disease-specific variables by applying Chi-Square test using the statistical package for social sciences (SPSS) version 16.

**Results** Mean age of the study sample was  $11.59 \pm 2.65$  years (range: 6–16 years). Out of total 39 patients, 21 (53.85%) was found to be psychologically distressed. Mean CPMS score was  $12.74 \pm 9.54$ . Mean scores among psychologically distressed and non-distressed patient groups were  $19.19 \pm 8.5$  and  $5.22 \pm 2.74$  respectively. Anxiety, conduct disorder and depression were the most common problems identified. Psychosocial distress (CPMS score  $> 10$ ) was more prevalent among those who were post-pubertal, males, Muslims, residing in rural areas, living in nuclear family, having no sibling and from upper-lower socio-economic background compared to pre-pubertal, females, Hindus, residing in urban areas, living in joint family, having siblings and from lower socio-economic background respectively. Psychosocial distress was significantly associated with increased number of insulin injection per day ( $p=0.041$ ), and dietary and drug regimen non-compliance ( $p=0.001$ ).

**Conclusion** This study revealed very high prevalence (53.85%) of psychosocial morbidity among T1DM patients. Psychosocial distress was significantly more among patients taking increased number of insulin injection per day, and patients who were non-compliant with dietary and drug regimen.

## OP02

### Changes in CIMT with Glycaemic Control in Patients of T2DM

S Sud

**Background and Aims** A long term (10 years) prospective randomized observational study to monitor changes in CIMT of T2DM patients who achieved HbA1c  $\leq 7\%$ , with those who did not. CIMT is a marker of subclinical atherosclerosis associated with CVD risk factors. This study was to ascertain if (keeping all other risk factors under control and at par in each group) a good glycaemic control could lead to a lower CIMT.

**Inclusions**

#Non – pregnant Adults

#T2DM with HbA1c  $\geq 8\%$

#B.P.  $\leq 130/80$  mm of Hg throughout the study

#Normal Lipid profile throughout the study

#eGFR  $\geq 60$  mL throughout the study

**Exclusions**

#Hospitalization due to any cause during the study

**Materials and methods** The total number of patients completing the study was 62 CIMT measurements done at recruitment and then once every year CIMT of the CCAs were scanned with 7–10 MHz linear probe transducer under real time B mode imaging. The patients included in the study were divided into (Group A n = 32 and Group B n = 30) Group A were those who could achieve HbA1c  $\leq 7\%$  by the end of the first year and were able to maintain the target for the whole study period Group B were those who did not achieve HbA1c  $\leq 7\%$  by the end of the first year of the study and had an average HbA1c of  $\geq 7.5\%$  for the major duration of the study

**Results** Group A had a mean CIMT of 0.79mm at baseline and at the end of the study it was 0.75 mm

Group B had a mean CIMT of 0.81mm at baseline and at the end of study it was 1.17 mm Results were statistically significant ( $p < 0.05$ )

**A good glycaemic control can reduce the burden of CVD as an independent entity**

## OP03

### Study of Risk Factors For Development Of a Major Adverse Cardiovascular Event Within One Year Of Coronary Angiogram In Patients With T2DM

N Mathur • M Chakrapani • P Manjarekar • P Kamath • N Pai

**Background and Aims** To study risk factors and markers for development of a major adverse cardiac event (non-fatal MI, restenosis requiring revascularization or cardiovascular death) (MACE) within one year of coronary angiogram in patients of T2DM.

**Materials and methods** It was a prospective nested case control study with power 0.9. 78 patients with T2DM were recruited and followed up for one year for development of a MACE. Conventional risk factors and markers such as FBS, HbA1c, Lipid profile were recorded along with serum fasting insulin, hsCRP, adiponectin, resistin, Lipoprotein(a) and Apo B. LDL/ApoB, HOMA-IR, HOMA-b, IR-AR, Adiponectin Resistin Index were calculated. Upon follow-up they were divided into the group developing MACE and those who did not. Multiple logical regression analysis was done on these factors.

**Results** 19 out of the 78 patients developed MACE at the end of one year (24.35%). The two groups were age matched. After logical regression, the two groups had statistical difference in

HbA1c ( $p=0.03$ ), Total cholesterol ( $p=0.04$ ), triglycerides ( $p=0.05$ ), HDL ( $p=0.006$ ), TC/HDL ( $p=0.01$ ) as well as Adiponectin Resistin index ( $p=0.03$ ) and novel Insulin resistance adiponectin-resistin (IR-AR) ( $p=0.002$ ).

**Discussion:** Patients with T2DM and CAD have much higher one-year MACE rates than general population. (24% vs 10%). Deranged conventional risk factors (HbA1c and Lipid profile) showed consistent association with development of one-year MACE in patients with CAD and T2DM whereas novel markers like resistin, hsCRP, Lipoprotein(a), ApoB failed to show significant difference. This might suggest that the newer markers might be of limited use once CAD is established and be of limited use in further prognostication. This may suggest their role in time dependent intervention for prevention/delaying of CAD in patients with T2DM, but not beyond a certain temporal threshold.

## OP04

### Age-Related Differences in Diagnostic Accuracy of Non-Fasting 75 gm Diabetes in Pregnancy Study Group of India (DIPSI) Criteria For Diagnosis of Gestational Diabetes Mellitus

S Jain • S Jain • V Jain • R Mittal

**Background and Aims** Gestational diabetes mellitus (GDM) is defined as glucose intolerance diagnosed for the first time during pregnancy. There exists a controversy regarding the optimal strategy for diagnosis of GDM. American Diabetes Association (ADA), International Association of Diabetes and Pregnancy Study Groups (IADPSG) and World Health Organisation (WHO) recommends 75 g OGTT for all pregnant women to diagnose GDM if one or more plasma venous glucose values exceeded the following thresholds: fasting  $>92$  mg/dl, one hour  $\geq 180.0$  mg/dl, or two hour  $\geq 153$  mg/dl. It requires antenatal patients to come to clinic in fasting state. However for Indian population, Diabetes in Pregnancy Study Group of India (DIPSI) criteria is recommended for GDM diagnosis which requires plasma glucose measurement after two hours of ingestion of 75 g glucose load irrespective of meal timings. To evaluate the overall accuracy and assess for age-related differences in diagnostic accuracy of non-fasting 75g DIPSI criteria of GDM compared to confirmatory fasting 75g OGTT WHO criteria in North Indian patients.

**Materials and methods** A single centre observational study conducted at Department of Obstetrics and Gynaecology, Vardhman Hospital, Ambala, Haryana. Four hundred and one consecutive antenatal patients presenting to Obstetrics OPD were included and divided into four groups according to age ( $\leq 25$  y ; 26–30y ; 31–35y and  $>35$ y). All patients underwent plasma glucose measurements and GDM was diagnosed according to DIPSI criteria and WHO criteria.

**Results** Overall diagnostic accuracy of DIPSI criteria was found to be 93.91%. The criteria was found to have high specificity (98.96%), positive predictive value (84.62%) and negative predictive value (94.51%) but a low sensitivity (50.0%). Age-specific analysis revealed that the diagnostic accuracy of DIPSI decreased with increasing age ( $\leq 25$  y = 95.0%] vs. [26–30y = 92.88%] vs. [31–35y = 92.86%] vs. [ $>35$ y = 88.24%]. A higher specificity and positive predictive value was found in younger age groups ( $\leq 25$  y = 100%;100%], [26–30y = 99.41;92.86%]) compared to older age groups ([31–35y = 96.83%;66.67%] , [ $>35$ y = 93.33%;50.0%].

**Conclusion** In our study, overall diagnostic accuracy of DIPSI was found to be high (93.91%) and accuracy decreased with increasing age. Also, specificity and positive predictive value of the criteria was found higher in younger age groups. Thus, DIPSI

proves to be a simple, feasible, and convenient diagnostic method especially in younger antenatal females.

## OP05

### TCF7L2 Polymorphism is a Prominent Marker Among South Indian Subjects With Type-2-Diabetes With a Positive Family History of Diabetes

U Juttada • S Kumpatla • R Parveen • V Viswanathan

**Background and Aims** Recent genomic studies have identified several genetic variations that contribute heavily to the disease prognosis due to positive family history. The one that exerts by far the biggest influence was gene TCF7L2 and diabetes. The present study aim to see the association between TCF7L2 gene polymorphism among diabetes subjects with different parental diabetes registry.

**Materials and methods** A total of 162 (M:F 101:61) newly diagnosed diabetes (NDM) subjects from parental diabetes registry were recruited and were categorized into 3 groups i.e Conjugal Parental Diabetes Registry (CPDR) (n=50), One Parental Diabetes Registry (OPDR) (n=56) and No Parental Diabetes Registry (NPDR)(n=65). Anthropometric and clinical data were recorded. For further validation, 8 families(4:CPDR, 2:NPDR, 2:OPDR) father, mother and offspring with diabetes were genotyped for TCF7L2 polymorphism and their inheritance patterns was assessed. DNA was isolated from whole blood using mini extraction kit (Qiagen) and Genotyping of the DNA was done using specific TCF7L2 SNP assay (KASP genotyping assay) using real time PCR .

**Results** Mean age of the subjects was 52.4±12.2 years. Parental history of diabetes and the TCF7L2 at-risk variant were not associated with BMI, hypertension and lipid profile whereas positive association was seen with age and eGFR. A positive parental history of diabetes was associated with TCF7L2 risk variants(CT/TT)among the study subjects(odd ratios (OR) (95% confidence interval (CI)=1.48 (1.10–2.00)).The CT/TT genotypes of SNP rs7903146 of TCF7L2 gene were strongly associated with diabetes. The mutant “T” allele is significantly higher in OPDR (35.5%) and CDR (61%) compared to NPDR subjects(18.4%)(p=0.001). Inheritance patterns studied of this gene among 8 families showed risk variants(CT/TT) in diabetes parents and their offspring except NPDR families. Almost 60% of people with T2DM carry two copies of the high-risk version of the gene thus concluding the family history of diabetes doubles the risk of the disease regardless of other risk factors.

## OP06

### Genetic Susceptibility of TGF-β1 (+869 T/C) Single Nucleotide Polymorphism in Diabetic Foot ULCER Among South Indian Population

T Adhikari • PP Vikraman • T Rajan • J Ravichandran • D Umamathy • RK Mohanram • R Keshavan

**Background and Aims** Diabetic Foot Ulcers (DFU), a major microvascular complication of Diabetes Mellitus often progresses to frequent amputations and high mortality risks. Transforming Growth Factor- Beta1 (TGF-β1) is a multifunctional gene which plays a pivotal role in wound remodeling by ECM formation and reported to be low in DFU, thereby impairing the wound healing process. Several genomic studies have reported TGF-β1 exon polymorphism as a susceptible marker for diseases like asthma,

ESRD. However, the association of exon +869T/C polymorphism in DFU remains unexplored. In the present study, we investigated the association of TGF-β1 SNP rs1800469 (Exon 1; +869T/C) among DFU in South Indian population.

**Materials and methods** In this cohort study, SNP of TGF-β1 gene was studied among controls (n= 75), T2DM (n= 82) and DFU subjects (n= 98). Genomic DNA was isolated from blood samples by phenol-chloroform extraction. The genotypes of TGF-β1, rs1800469 were determined using PCR- RFLP method.

**Results** TGF-β1 genotype frequency was as follows: TT: 46 (61.3%); CT: 24 (32.0%) and CC: 5 (6.7%) in the control group, TT: 38 (46.3%); CT: 29 (35.4%) and CC: 15 (18.3%) in the T2DM group and TT: 33 (33.7%); CT: 37 (37.8%) and CC: 28 (28.5%) in the DFU group. CC genotype was found to be significant in DFU when compared to control (Control vs DFU: OR= 5.60(2.04-15.3), P= 0.0008). Similarly, we noticed that CC genotype was significantly increased in T2DM when compared to control (Control vs T2DM: OR= 3.13(1.07-9.1), P= 0.03).

**Conclusion** Our findings indicate that TGF-β1 SNP (+869T/C) is more significant in DFU when compared to both T2DM and control. Therefore, TGF-β1 functional polymorphism may play a role in the pathogenesis of DFU in diabetic patients.

## OP07

### Crosstalk Between Endoplasmic Reticulum Stress and Oxidative Stress in the Progression of Diabetic Nephropathy

RK Mohanram • SP Victor • D Umamathy • V Viswanathan

**Background and Aims** A number of pathophysiological insults lead to accumulation of unfolded proteins or misfolded proteins in the endoplasmic reticulum (ER) and cause ER stress. In response to accumulation of unfolded/misfolded proteins, cells adapt themselves to the stress condition via the unfolded protein response (UPR), the production of reactive oxygen and nitrogen species and a state of oxidative stress. Oxidative stress (OS) and ER stress are integrally entwined states, implicated in the aetiology of many diseases including diabetes. The present study aims to investigate the crosstalk between ER stress and oxidative stress in the pathophysiology of Diabetic Nephropathy (DN).

**Materials and methods** In the present cross sectional study, we enrolled a total of 80 subjects in which, Group-I (n=20) Healthy controls consisted of non-diabetic subjects, Group-II (n=20) T2DM subjects without any late complications with eGFR above 90. Group-III (n=40): T2DM subjects with DN. Further, group-III subjects were subdivided into two groups based on their eGFR (mL/min/1.73 m<sup>2</sup>). Group-IIIa (n=20): T2DM subjects with an eGFR between 60 to 89. Group-IIIb (n=20): T2DM subjects with an eGFR between 30 to 59. Peripheral blood was collected from all the study subjects and PBMCs were isolated. Total RNA was further isolated using kit and qPCR was performed to check the expression of ER stress and oxidative stress markers along with the redox crosstalk markers such as protein disulfide isomerase (PDI) and ER oxidase 1α (ERO1α).

**Results** The ER stress markers such as GRP-78, IRE-1α, ATF-6, PERK, CHOP and the OS markers such as IRAK-1, TXNIP, p22phox and TRPC6 were also found to be elevated in the progression of DN. Further, elevated expression of redox crosstalk markers such as PDI and ERO1α were well correlated with eGFR of the study subjects.

**Conclusion** Our study identifies the underlying molecular mechanisms of oxidative protein folding in DN and therapeutic interventions that target the ER stress response would be potential strategies to treat DN.

## OP08

**MiR-146a Promotes the Progression of Diabetic Foot Ulcer Via Induction of ER Stress**

PP Vikraman • K Amin • D Umapathy • S Dornadula • R Kesavan • RK Mohanram

**Background and Aims** MicroRNAs (miRNAs), a class of small non-coding RNAs, are thought to serve as crucial regulators of gene expression. Accumulating evidence suggests that miRNAs are not only key regulators in normal physiological processes, but also play an important role in the pathologic processes of many diseases including type 2 diabetes mellitus (T2DM). miR-146a has been implicated in regulation of the immune and inflammatory responses. We made an attempt to examine the expression of miRNA-146a in the progression of diabetic foot ulcer and to study the correlation with Endoplasmic Reticulum (ER) and oxidative stress in patients with acute and chronic diabetic foot ulcer (DFU).

**Materials and methods** A total of 90 subjects were recruited and divided into 3 groups [Group-I, Controls (n=30), Group-II, T2DM (n=30), Group-III, DFU (n=30)]. DFU was further subdivided into Group-IIIa, Acute DFU (n=15), Group-IIIb, Chronic DFU (n=15). Peripheral blood was taken from the study subjects. Total RNA from both PBMCs and tissues were isolated using miRNA isolation kit and qPCR was performed to check the expression of miR-146a, ER stress and oxidative stress markers.

**Results** miR-146a expression levels were significantly increased in DFU patients. The ER stress markers such as GRP-78, IRE-1 $\alpha$ , ATF-6, PERK, CHOP and the OS markers such as IRAK-1, TXNIP, p22phox and TRPC6 were also found to be elevated in both circulation and tissues of DFU. Further, miR-146a showed a significant positive association with ER stress genes.

**Conclusion** Our results demonstrate that overexpressed miRNA-146a was found to be associated with ER stress and oxidative stress in DFU patients. In addition, our results suggest that miR-146a may also represent a potential useful marker of inflammation as well as a potential therapeutic target for modification of the diabetic wound-healing response.

## OP09

**High Glycaemic Variability is a Pro-arrhythmic Factor in Patient of Type-2 Diabetes Mellitus With Heart Failure**

S Singh • D P Singh • S S Singh • A K Srivastava

**Background and Aims** Prevalence of chronic heart failure in type-2 diabetic patients is well known worldwide. Ventricular arrhythmias seem one of the factors that determine the prognosis of heart failure. Present study was done with aim to investigate the influence of Glycaemic variability on ventricular cardiac arrhythmias in type-2 diabetics with chronic heart failure. Ninety type-2 diabetics with chronic heart failure were included in this study. 54 patients (60%) characterised by III and IV functional class of heart failure. 54 patients used oral hypoglycaemic agents, 30 on insulin as mono-therapy or in combination with oral medication. The follow-up period was of 6 months. Holter Electrocardiogram monitoring at the inclusion, at 3 months and 6 months. The blood glucose levels were estimated at pre-meals, 2 hours post-meals, at bed time and at 3AM. A combined Holter and Continuous Glucose Monitoring (CGM) were performed in 25 patients simultaneously. Eight patients died during the study period. Dangerous

ventricular arrhythmias were detected in 48 patients (53.3%). Glucose less than 90mg/dl during the day of Holter increased the risk of dangerous arrhythmias by 4.8 times. The Mean Amplitude of Glycaemic Excursion was associated with dangerous ventricular arrhythmias. There was a direct correlation between the level of Mean Amplitude of Glycaemic Excursion and the number of ventricular premature beats ( $r=0.54$ ;  $p=0.02$ ). Mean Amplitude of Glycaemic Excursion were 95.40mg/dl and 43.20mg/dl in patients with arrhythmias and without arrhythmia, respectively ( $p=0.006$ ). Prevalence of dangerous ventricular arrhythmias were 43.3% and 10% in cases with Mean Amplitude of Glycaemic Excursion  $>90$ mg/dl and  $<90$ mg/dl respectively ( $p=0.02$ ). The high Glycaemic variability i.e. Mean Amplitude of Glycaemic Excursion  $>90$ mg/dl was associated with dangerous arrhythmias. The high Glycaemic variability acts as a pro-arrhythmic factor in type-2 diabetics with heart failure.

## OP10

**A Cross-Sectional Study on Prevalence of Sexual Dysfunction in Patients with Diabetes**

S Jha • D Mangal • S Waghadhare • S Siddiqui • N Chabra • S Bali

**Background and Aims** Type 2 Diabetes mellitus (T2D) is known to cause different medical, psychological and sexual complications. Sexual dysfunction (SD) can also be an early sign of T2D. SD is common among both male and female patients. Several studies have shown that men with diabetes are at increased risk for erectile dysfunction. Although women are bound to have the same risk to develop diabetic complications, the sexual problems of women with diabetes have received much less attention in research and clinical practice. In India not many studies have studied the prevalence. So we planned to study the prevalence of SD in patients with T2DM in a tertiary care centre at Delhi.

**Materials and methods** This cross-sectional study was conducted to assess the prevalence of SD in patients of diabetes of both genders using international validated questionnaires. Standard questionnaires were given to a total of 210 male and 130 female patients who had diabetes. The male and female patients who were sexually active and fulfilled the study criteria were evaluated using the Arizona Sexual Experience Scale (ASEX), as a screening tool for the presence of sexual problems. The male patients who were found to have sexual problems (ASEX Score  $> 10$ ) filled the International Index of Erectile Function (IIEF)-5 or SHIM (Sexual Health Inventory for Men score) questionnaires.

**Results** The most prevalent dysfunctions were dissatisfaction with orgasm (83%) and lack in ease of orgasm (82.2%) among male patients. Among male patients who had sexual dysfunction, almost all patients had erectile dysfunction (99.3%). The most prevalent dysfunction was the lack of satisfaction with orgasm (82%) among female patients. The frequency of all the dysfunctions was similar in both genders.

**Conclusion** Our study concluded that erectile dysfunction is the most common sexual dysfunction in patients with T2D. Lack of satisfaction with orgasm is prevalent amongst both males and females. The study recommends that sexual dysfunction should be addressed more adequately in health care practice in India. Family Physicians need to take a detailed history and discuss sexual life from, both, male and female members of society and educate them on the importance of a healthy sexual relationship and its implication on their family. Sexual dysfunction in both men and women with diabetes deserves further research as causes are many, and the neuro- endocrinological background is complex.

## OP11

**Extrapancreatic Glucagon, Incretins And Hyperglycemia – Time For A “GUT”-sy Pathogenesis In Fibrocalcific Pancreatic Diabetes (FCPD)?**

R Dasgupta • S Verma • S Anoop • M Kurien • G • P Christudoss • G Rebekkah • F Christina • F Jebasingh • H S Asha • T V Paul • N Thomas

**Background and Aims** Chronic pancreatitis is the commonest disorder of the pancreas associated with secondary diabetes. In many tropical countries a kin to India, the aetiology frequently includes so-called ‘Tropical Chronic Pancreatitis’(TCP). Fibrocalcific Pancreatic Diabetes (FCPD) is an important late feature of TCP, often characterized by brittle diabetes, frequent hypoglycemia and an increased risk of pancreatic malignancy. Though traditionally thought of as a beta-cell and alpha-cell secretory defect due to global pancreatic destruction, the role of incretin and glucagon secretion in them remains elusive.

**Primary:**

1. To assess the glucagon and incretin responses in patients of fibrocalcific pancreatic disease with diabetes mellitus (FCPD).
2. To establish the source of glucagon in patients with fibrocalcific pancreatic disease with diabetes mellitus (FCPD).

**Secondary:**

1. To calculate the incretin effect in patients with FCPD on oral glucose challenge and isoglycemic intravenous glucose infusion (IIGI).
2. To study the relationship of glucose, incretins and glucagon to hyperglycemia in FCPD.

**Materials and methods** An observational, cross-sectional 2-year case-control study was conducted at the Department of Endocrinology, Diabetes and Metabolism, CMC Vellore after obtaining the necessary ethical clearance (IRB:13-2191). Non-alcoholic, normoglycemic subjects with clinical evidence of recurrent episodes of pain abdomen and steatorrhoea with radiological (CT abdomen) evidence of large ductal calcifications and biochemical evidence of diabetes mellitus were designated as Fibrocalcific Pancreatic Diabetes (FCPD). The study population comprised of age and BMI matched male subjects with FCPD (n=9) and healthy non-diabetic controls (n=6). On two separate days separated by a gap of 72-hours, following correction of hyperglycemia for >12 hours, isoglycemic intravenous glucose infusion (IIGI) and 75-gram oral glucose tolerance test (OGTT) were performed respectively. Timed samples of glucose, C-peptide, insulin, glucagon, GLP-1, GIP, Pancreatic Polypeptide and Oxyntomodulin were assayed at 0, 15, 30, 45, 60, 90, 120, 150 and 180 minutes during the IIGI and OGTT respectively. Incretin response was assessed from the glucose infusion rates and C-peptide kinetics during the IIGI and OGTT using the formula for GIGD (gastrointestinal glucose disposal rate) while insulin secretion rates were calculated from the C-peptide deconvolution studies.

**Results** Baseline characteristics revealed that the FCPD subjects (cases, n=9) and non-diabetic controls (n=6) were age and BMI matched with the mean HbA1c in the cases being 8.4 with a mean duration of diabetes of 9.6 years. The basal, mean AUC and basal subtracted mean AUC were calculated for each of the biochemical parameters. The FCPD group significantly suppressed basal and OGTT-stimulated C-peptide and pancreatic polypeptide levels ( $p < 0.05$ ) suggesting poor pancreatic reserve. The FCPD group significantly higher basal and OGTT-stimulated glucagon and GLP-1 levels ( $p = 0.01$ ) while the stimulated GIP responses were blunted in the FCPD group. Further, oxyntomodulin levels were significantly higher at baseline and after OGTT ( $p < 0.05$ ). The incretin response derive from the OGTT and IIGI timed assays of glucose and C-peptide were significantly reduced in the FCPD group, with GIGD showing a 2.5 fold decline in the FCPD group ( $p = 0.05$ ). The combination of elevated glucagon, GLP-1 and

oxyntomodulin with suppressed pancreatic polypeptide and C-peptide levels during the IIGI/OGTT studies point to a selective upregulation of prohormone convertases in the L-cells of the gut, thus pointing to a possible role of extrapancreatic glucagon secretion, despite the presence of a globally destroyed pancreas, in FCPD.

**Conclusion** We report the first isoglycemic intravenous glucose infusion (IIGI) and 75-gram oral glucose tolerance test (OGTT) tests in FCPD subjects with elucidation of the glucagon-incretin axis. Hyperglucagonemia, possibly contributed from the L-cells of the gut, with decreased incretin response and negligible insulin secretion from the pancreatic beta-cells - are novel pathogenetic mechanisms in FCPD that may signal a paradigm shift in the understanding and treatment of this intriguing form of tropical diabetes.

## OP12

**Insulin Secretion, Insulin Sensitivity and Adipose Tissue Characteristics in Malnutrition Modulated Diabetes" (MMD, <19.0 kg/m2) Amongst Asian Indians: Insights From Euglycemic-Hyperinsulinemic Pancreatic Clamps from South India**

R Dasgupta • S Anoop • V Padmanabhan • M Jambugulam • M E. Kurien • R Livingstone • A Chapla • A Jose • M Inbanathan • F Christina • G Rebekkah • S Jeyaseelan • S Kehlenbrink • S Koppaka • A Goyal • M Carey • R Maginley • J Moy • A Wickramanayake • D Stein • M Hawkins • N Thomas

**Background and Aims** Pathogenetic mechanisms regulating metabolism in “Malnutrition Modulated Diabetes” (MMD, <19.0 kg/m<sup>2</sup>) amongst Asian Indians remains obscure. This study was performed to determine the role of insulin secretion, sensitivity defects and adiposity in MMD.

**Materials and methods** This was a study including age-matched males: MMD, Type 2 Diabetes (T2D), Type 1 Diabetes (T1D); and lean and obese controls without diabetes. MMD were subjects with BMI < 19 kg/m<sup>2</sup>, with documented history of low birth weight/malnutrition and were negative for auto-antibodies, pancreatic calculi and mutations for inherited forms of diabetes. Insulin secretion-rate (ISR) was assessed by C-peptide-deconvolution, following mixed-meal test (MMT). Peripheral and hepatic insulin resistance (IR) analyzed through Hyperinsulinemic-Euglycaemic Pancreatic Clamps (HEC) and Deuterated Glucose (D2G), performed after rigorous control of blood glucose levels over two weeks to eliminate acute glucotoxicity. 1-H-Nuclear-magnetic-resonance-spectroscopy (NMR) assessed hepatic, intramyocellular (IM) and extramyocellular fat (EM). Dual Energy Absorptiometry (DXA) and indirect calorimetry assessed body composition and resting energy expenditure respectively.

**Results** Baseline parameters, including HbA1c and fructosamine matched across the diabetic groups. Pre-hepatic ISR was significantly lower in MMD relative to lean non-diabetic and T2D, but higher than T1D subjects. Peripheral glucose uptake (Rd) was significantly higher in MMD compared to the T2D group, but was similar to T1D and lean non-diabetics. Endogenous glucose production (by D2G) was similar between study groups except for the T2DM group which showed significantly higher EGP. Percentage of pancreatic fat was significantly higher for MMD when compared to lean normal, T1D and T2D groups. Visceral adipose tissue (VAT) and percentage of hepatocellular fat were significantly higher in MMD compared to lean normal and T1DM, but significantly lower than T2D subjects; with percentage of IM and EM lipids being significantly lower in MMD compared to T2D. A trend towards correlation between hepatic insulin sensitivity and hepatocellular and subcutaneous adiposity in MMD, existed. Metabolomics revealed insulin sensitivity in MMD to be associated with increase in the concentrations of

several phosphatidylcholines that are potential markers of inflammation, while Targeted RNA sequencing using Ampliseq technology revealed Toll-like-receptor 4 expression to be 22-fold higher in adipose tissue of Lean- diabetes compared to T1D and 5.8-fold higher than in T2D.

**Conclusion** This is the first study demonstrating the unique metabolic profile of MMD amongst Asian Indians characterizing reduced insulin secretion, increased pancreatic, hepatocellular and visceral adiposity with heterogeneity in hepatic and peripheral insulin sensitivity and probable role of adipose tissue inflammation and adipose tissue resistance in the pathogenesis of MMD. Thus our study characterizes MMD as an unique metabolic disorder with distinct differences from T1D and T2D subjects,

### OP13

#### Efficacy And Safety Of Remogliflozin In T2DM: Results From 24 Week Randomized Double-blind, Double- dummy Phase III Study

A Asirvatham • S Katara

**Background and Aims** Remogliflozin etabonate (RE) is novel SGLT2 inhibitor approved for use in Type-2

Diabetes Mellitus (T2DM). This Phase III study evaluated efficacy & safety of two different doses of RE vs. Dapagliflozin.

**Materials and methods** This 24-week, double-blind, double-dummy 3-arm study randomised T2DM patients with inadequate glycaemic control ( $HbA1c \geq 7\%$  to  $\leq 10\%$ ) on stable dose of Metformin monotherapy to either test arms of RE (100mg BID; Arm-01); or RE (250mg BID; Arm-02) or to control arm of Dapagliflozin (10mg OD; Arm-03). All patients were followed up at week-1, week-4 & every 4 weeks till 24 weeks. The efficacy assessments included mean change in HbA1c (Primary endpoint at 24 weeks, NI margin 0.35), FPG, PPG, body weight & safety assessments included monitoring for treatment emergent adverse events (TEAEs).

**Results** Of 612 randomized patients, 167, 175 & 103 in treatment arms 1, 2 & 3 respectively with comparable baseline characteristics completed the study. Mean change (SE) from baseline to week-24 in HbA1c was  $-0.72\%$  (0.09%),  $-0.77\%$  (0.09%) &  $-0.58\%$  (0.12%) in arms 1, 2 & 3 respectively. The difference in mean HbA1c of RE 100mg vs. Dapagliflozin ( $-0.14\%$ ; 90%CI:  $-0.38, 0.10$ ) & RE 250mg vs. Dapagliflozin ( $-0.19\%$ ; 90%CI:  $-0.42, 0.05$ ) was found to be non-inferior to Dapagliflozin (both  $P < 0.001$ ). No significant difference was found between RE 100mg or RE 250mg & Dapagliflozin in change in FBG, PPG & body weight. Overall incidence of TEAEs was comparable across study arms (32.6%, 34.4% & 29.5%, respectively) including AEs of special interest viz. hypoglycaemic events, UTI, genital fungal infection. Most TEAEs were mild to moderate in intensity, with no SAEs reported.

**Conclusion** RE in doses of 100mg and 250mg is non-inferior to Dapagliflozin 10mg in efficacy and was well-tolerated in patients with Type-2 Diabetes Mellitus

### OP14

#### Efficacy and Safety of Evogliptin Versus Sitagliptin as an Add-on Therapy in Indian Patients with Type 2 Diabetes Mellitus Inadequately Controlled with Metformin: A 24-Week Randomized, Double-Blind, Non- Inferiority, EVOLUTION INDIA study

A Trailokya

**Background and Aims** This study aimed to assess efficacy and safety of evogliptin versus sitagliptin, when added to background metformin therapy in Indian patients with uncontrolled type 2 diabetes.

**Materials and methods** Overall, 184 patients with uncontrolled type 2 diabetes ( $7\% \leq HbA1c < 10\%$ ) receiving  $\geq 8$  weeks of stable metformin monotherapy ( $\geq 1$  g/day), were randomized to receive add-on treatment (evogliptin 5 mg or sitagliptin 100 mg) for 24 weeks. Primary endpoint was change in HbA1c from baseline to 12 weeks (non-inferiority margin:  $< 0.35$ ).

**Results** Mean reductions in HbA1c at 12 weeks in evogliptin- and sitagliptin-treated patients were  $-0.37 \pm 1.06$  and  $-0.32 \pm 1.14$ , respectively. The adjusted mean difference between treatment groups was  $-0.022$  (95% CI:  $-0.374, 0.330$ ;  $P = 0.901$ ), that demonstrated non-inferiority. Reductions in FPG and PPG were similar between evogliptin and sitagliptin at 12 and 24 weeks. Changes in body weight were comparable between the treatment groups. Patients achieving target HbA1c  $< 7.0\%$  (evogliptin, 26.7% vs. sitagliptin, 20%) was almost equal in both groups. Treatment-emergent adverse events occurred in 52 patients (evogliptin, 25% and sitagliptin, 31.5%) and were generally mild.

**Conclusion** Evogliptin was non-inferior to sitagliptin in HbA1c reduction. It effectively improved glycemic control and was well tolerated in type 2 diabetes patients inadequately controlled by metformin alone.

**Keywords:** Evogliptin, dipeptidyl peptidase-4 inhibitor, type 2 diabetes mellitus, sitagliptin

### OP15

#### Determining The Best Screening Strategies For Glucose Intolerance And Diabetes Mellitus In Patients With Mycobacterium Tuberculosis Infection

AK Gupta • S Bajaj • MK Mathur • T Mahmood

**Background and Aims** Diabetes mellitus is a group of common metabolic disorders that share the phenotype of hyperglycemia. Mycobacterium Tuberculosis is very common infection around worldwide especially in developing country. WHO estimates 15% of patient with tuberculosis infection have coexisting diabetes mellitus. The countrywide prevalence figures for presence of diabetes mellitus in newly diagnosed patient with tuberculosis is estimated to be between 25% (Tamil Nadu) & 44% (Kerala) in south to 11.6% (Punjab) in the north, 13.9% (Orissa) in the east and 15.3% (Gujarat) among patients with tuberculosis infection in west. Acute inflammation in tuberculosis could also in theory contribute to insulin resistance and increased glucose intolerance in patient with tuberculosis and this would then improve with the onset of treatment. OGTT, fasting plasma glucose & A1C are different modalities used to determine as screening test for glucose intolerance in mycobacterium tuberculosis infection.

**Materials and methods** To determining the best strategies for diagnosis of diabetes mellitus in patients with mycobacterium tuberculosis infection. To determining the best time for diagnosis of diabetes mellitus in patients with mycobacterium tuberculosis infection

**Results** This study was prospective observational case study in Moti Lal Medical College, Prayagraj and its associated Swaroop Rani Hospital from May 2018. Patients (both male and female) attending Medicine and pulmonary medicine department in MLN Medical College Allahabad were the source of the data. All consecutive adults with tuberculosis infection determined bacteriologically, histologically, clinically or radiologically were recruited after informed consent. Fasting Plasma Sugar, Postprandial Plasma Sugar and A1c was done and followed at 3 month and 6 month later. Chi Square test was used for evaluation of results.  $p$  value  $< .05$  is considered as significant

**Conclusion** 101 Tubercular patients were observed during study. Out of 101, 24 patients were diagnosed case of diabetes and 15

patients were pre-diabetes by A1c test, 4 patients having transient hyperglycemia. Appropriate statistical test was applied and found that A1c test was better than OGTT in screening of diabetes in tubercular patients and 3 month later of treatment is best timing to detect glucose intolerance in tubercular patients.

**Keywords :** OGTT, A1c, Diabetes, Tuberculosis

#### OP16

##### A Study of Correlation Between Apolipoprotein B and Dyslipidemia in Type 2 Diabetes Patients and Its Relation With Proteinuria

M Gunhawar • SK Kochar

**Background and Aims** Individual with diabetes may have several forms of dyslipidemia. Dyslipidemia has been considered to be a factor that plays a risk in progression of micro vascular disease, especially in diabetes. The present study is intended to study the correlation between Apolipoprotein B and dyslipidemia in type 2 diabetes patients and prevalence of dyslipidemia in type 2 diabetic patients.

**Materials and methods** Prospective cross sectional study conducted on 100 cases of type 2 diabetes mellitus. Groups are divided according to A/C ratio and association of dyslipidemia was seen. Serum Apolipoprotein B was measured using immunoturbidimetric method.

**Results** Pearson's correlation analysis of Apo B with lipid parameters in diabetic patients showed that LDL, TC and Tg were positively correlated with Apo B. There was a positive and linear correlation between LDL and Tg. Apo B was negatively correlated with HDL-C.

**Conclusion** The majority of patients studied had low HDL-C, elevated non HDL-C, elevated total cholesterol, elevated triglycerides, elevated LDL-C and elevated Apo B. Apolipoprotein B had a positive linear correlation with total cholesterol, triglycerides, LDL-C, non HDL-C. The strongest positive correlation was with non HDL-C. Patients with low HDL-C had high Apo B levels.

#### OP17

##### To Study the Effect of Thyroid Status on Glycated Haemoglobin in Non-Diabetics and Effect of Its Treatment on HbA1C

S Rai • A Srivastava • S Bajaj

**Background and Aims** Glycated haemoglobin levels depend on factors other than glycemic status and may have altered levels in different conditions. It has been postulated that HbA1C levels may vary due to altered thyroid status. The hypothesis underlying this is possibly the change in red blood cells turnover.

The objective of this study was to determine the levels of glycated haemoglobin in patients of overt hypothyroidism and hyperthyroidism who were non-diabetics and to see the effect of treatment of both on levels of HbA1C.

**Materials and methods** Non-Diabetic patients of overt hypo- and hyperthyroidism were selected. Age and sex-matched controls were recruited. Baseline values of HbA1C and reticulocyte count (for RBC turnover) was measured. These values were re-evaluated in randomly selected subgroups after achievement of euthyroid status.

**Results** HbA1C values in patients initially selected, was found to be significantly higher in hypothyroid group as compared to controls. Values did not differ significantly in hyperthyroid group. Post-treatment after achieving euthyroid status, HbA1C levels

reduced significantly in hypothyroid group and no such significant effects were observed in hyperthyroid group.

**Conclusion** In patients of hypothyroidism, baseline HbA1C levels were found to be significantly higher and post-treatment, after achievement of euthyroid status it reduced significantly. On the other hand, no such effects were observed in hyperthyroid group pre- and post- treatment. Such effects warrant the need for evaluation of HbA1C in patients of hypothyroidism with more caution and prevent the patients from irrelevant investigations and work up for diabetes.

**Keywords** - HbA1C, Thyroid function, reticulocyte count

#### OP18

##### An Uncommon Etiology of Diabetic Ketoacidosis

J Kaur • M Singla • SS Lehl

**Background and Aims** Diabetic ketoacidosis (DKA) is hallmark of type 1 Diabetes Mellitus. At times it can manifest in patients of type 2 Diabetes Mellitus with catabolic states. We present a rare endocrinopathy which presented as DKA.

**Results** We report a 36-year old female who presented to the emergency department with 2 days history of shortness of breath and pain abdomen, and vomiting for 1 day. At presentation, her plasma glucose levels were 360mg/dL, pH = 6.9, bicarbonate levels were 10mEq/L and potassium - 3.5mEq/L respectively. Urine ketones were positive. Patient was managed on the lines of DKA with IV insulin infusion and fluids. However, on detailed physical examination patient had coarse facial features, large fleshy nose, thick lips, prognathism thickening of hands and feet, acanthosis nigrans and multiple skin tags suggestive of GH excess. High IGF-1 levels - 1402ng/ml (62-243) and GH levels >50 ng/ml (<5) confirmed the diagnosis. CEMRI Brain revealed 20x18x15mm sellar suprasellar mass extending into the left cavernous sinus. She underwent transsphenoidal surgery with gross resection of the tumor. At 3 month follow-up patient had normal blood glucose profile (FBS- 96mg/dl, PPBG - 126mg/dl, HbA1c - 5.6% ) with no requirement of insulin therapy.

**Conclusion** Patients with acromegaly have diabetes due to insulin resistance. Uncontrolled DM and DKA can be a presenting manifestation. Meticulous clinical examination should be performed in patients presenting with diabetes ketoacidosis to rule out the curable etiologies like acromegaly, as in our case surgery cured her diabetic state.

#### OP19

##### Baseline Characteristic of Remogliflozin to Evaluate Efficacy And Safety For Type 2 Diabetes Form North Gujarat

P Goswami • P khatri • K Patel • B Patel • R Gokalani

**Background and Aims** Randomized control trials are gold standard to evaluate newer drugs but in real-world clinical setting patient's population are heterogenous. We need to understand our true clinical utilization of newer drugs by looking baseline characteristic of our patients.

**Materials and methods** This retrospective observational study for 64 patients who were prescribed remogliflozin for type 2 diabetes were analyzed. Data for 61 patients were analyzed as for 3 patients data mismatch was there. Data were primarily analyzed for HbA1c, weight, eGFR. Other parameters were analyzed for age groups, duration diabetes, micro and macro albuminuria, starting



dosage of drugs and other oral hypoglycemic agents. We will also look any adverse events during this study.

**Results** Mean HbA1c was  $8.6 \pm 1.75$ . BMI  $26.7 \pm 3.38$ . for BMI less than 25, BMI 26 to 30, BMI more than 30 the mean HbA1c was  $8.53 \pm 1.72$ ,  $8.63 \pm 1.86$ ,  $8.88 \pm 2.23$  respectively. eGFR for this study was  $73.9 \pm 15.57$ . Male to female ration 70.5 % vs 29.5 %. Duration Diabetes was  $7.5 \pm 6.43$  years. For 0 to 5 years, 6 to 10 years, 11 to 15 years, more than 15 years duration of diabetes the Mean HbA1c was  $8 \pm 1.43$ ,  $9.09 \pm 1.71$ ,  $9.58 \pm 1.96$ ,  $8.88 \pm 2.23$  respectively. We have reduced or changed dosage of other oral hypoglycemic drugs.

**Conclusion** Mean HbA1c  $8.6 \pm 1.75$  and sex ratio Male to female 70.5 % Vs 29.5 %. which is in line most of the other SGLT 2 inhibitor randomized control trials. Remogliflozin is new drug to Indian patient population and this study will really give more meaningful information for clinician for their day to day practice.

**Keywords:** Baseline characteristic, remogliflozin, type 2 diabetes.

## OP20

### Serum CCL 18 Levels in Women With Polycystic Ovarian Syndrome

JE Sam • KM Suryanarayana

**Background and Aims** Polycystic ovarian syndrome (PCOS) is the most common metabolic disorder seen in women of the reproductive age group, with the majority of them having insulin resistance. There is a need to identify sensitive markers of insulin resistance. CC chemokine ligand 18 (CCL 18), secreted from white adipose tissue (WAT) is upregulated in individuals with insulin resistance. To study the correlation between serum CCL 18 levels and insulin resistance in PCOS.

**Materials and methods** This case-control study included 45 PCOS women and equal number of age and body mass index (BMI) matched controls. Estimation of serum CCL 18, serum testosterone, fasting plasma glucose, fasting insulin and HbA1c and ultrasonography of abdomen and pelvis were done and HOMA IR was calculated.

**Results** Serum CCL 18 level was higher in women with PCOS when compared to controls. The mean level of serum CCL 18 (ng/mL) in the PCOS group and control group was  $28.32 \pm 4.17$  and  $11.90 \pm 4.91$  respectively ( $p < 0.001$ ). Blood pressure, waist circumference, waist-hip ratio, serum total testosterone, fasting serum insulin and HOMA IR showed a positive correlation with serum CCL 18 levels. High systolic BP, serum CCL 18 and serum total testosterone levels were independent predictors of PCOS ( $P < 0.05$ ). A serum CCL 18 cutoff level of 18.84 ng/mL showed 93.3 % sensitivity and 91.4 % specificity in distinguishing PCOS subjects from healthy individuals.

**Conclusion** There is a significant correlation of serum CCL 18 level with insulin resistance in PCOS subjects and serum CCL levels can act as a marker of PCOS.

## OP21

### Association of Serum Magnesium Levels with Glycosylated Hemoglobin and Degree of Neuropathy in Patients with Diabetic Neuropathy

S Jhajharia • J Bahinipati

**Background and Aims** Magnesium plays an important role in glucose metabolism and insulin response, as a cofactor involved in transmembrane movement of glucose and release of insulin. The association between Diabetes mellitus and hypomagnesemia has a wide impact on diabetes control and development of its

complications. This study was done to find out the correlation between serum Magnesium, glycosylated hemoglobin (HbA1c) and Vibration Perception Threshold (VPT) scoring in Diabetic neuropathy patients.

**Materials and methods** 286 patients with signs and symptoms of Diabetic neuropathy were enrolled in the study duration of 1 year. FBS, PPBS, HbA1c and serum Magnesium levels were analyzed. VPT scores were determined using a Digital Biothesiometer and neuropathy was graded as normal (<15 volts), mild (15-20 volts), moderate (20-25 volts) and severe (>25 volts). Serum Magnesium was correlated with HbA1c and VPT scores in the study participants.

**Results** In our study group, the mean FBS was  $129.76 \pm 31.48$  mg/dl, mean PPBS was  $286 \pm 41.82$  mg/dl, mean HbA1c was  $7.37 \pm 1.04$  % and mean serum Magnesium was  $1.62 \pm 0.38$  mg/dl. Serum Magnesium was found to be negatively correlated with HbA1c ( $r = -0.26$ ,  $p < 0.001$ ). Similar statistically significant negative correlation was also found between serum Magnesium with VPT scoring ( $r = -0.437$ ,  $p < 0.001$ ) in Diabetic neuropathy patients.

**Conclusion** In summary, our data showed that lower serum Magnesium levels were significantly associated with higher HbA1c and higher VPT scores indicating increased severity of neuropathy in patients with T2DM. Hence low serum Magnesium levels might affect peripheral nerve function through axonal degeneration suggesting that low serum Magnesium levels may underlie many of the pathophysiologic features of Diabetes neuropathy.

**Keywords:** Serum Magnesium, HbA1c, VPT, Diabetic neuropathy.

## OP22

### Bone Marrow Mesenchymal Stromal Cells Derived Exosomes and Electrical Stimulation are Key Players in Management of Diabetes Associated Peripheral Neuropathy

A Raghav

**Background and Aims** Diabetic peripheral neuropathy (DPN) is a long-term complication associated with nerve dysfunction and uncontrolled hyperglycemia, imposing an economic and social burden on society. In spite of new drugs discoveries, development of effective therapy is much needed to cure DPN. In the current study, we developed a combinatorial approach to provide biochemical and electrical cues in a single system, considered to be important for nerve regeneration.

**Materials and methods** Exosomes derived from bone marrow mesenchymal stromal cells (BMSCs) were fused with liposomes containing polypyrrole nanoparticles (PpyNps) to deliver both the cues in a single delivery vehicle. We developed the diabetic peripheral neuropathy (DPN) rat model using streptozotocin (STZ) and injected the fused conducting exosomal system intramuscularly in the diabetic neuropathy animal model.

**Results** It was found that fused exosomal system along with exogenous electrical stimulation normalized the electrophysiological parameters such as nerve conduction velocity ( $57.60 \pm 0.45$  m/s) and compound muscle action potential ( $16.96 \pm 0.73$  mV) similar to the healthy control group ( $58.53 \pm 1.10$  m/s;  $18.19 \pm 1.45$  mV). Gastrocnemius muscle morphology, muscle mass, and integrity were recovered after treatment with our exosomal therapy. We also observed the paracrine effect of the delivered exosomes in controlling hyperglycemia and loss in the body weight. The therapy also showed regeneration of the tissues such as the pancreas, kidney, and liver after DPN.

**Conclusion** The outcome of the study has promised further clinical evaluation trials to determine the safety and efficacy in patients.

## OP23

**The Real-World Evidence for the Glycemic Efficacy and the Metabolic Effects of the Fixed Dose Combination of Empagliflozin and Linagliptin**

S Datta • A Mohan • R Unnikrishnan • V Mohan

**Background and Aims** Empagliflozin in combination with linagliptin is a fixed-dose, once-daily tablet combining a sodium glucose co-transporter-2 (SGLT2) inhibitor with a dipeptidyl peptidase-4 (DPP-4) inhibitor, utilised as an adjuvant to diet and exercise to improve glycemic control in type 2 diabetes and both act with different, complementary mechanisms of action to improve glycemic control

**Materials and methods** We conducted a real-world analysis for the glycemic and other metabolic parameters (body weight, SBP and DBP) in patients who have been recently initiated on the combination therapy. Unpaired t test was utilised for the statistical analysis.

**Results** 38 patients were initiated on the novel combination. The mean age was 53 years (minimum 30, maximum 64, SD  $\pm$  8.6, 95% CI 50 to 55). The mean duration of diabetes was 11 years

(minimum 0, maximum 30, SD  $\pm$  8.1, 95% CI 8.5 to 14). The mean HbA1c at the initiation was 9.8% (minimum 5.6, maximum 15, SD  $\pm$  2.1, 95% CI 9.1 to 11). The need for the enhanced therapeutic compliance and cost effectiveness enabled the shift to the combination in 10 patients (26%) who were on the ongoing individual monotherapy with SGLT2 inhibitor and DPP IV inhibitor, with initial mean HbA1c 9.6 % (minimum 8, maximum 11, SD  $\pm$  1.1, 95% CI 8.8 to 10). The mean decrease in the Fasting Plasma Glucose (FPG) was 73 mg/dl, with 16 patients (42%) achieved reduction of more than 100 mg/dl. The mean decrease in the Post Prandial Glucose (PPG) was 101 mg/dl, with 17 patients (45%) achieved reduction of more than 100 mg/dl. The mean initial eGFR at initiation was 101 mL/min/1.73m<sup>2</sup> (minimum 61, maximum 145, SD  $\pm$  20, 95% CI 94 to 107). The mean reduction of the body weight was 1 kg. There was a mean reduction of 6 mmHg and 2 mmHg of SBP and DBP, respectively.

**Graph/Table :**

**Table: Changes in Glycemic and Metabolic Parameters**

Parameter Baseline Vs at 1 month		Mean (SD)	Minimum	Maximum	95% CI	P value
FPG (mg/dl)	Baseline	218 (71)	111	405	195 to 241	p<0.0001
	1 month	145 (51)	83	302	128 to 162	
PPG (mg/dl)	Baseline	318 (87)	161	471	289 to 346	p<0.0001
	1 month	217 (80)	94	429	191 to 243	
Body Weight (kg)	Baseline	78 (13)	55	120	74 to 83	p=0.59 NS
	1 month	77 (13)	55	115	73 to 81	
SBP (mmHg)	Baseline	128 (14)	104	182	123 to 132	p=0.05 NS
	1 month	122 (14)	102	160	117 to 126	
DBP (mmHg)	Baseline	78 (11)	40	98	75 to 82	p=0.20 NS
	1 month	76 (8.3)	58	100	73 to 82	

**Conclusion** The initial real-world results, in line with the randomised controlled studies, demonstrate a powerful glycemic efficacy with the numerically superior reductions in the body weight and blood pressure, as early as one month. The combination of Empagliflozin and Linagliptin is a suitable option as an add on to metformin therapy to improve the glycemic and metabolic parameters. The results need to be validated through a long-term larger study.

## OP24

**Time To Do More: An Indian Perspective of Addressing Clinical Inertia in the Management of Type 2 Diabetes Mellitus in East India**

S K Shah • A Majumder • S Kumar • AV Thorat

**Background and Aims** Despite the availability of a plethora of well-tolerated treatment options, optimal therapeutic targets for diabetes are often not met. The present study was conducted to understand the attitudes and behaviors of physicians and patients towards the management of diabetes.

**Materials and methods** The basis of the survey in India was an extension to the global survey<sup>1</sup>. The survey in India was conducted in a face-to-face interview among 641 patients and 638 physicians from mid-

June 2018 to September 2018. East Zone achieved a sample of 120 physicians and 119 type 2 diabetes patients which is around 19% of the total survey physician and patient sample alike. Five cities were covered in this zone of which one is a metro city, other four cities are close to the metros (Bhubhneswar, Patna, Howrah, Kolkata and Guwahati). The questionnaire was validated by leading endocrinologists from different parts of India and translated to local languages. The data gathered was tabulated as per the variables, was converted to percentages and was presented using descriptive statistics.

**Results** The results were divided based on questions related to diagnosis consultation, hypoglycemia reporting, and getting HbA1c to goal. Patients cite kidney (65%) and vision (61%) problems as the most concerning complications about diabetes. While 3 out of 4 patients claim to be compliant towards their medication, doctors have seemingly low confidence in patients. Around 48% doctors feel the incidence of hypoglycemia is under-reported and attribute the common reason to be patients' lack of awareness on seriousness of hypoglycemia and reporting it. About 86% of patients were prescribed medication immediately in East Zone compared to all India (79%). According to doctors, 40 year old patients are more likely to reach their blood glucose levels targets (49%) as compared to 70 year old (38%) or renally impaired (29%) patients.

**Conclusion** Due attention to diagnosis consultation, hypoglycemia reporting & challenges in management and getting HbA1c to goal will significantly enhance the understanding and alliance between

physicians and patients and thereby improve diabetes care in India. There is a need to drive joint ownership in management of diabetes by addressing key barriers in patient care which are beyond pharmacotherapy.

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**OP25**

**Improving Diabetes Care by Evaluating Quality of Life in Patients with Type 2 Diabetes Mellitus– A Patient Centric Approach**

DA Padhye • HV Sharma • MK Kulkarni

**Background and Aims** Quality of Life (QOL), a representation of the patient’s view is a vital tool for the care of diabetics

**Materials and methods** We conducted a prospective study at a single centre providing advanced diabetes care. QOL was measured using QOL Instrument for Indian Diabetes (QOLID) patient’s questionnaire, consisting of 8 domains and 34 items, was administered to 369 consecutive patients as a single point assessment tool. We calculated the percentage score for each

domain and the mean value formed the basis for the calculation of the weighted score. Descriptive statistics was used for the analysis.

**Results** A total of 369 patients were administered the QOLID (173 males and 196 females). The mean age was 59 years (minimum 19, maximum 81, SD ± 11, 95% CI 58 to 60). The mean HbA1c was 8.1 % (minimum 5.3, maximum 16, SD ± 1.6, 95% CI 7.9 to 8.3). Notably, 278 patients had HbA1c ≥ 7. 26% (n=99) had HbA1c <7. The mean duration of the diabetes was 11 years (minimum 0.2, maximum 40, SD ± 7.8, 95% CI 10 to 12). The mean duration of the follow up since the first visit at our centre was 25 months (minimum 1, maximum 44, SD ± 12, 95% CI 24 to 27). The mean number of visits were 7.7 (minimum 1, maximum 25, SD ± 3.7, 95% CI 7.4 to 8.1). 89.7 % (n=331) were exclusively on OHA, 26 patients were both on OHA and insulin and only 12 patients were exclusively on lifestyle modification. The individual mean domain scores with the percentage scores and the weighted scores are depicted in the Table. The relatively higher mean age group as compared to other studies has helped us to target the screening and intervention for detection even at the younger age. Financial worries, diet satisfaction and general health are the three areas that were particularly identified that need specific attention to improve the quality of life of these patients

**Graph/Table :**

**Table- Quantification of the Domain Scores and the Weighted Score**

	Mean	± SD	Minimum	Maximum	95% CI	% Score	Weighted Score
Physical Health (6)	27	3.5	13	30	27 to 27	90	1.11
Physical Endurance (6)	25	5.2	7	30	25 to 26	83.33	1.03
General Health (3)	11	2.2	3	15	10 to 11	73.33	0.90
Treatment Satisfaction (4)	17	2.8	5	20	16 to 17	85	1.05
Symptom Botherness (3)	13	2.1	3	15	12 to 13	86.66	1.07
Financial Worries (4)	14	3.2	4	19	13 to 14	70	0.86
Emotional/Mental Health (5)	21	2.8	9	25	21 to 21	84	1.04
Diet Satisfaction (3)	11	1.9	4	15	11 to 11	73.33	0.90
	Cumulative 139					Mean 80.70	

**Conclusion** Patient centric QOL tool is useful to evaluate and guide for the treatment interventions in patients with type 2 diabetes

**OP26**

**'GLAM' Diet for Preventing and Controlling Type-2 Diabetes Mellitus**

P Jaggeesh

**Background and Aims** To prevent and control type-2 diabetes following GLAM diet.

**Materials and methods** The study was conducted with around 50 patients with two arms (both with pre and post AGPs) and with the adherence to ‘Glucose Level Assisted Monitoring’ (GLAM) Diet utilizing a unique combination of dietary recommendations and lifestyle modifications which was completely tailor-made

based on the individual patient’s glucose level readings. The initial study consisted of having the prerequisite blood readings. The AGP sensor was applied and GLAM diet was adopted based on each individual’s requirements. Dietary guidelines were provided for managing and promoting overall nutritional well- being, glycaemic control, and prevent or ameliorate diabetes-related complications. After 3 months of following the GLAM diet principles, the entire set of blood tests done at baseline were repeated.

**Results** The end results after 3 months were positive. It proved that simple changes, modifications and basic dietary adherence independent of the medications they were on or the number of years they have been diabetic; every single patient had better control of their diabetes.

The Primary Objective of the study to prevent and control type-2 diabetes following GLAM diet was easily achieved.

The Secondary Objectives of the study were also achieved:

1. Optimal blood glucose concentration following GLAM diet and lifestyle modifications.

2. Optimal lipid profile concentration by following GLAM diet and life-style modifications.
3. Optimization of time in target by following GLAM diet and lifestyle modifications.
4. Evaluation of Glucose variability by following GLAM diet and life-style modifications.
5. Reduction in insulin requirements by following GLAM diet and life-style modifications.
6. Guidance towards prevention, delay, and treatment of diabetes-related complications.

**Conclusion** Diet plays one of the most major roles in improving the quality of health and life and the future of the healthcare industry would be Glucose Tracking Diet. The study conducted proves the efficacy of dietary and lifestyle modifications to help reverse and control type-2 diabetes across all age groups in the society.

## OP27

### Evaluation of Burden of Prediabetes in School Going Children of Jaipur, Rajasthan

SP Sharma

**Background and Aims** Present study aimed to know the magnitude of prediabetes among children. To evaluate the burden of Prediabetes among children of government and private schools of Jaipur, Rajasthan and to conduct their comparative evaluation.

**Materials and methods** The Present observational study was carried cross-sectionally among schools of Jaipur district. Sample size of 3200 was calculated at 95% confidence level and 15% relative precision. Stratified random sampling was applied to select the study population among children of government and private schools of Jaipur, Rajasthan. We select 32 schools by simple random sampling among selected strata's and selected 100 children (of more than 6 years of age) by systemic random sampling from each school equally from government and private schools. Oral glucose tolerance test was applied to estimate blood sugar levels.

**Results** In present study, a total of 3200 children were enrolled. Out of them 1728 (54%) were boys and 1472 (46%) were girls. The mean age of study participants was  $11.2 \pm 3.9$  years. The overall magnitude of prediabetes among children was 2.44% (78 students). Among children enrolled in government schools prediabetes prevalence was 2.12% (34 students) and prediabetes prevalence among children enrolled in private schools was 2.75% (44 students). Two students which were enrolled in private schools were screened as diabetics by OGTT. There was no significant association was reported in our study with prediabetes and major risk factors of diabetes.

**Conclusion** The problem of Prediabetes is representing the hidden portion of iceberg and routine screening programs must be conducted to early detection and proper intervention.

**Keywords:** Prediabetes, Diabetes, Children

## OP28

### Latent autoimmune diabetes in adults (LADA): a case series

A Pandey

**Background and Aims** Type 1 diabetes and type 2 diabetes are heterogeneous diseases. In clinical practice sometimes to classify individuals with diabetes in these subtypes at the time of diagnosis is difficult. The traditional teaching that type 2 diabetes occurring only in adults and type

1 diabetes only in children is no longer acceptable. Type 2 diabetic subjects who had failed sulphonylurea therapy soon after diagnosis have been thought to be slowly progressive type I patients. This diabetes sub-type is currently referred to as latent autoimmune diabetes in adults (LADA). There is a lack of clinical study on LADA in Indian population. In this case series of twelve LADA patients we compared clinical characteristic, laboratory data and course.

## OP29

### A Study to Evaluate the Glucagon and Incretin Responses and Identify the Role of Extrapancreatic Glucagon in Patients of Fibrocalcific Pancreatic Diabetes

S Verma • N Thomas

**Background and Aims** In tropical countries, one of the common causes for young onset diabetes is "Fibro Calcific Pancreatic Diabetes" (FCPD). Despite widespread destruction of pancreas in FCPD, glucagon has been found to be higher in various studies. We hypothesize that the hyperglucagonemia in FCPD arises from gut. To evaluate glucagon and incretin responses in patients with FCPD.

**Materials and methods** Nine FCPD subjects and six age and BMI matched healthy controls were subjected to 75gram oral glucose tolerance test (OGTT) followed by isoglycemic intravenous glucose infusion (IIGI). Blood samples were analyzed for incretins and glucagon at nine pre-specified time points over three hours and area under curve was calculated.

**Results** Glucagon was significantly higher during OGTT compared to IIGI in FCPD subjects ( $98.8 \pm 13$  pg/ml vs.  $63.4 \pm 7$  pg/ml,  $p=0.03$ ) and was also higher when compared to controls ( $98.8 \pm 13$  pg/ml vs.  $65.8 \pm 18$  pg/ml,  $p=ns$ ). FCPD subjects showed very low basal and stimulated c-peptide ( $0.43 \pm 0.14$  ng/ml &  $1.09 \pm 0.3$  ng/ml, respectively) and pancreatic polypeptide ( $12.3 \pm 0.0$  pg/ml &  $12.0 \pm 0.6$  pg/ml, respectively) levels. GLP-1 was significantly higher in cases on OGTT when compared to controls ( $44.5 \pm 9.2$  pM vs.  $12.8 \pm 7.5$  pM,  $p=0.02$ ). Oxyntomodulin was also insignificantly higher in cases on OGTT when compared to controls ( $1252 \pm 350$  pg/ml vs.  $859.8 \pm 165$  pg/ml,  $p=0.43$ ). GIP was lower in cases on IIGI when compared to controls ( $52.9 \pm 23.9$  pg/ml vs.  $144.5 \pm 36.1$  pg/ml,  $p=0.045$ ) and there was blunted response on OGTT as well ( $106.8 \pm 40.3$  pg/ml vs.  $557.8 \pm 96.4$  pg/ml,  $p=0.003$ ).

**Discussion:** We found hyperglucagonemia in FCPD on OGTT which was suppressed on IIGI. Increase in L- cell products: GLP-1 and oxyntomodulin and a good correlation between glucagon and GLP-1 during OGTT were suggestive of extrapancreatic glucagon production probably from L-cell. The blunted GIP could probably be due to: inadequate pancreatic enzyme supplements, a selective PC-2 enzyme up-regulation or a negative feedback regulation from extra-pancreatic glucagon.

**Conclusion** Extra-pancreatic glucagon does exist in FCPD and may contribute to post-prandial hyperglycemia and lower GIP levels.

## OP30

### 5 Years Mortality After Non ST Segment Elevation Myocardial Infarction Patients With or Without Diabetes

N Sen • S Tanwar • A Jain

**Background and Aims** Major cause of death worldwide is coronary artery disease (CAD). Epidemic of diabetes mellitus is increasing the burden of cardiovascular disease, the leading cause of death among same. Obesity associated with diabetes known as diabetes have more cardiac risk. To evaluate the influence of diabetes on

mortality after non ST segment elevation myocardial infarction(NSTEMI).

**Materials and methods** Significant CAD patients presented NSTEMI in randomized observational study from 2010 to 2012 were pooled, including 3287 in Group A: n=1004, 30.5% with diabetes type-2, mean HbA1c =9.1 with obesity, mean body mass index (BMI) and Group B: n=2283 without diabetes. We divided into two sub groups A1: n=204 (PCI/CABG) 20.3% and A2: n=800 (Medical treatment) with diabetes. Another subgroup B1 : n=487 (PCI/CABG) 21.3% and B2 : n=1896 (Medical treatment) without diabetes. multivariable model was constructed to adjust for baseline characteristics, aspects of NSTEMI presentation, and treatments for the same event.

**Results** Mortality at 30 days was significantly higher among patients with diabetes than without diabetes in PCI/CABG; group A1 vs B1(2.45% vs 1.64%,  $P < .03$ ) and Medical treatment ;group A2 vs B2 (4.5% vs 2.68%,  $P < .04$ ). Diabetes was independently associated with higher 30-day mortality after NSTEMI in PCI/CABG group (odds ratio [OR], 1.50; 95% confidence interval [CI], 1.34-1.79) versus Medical treatment group (OR, 1.70; 95% CI, 1.45-2.16). Diabetes with NSTEMI was associated with significantly higher mortality after 12 months in PCI/CABG; group (hazard ratio [HR], 1.23; 95% CI, 1.09-1.45) versus Medical treatment (HR, 1.56; 95% CI, 1.30-2.10). Mortality after 5 years was significantly higher with diabetes than without diabetes in PCI/CABG; group A1 vs B1(11.27% vs 5.33%,  $P < .03$ ) or Medical treatment ;group A2 vs B2 (14.5% vs 7.22%,  $P < .03$ ).

**Conclusion** Diabetes confers a significant adverse prognosis with ischemic heart disease with two fold increased mortality as compared to euglycemic NSTEMI patients. Coronary revascularization may have beneficiary role to reduce half risk of cardiac death after significant CAD in diabetic patients.

### OP31

#### Identifying the Burden of Diabetes Distress and Assessing Its Impact on Patients With Type 2 Diabetes

K Khadilkar • R Sinha • KS Shivaprasad • S Kannan

**Background and Aims** Diabetes is a psychologically challenging medical condition. Diabetes distress (DD) refers to the unique, often hidden emotional burdens and worries that the patient experiences when managing diabetes. It is associated with increased HbA1c levels, comorbidities, mortality and patient's adherence to diabetes treatment.

The purpose of the study is to find the magnitude of DD in T2DM patients and its effect on glycaemic status

**Materials and methods** The study included 250 patients with Type 2 Diabetes who attended the endocrine outpatient department from February to April 2019. Diabetes distress was measured by using diabetes Distress Scale.

**Results** The prevalence of DD was 19.6%. The risk of DD was 4.25 times more in age  $\leq 45$  years as compared to age  $> 45$  years. Patients with HbA1c  $> 8\%$  had 8.8 times more DD. A positive moderate correlation was found [ $r(248) = 0.707$ ,  $p < 0.001$ ], indicating a significant linear relationship between DD and HbA1c levels. Patients on insulin had more DD (5.4 times) as compared to patients who were on OADs. Patients with history of treatment interruption had 11 times more risk of DD as compared to patients who didn't have any treatment interruption.

**Conclusion** DD was found to be high among patients aged  $\leq 45$  years; illiterates; patients on insulin; patients with history of treatment interruption and HbA1c  $> 8\%$ . Patients with high DD were found to have higher HbA1c levels.

Keywords : Diabetes Distress; Glycaemic status; Type 2 Diabetes

## Poster Presentations

### PP01

#### Magnitude of Cognitive Dysfunction in T2DM Patients in a Tertiary Care Hospital in South India and Understanding Their Possible Link to Dyslipidemia

A Chakraborty • MM Prabhu • K Prabhu RV • SK Praharaj • D Upadhyay

**Background and Aims** There is strong evidence that diabetes mellitus increases the risk of cognitive impairment and dementia. T2DM is a risk factor for atherosclerosis and small vessel disease, so it clearly increases the risk of multi-infarct dementia and mixed type dementia. In our study we aimed to find out the magnitude of CD in South Indian population and the association of general lipid profile parameters with the normal subjects and the patients with CD.

**Materials and methods** 2 cognitive questionnaire tools such as Montreal Cognitive test (MoCA) and Digit Symbol Substitution tests (DSST) were given out to patients visiting a tertiary care hospital in Manipal to identify the magnitude of cognitive dysfunction and the lipid profile parameters of each of these patients were performed.

**Results** The magnitude of CD found in the T2DM population is 32.33% while the remaining 67.67% were found to be normal. Several studies in the past showed that elderly population having higher plasma total cholesterol, triglyceride, LDL and HDL cholesterol levels developing a high risk of MCI and dementia with the advancement of age. But our study found no significant association between any of the lipid profile parameters and CD whereas significant association was found between the years of education ( $p = .001$ ) and DSST scores ( $p < .0001$ ). This might be due to smaller sample size.

**Conclusion** Conducting this study in a larger population may help the future population for therapeutic intervention studies and the role of complex lipids in the brain can further be explored by lipidomics approach.

Acknowledgement I would like to sincerely thank RSSDI for funding my project.

### PP02

#### Important Factors Influencing Physicians to Start Insulin Therapy Among Type II Diabetes Patients From Indian Human Insulin Registry (INHIRIT)

P Raj • Priya J • SP Wagh • Pradeep BK • Camelia B • Dano M

**Background and Aims** American Diabetes Association (ADA) and Research Society for the Study of Diabetes in India (RSSDI) recommends timely insulin initiation in patients with type 2 diabetes or in patients with diabetes who are uncontrolled on current oral glycaemic therapy.

To evaluate different parameters and factors influencing physicians to initiate insulins among Type II diabetes patients.

**Materials and methods** The data from 3476 patients were extracted from INHIRIT database which is a multi-centric, prospective, open-label, single-arm, observational, naturalistic registry of diabetes mellitus patients in India. Patients initiated on human insulin were included in present study.

**Results** Of the total 3476 patients, insulin initiation was predominantly observed in male (57.5%) patients who were with the mean age of 52.32 years. Majority (55.3%) of patients who were initiated with insulins were hypertensive. The baseline value of patients in whom insulin initiated were overweight ( $26.25 \pm 7.05$  kg/m<sup>2</sup>) with HbA1c of  $8.46 \pm 2.56\%$ , post prandial glucose (PPG) was  $273.83 \pm 98.73$  mg/dl, fasting plasma glucose (FPG) was  $193.04 \pm 77.51$  mg/dl. Among the insulins type, human

premixed 30/70 insulin (72%) was most commonly prescribed by physicians. Bigunide (Metformin) (33.1%) was the most commonly prescribed drug followed by sulfonylureas (29.6%) along with insulin. Among sulfonylurea, maximum patients received glimepiride (24.9%) followed by gliclazide (4.7%). Patients Uncontrolled on existing therapy (78.1%) was the foremost reason for prescribing insulin. Mean dose of glimepiride was significantly reduced after initiating insulin therapy ( $2.17 \pm 2.83$  mg) compared to before insulin ( $2.98 \pm 2.76$  mg) ( $p < 0.001$ ). Mean dose of metformin was significantly reduced after initiating insulin therapy ( $702.84 \pm 426.11$  mg) compared to before insulin ( $609.90 \pm 347.58$  mg) ( $p < 0.001$ ).

**Conclusion** The most common reason to initiate insulins in patients was those who were uncontrolled on existing therapy. Human premixed 50/50 insulin was initiated at mean HbA1c of  $\geq 9\%$  whereas Human premixed 30/70 insulin was initiated at HbA1c  $\geq 8.4\%$  HbA1c. Mean dose of glimepiride and metformin was reduced significantly after insulin initiation. Indian health care physicians prefer Human premix 30/70 formulation among human insulin in their patients.

### PP03

#### Nutritional and Glycemic Assessment of Green Jackfruit and an Ecological Evaluation of Anti-Diabetic Medication Sales in Kerala, India

J Joseph

**Background and Aims** Kerala has a high prevalence of diabetes. Management of diabetes through pharmacological strategy imposes economic burden and adverse effect. Green Jackfruit, a traditional food of Kerala, has shown promising effect in the management of diabetes. So the present study was focused to evaluate the nutritional quality and glycemic load of green jackfruit as a meal and also to evaluate the antidiabetic sales in units during the jackfruit season.

**Materials and methods** Nutritional analysis of one cup of green jackfruit was done at National Accreditation Board for Testing and Calibration Laboratories (NABL) certified lab. Glycemic load assessment of green jackfruit as a porridge meal was conducted at the University of Sydney on 10 healthy volunteers and compared with glucose. 'One meal green jackfruit' campaign to replace rice was conducted during peak season from April 2018– July 2018 and the anti-diabetic medicine sales in units was recorded.

**Results** The nutritional analysis of a cup green jackfruit reveals a low calorie of 115 k/cal, low total carbohydrate of 27.3 g and high fiber content of 1.95 g compared to a cup of white rice. Glycemic study reveals a glycemic load of 17. Official fruit announcement and 'One meal green jackfruit campaign' is associated with a significant decline in the anti-diabetic medication sales in units during the period from April 2018– July 2018.

**Conclusion** Green jackfruit offers good dietary fiber content, low calorie, low carbohydrate and low glycemic load, and could be a replacement for high carbohydrate diet. As a low calorie strategy, using green jackfruit as a meal can reduce Kerala's burden on antidiabetic medications.

### PP04

#### Knowledge, Attitude, Practice and Perception of Primary Care Physicians in India Towards Dietary Intervention in Management of Patients With Type 2 Diabetes Mellitus

D Ankita • R Sameer

**Background and Aims** Family physicians have primary role in detecting, diagnosing, and managing diseases especially in a country burdened with Type 2 Diabetes mellitus (T2DM) cases. Unfortunately, the data on

their knowledge about nutrition; one of the cornerstone for T2DM management, is missing from India

We aimed to assess the knowledge(K), attitude(A), practices(P) and perceptions (Pr) (KAPP) of Primary Care Physicians (PCPs) in India on nutrition management in patients with T2DM basis a simple questionnaire led survey

**Materials and methods** A self-administered 7 questions-based survey was conducted from December 2018– January 2019.

**Results** A total of 496 PCPs from metros (47%) and non-metro (57%) cities shared their responses. More than 90% ( $n=488$ ) of the PCPs recommend dietary changes for patients on diagnosis of T2DM. 402 PCPs (81%) recommended  $\geq 2$  dietary modifications which includes; avoidance of sugars (83%) and foods with high carbohydrates (81%) and increase protein intake (58%). About 93% ( $n=463$ ) PCPs actively discussed dietary recommendations even during follow-up visits. Glycemic Index (GI)/ Glycemic Load (GL),  $n=429$ ; was the most familiar nutrition-related term known by the PCPs followed by soluble fibre and Glucagon Like Peptide- 1 (GLP-1). Products promoted as Diabetes Specific Nutrition (DSN) and multivitamins came as the most preferred nutritional supplements with 70% ( $n=346$ ) and 47% ( $n= 235$ ) PCPs recommendations, respectively. While majority of the PCPs ( $>50\%$ ) reported giddiness as a complaint in  $<10\%$  of their patients on oral anti-diabetic drugs, almost 90% PCPs felt DSN could help manage such cases if occurred.

**Conclusion** Healthcare Providers in India do believe strongly in recommending dietary modifications for patients with T2DM, however face challenges in doing so. The observed inclination of PCPs towards nutrition calls for further continuous and evidence-based awareness programs on nutrition to empower them on the way of better outcomes among patients with T2DM.

### PP05

#### Burkholderia Cepacia Causing Intra-Abdominal Abscesses in Diabetics: A Case Series

A Dhanawat • P Gupta • L Mohanty • AP Mohanty

**Background and Aims** Burkholderia is a gram-negative bacillus causing infections in immunocompromised patients. It is commonly seen in the tropics and is known to mimic tuberculosis clinically. We report a series of 6 patients who had intra-abdominal abscesses caused by burkholderia cepacia.

**Materials and methods** We reviewed a total of six patients who were admitted in our hospital between July 2018 to June 2019. Detailed history and clinical examination was done and investigations including blood tests, chest-xray, ultrasonography of abdomen and CT abdomen were carried out.

**Results** All the 6 patients were uncontrolled diabetics with HbA1c levels between 8.2–13.9% who presented with fever more than 2 weeks and also had vague abdominal symptoms like vomiting, abdominal pain or loss of appetite. Some also had respiratory symptoms like cough, chest pain and breathlessness. All of them had leucocytosis (neutrophilic). Mildly raised serum transaminases were also seen. Chest X-ray revealed bilateral pneumonia in 5 patients. CT abdomen revealed presence of multiple hepatic and splenic abscesses in all the patients. Burkholderia cepacia was found in the blood of 4 patients, sputum of 1 patient and pus aspirate from the spleen of 1 patient. Four patients were treated with meropenem and rest with ceftazidime. All of them responded well, became afebrile and asymptomatic. Ultrasonography abdomen at follow-up were negative for any intra-abdominal abscess. They were also put on long term oral co-trimoxazole.

**Discussion** The clinical presentation of burkholderia closely mimics tuberculosis as it predominantly affects immunocompromised and causes a long-duration multi-systemic illness. The clue to early diagnosis lies in

imaging and culture isolate of blood, sputum or pus. There have been several case series of intra-abdominal abscesses caused by burkholderia pseudomallei but infections by burkholderia cepacia in the abdomen is a rare finding.

**Conclusion** The diagnosis of burkholderia is often delayed due to its inconspicuous nature, lack of clinical suspicion and often mimicking tuberculosis clinically. Treatment with carbapenems and co-trimoxazole has been found to be curative.

#### PP06

##### Evaluation of Anti TPO Antibodies in Newly Diagnosed Type -2 DM Patients

BK Gupta • A Gupta

**Background and Aims** Type 2 DM and the thyroid disorders are two major endocrinopathies. The prevalence of thyroid disorders is significantly higher among diabetic patients than in general population. Evaluating thyroid autoantibodies for the diagnosis of thyroid disorders in patients with Type 2 DM are lacking; therefore we conducted a study to find out the prevalence of anti-TPO antibodies among newly diagnosed Type -2 DM patients.

**Materials and methods** The study was conducted on 100 newly diagnosed type2 DM patients of age group 30 to 60 years with unknown thyroid status. Fasting Blood Sugar, HbA1C, serum C peptide levels (if required); serum FT3, FT4, TSH; and anti-TPO antibodies were measured in all the individuals. The observations and interpretations were recorded and results obtained were statistically analysed.

**Results** The observed frequency of thyroid dysfunction in newly diagnosed Type 2 DM patients was 24% in our study with subclinical hypothyroidism in 17%, and primary hypothyroidism was 5%. Hyperthyroidism was found in 2% of subjects. Among these patients with thyroid dysfunction, anti TPO antibodies were found in 52%. We also observed that among rest of the 76% of euthyroid individuals, 19% were found to be anti TPO antibodies positive. Thyroid dysfunctions and anti-TPO antibodies positivity were more in females.

**Conclusion** Estimation of autoimmunity in newly diagnosed Type2 DM patients will help in early detection and treatment of thyroid disorders and this will prevent the associated morbidities and will improve the quality of life.

**Keywords**: Type 2 diabetes mellitus (Type2DM), Anti-thyroid peroxidase antibodies (anti-TPO).

#### PP07

##### Multi-drug Resistant Community-Acquired Enterococcus Faecalis Urinary Tract Infection In An Elderly Diabetic Female

A Hinduja • R Viswanathan

**Background and Aims** Enterococci are omnipresent bacteria that primarily inhabit intestinal tract of humans where they are part of the normal microbiota. Enterococci are intrinsically resistant to many antimicrobials and easily acquire high-level drug resistance via horizontal gene transfer. Multidrug-resistant enterococci are emerging as a major nosocomial pathogen with increasing frequency. We present a case of multi-drug resistant community acquired Enterococcus faecalis UTI in a diabetic female. The patient, a known case of Type 2 Diabetes mellitus for 16 years presented to the outpatient department with complaints of low-grade fever with chills and dysuria in the past two weeks. The patient did not complain of nocturia, polyuria or urgency. Investigations showed glycosylated haemoglobin of 7.6%. Patient was currently on Insulin Degludec 12 units OD and Metformin 500 mg BD. The patient had a negative blood

culture. The urine culture was positive, and the isolate was identified as Enterococcus faecalis with a colony count of 10,000 CFU/ml and showing resistance to ciprofloxacin, daptomycin, erythromycin, tetracycline and cotrimoxazole. It was found to be sensitive to Penicillin, Vancomycin, Linezolid and Nitrofurantoin. 2D Echo with colour doppler did not reveal any evidence of endocarditis.

The patient was prescribed a course of Nitrofurantoin 100 mg BD for 14 days. Her symptoms failed to abate even after a week and repeat urine culture grew Enterococcus faecalis with acquired resistance to Nitrofurantoin and Penicillin. She was then prescribed Linezolid 600 mg BD for 21 days. Defervescence occurred within 48 hours and patient became completely symptom-free with a negative urine culture at the end of three weeks. The case emphasises the need for rational antibiotic usage especially in diabetics and suspecting multi-drug resistant infections even in community-acquired settings and Linezolid is a good oral choice of antibiotic in culture proven sensitive cases.

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#### PP08

##### Use Of A Translated Version Of DEPS-R For Evaluation Of Disturbed Behaviours (DEB) In Young Type 1 DM Subjects

V Talwar • G Talwar

**Background and Aims** Disordered eating and Eating disorders are commonly reported in T1DM. Simple clinical tools are needed to be validated to evaluate disordered eating behaviours (DEB) in these children and adolescents. Our aim was to study the prevalence of disturbed eating behaviour in the young Indian patients with TYPE 1 DM, using a translated version of simple clinical tool "Diabetes Eating Problem Survey-Revised" (DEPS-R) and to determine its relationship with glycemic control.

**Materials and methods** This cross sectional study was conducted in 182 Type 1 DM patients (88 males and 74 females) who were attending the out patient diabetes clinic. Clinical data were recorded and HbA1c was measured using NGSP certified HPLC method. Translated version of DEPS-R (Punjabi) and diabetes distress score (DDS) questionnaire were given to all the patients. Statistical analysis was done with SPSS and excel data software.

**Results** Age of study population was 15.5± 3.1 years. 22.7% of the subjects scored above the DEPS-R cutoff of 20, indicating that they are at risk for eating disorder. There was no significant differences in DEPS-R questionnaire score between males and females (p=0.29). Mean HbA1c was higher among those at risk of developing eating disorder (10.6±/2.3) than those without the risk (8.6±/1.6) (p = 0.002). Risk of developing eating disorder was not effected by Age (p=0.35) and duration of diabetes (p=0.47). DDS was higher among those with risk of developing eating disorder (p=0.02)

**Discussion** The term "disturbed eating behaviours (DEB)", encompasses mild as well as more extreme dieting behaviour, binge eating attacks, and compensatory behaviour for weight control. Detecting and treating eating disorders in children and adolescents with type 1 diabetes by using a simple, convenient and specifically designed screening tool is important because of their

potentially severe consequences. The Diabetes Eating Problem Survey-Revised (DEPS-R) developed by Markowitz is a 16-item diabetes-specific self-report instrument to screen eating disorders for individuals with Type 1 DM and this screening tool has good internal consistency and validity. Consistent with the literature, in our series of young Indian patients of Type 1 DM, those with scores above the cut-off on DEPS-R had significantly higher HbA1c levels ( $p < 0.002$ ) in both genders

**Conclusion** Our study reports a higher risk of disturbed eating behaviours among the young patients with type 1 diabetes mellitus and it was associated with poor glycemic control and higher DDS score. DEPS-R is a simple, valid screening tool that can be used routinely in the clinical care of adolescents with type 1 diabetes for disordered eating behaviours.

#### PP09

##### Though HbA1c is a Well Validated Standard Method for Assessment of Glycemic Control But It Has Also Got Certain Limitations

J Goyal • S Das

**Background and Aims** Management of type 2 diabetes revolves around achievement of target glycemic control with the help of antidiabetic drugs or insulin. There are various markers for measurement of glycemic control like HbA1c, Mean Blood Glucose and Fructosamine levels. Though HbA1c is a well validated standard method for assessment of glycemic control but it has also got certain limitations. Fructosamine, a less explored method may be used as an alternative marker for an assessment of glycemic control in cases where HbA1c is unreliable or unavailable. The objective of this study is to compare the Fructosamine levels with HbA1c in assessment of glycemic control in type 2 diabetics so as to assess the utility of Fructosamine as an alternative marker for evaluation of glucose control.

**Materials and methods** This is a cross-sectional study of retrospective data collected from 48 type 2 diabetic patients who attended the medical outdoor of Nayati Medicity, Mathura, Uttar Pradesh. Data was collected from January 2018 to June 2018. Data was collected in terms of age, sex, BMI, duration of diabetes, Fructosamine, HbA1c and FBS levels. Level of glycemic control was assessed with HbA1c and Fructosamine and fasting blood glucose levels.

**Results** Analysis of glycemic control of 48 type 2 diabetic patients showed that Fructosamine and HbA1c level have statistically significant correlation with each other ( $p$  value  $< 0.001$ ).

**Conclusion** The level of Fructosamine and HbA1c are significantly correlated with each other; and hence Fructosamine can be used as an alternative biomarker for assessment of glycemic control in type 2 diabetics especially when hba1c values are unreliable or not available.

**Keywords:** FBS (Fasting Blood Sugar), HbA1c (Glycosylated Hemoglobin), Fructosamine, BMI (Body Mass Index), Type 2 Diabetes

#### PP10

##### Genetic Polymorphism in Early and Late Night eaters of Type 2 Diabetes Mellitus

S Rastogi • N Verma

**Background and Aims** To find gene polymorphisms associated with early and late night eating in a major circadian rhythm controlling gene BMAL-1

**Materials and methods** 40 diabetics, who met our selection criteria, were recruited from OPD Endocrinology, KGMU, Lucknow. Patient's data was recorded and they were allocated into 2 groups, EMI (early meal intake) and late meal intake (LMI) group based on whether they have dinner at 7 pm or later for more than a year. Anthropometric measurement, height, weight, waist hip ratio, aBSI, neck size and fasting & post prandial blood sugar, HbA1c, lipid Profile, blood pressure and heart rate were noted. Single Nucleotide Polymorphism was done by standard phenol chloroform & Restriction Fragment Length Polymorphism method. 2 restriction sites were studied in BMAL-1 gene. BMAL1(rs11022775): gene was genotyped by PCR amplification of a specific allele assay using two allele-specific Forward primers, 50 TCTCTCCTCAAACCTCCATC G 30 (C allele) and 50 TCTCTCCTCAAACCTCCATCA 30 (T allele), Reverse primer, 50 AGAGTGGATGGTGCAGGATT 30, in two separate PCR reactions. BMAL1(rs7950226): gene was genotyped by PCR-RFLP assays by using the Forward primer 50 CATGCTGTGCTTGAATACTC CT 30 and Reverse primer 50 CTATGAAACCAAGGCTGAAACA 30. After amplification of particular sequence RFLP (Restriction Fragment Length Polymorphism) was done with the help of restriction enzyme. Genetic Polymorphism was calculated by the Hardy Weinberg Software online.

**Results** Mean arterial pressure, pulse rate, pulse pressure, diastolic blood pressure, waist and neck size were not significantly different in the 2 groups. BMI, Hip size, systolic blood pressure, HbA1c, blood sugar (fasting and post-prandial) were significantly different. Our results indicated for the first time, that the rs7950226 and rs11022775 polymorphisms, are associated with early night eating in Type 2 diabetics.

#### PP11

##### To Study The Prevalence Of Impaired Fasting Glucose (IFG), Impaired Glucose Tolerance (IGT) And Diabetes Mellitus (DM) Among Children And Adolescents With Obesity In North-west Rajasthan

Ramesh • S Sethi • RP Agarwal • JK Meel • K Chahar • R Agarwal

**Background and Aims** Obesity has emerged as one of the global health problems. It is a serious health risk and associated with multiple co-morbidities such as type 2 diabetes mellitus, dyslipidemia, polycystic ovarian disease, hypertension, metabolic syndrome etc. which are increasingly becoming common among children and urban adolescents. To study the prevalence of overweight, obesity, hypertension, pre-diabetes and diabetes in children and adolescents in North-West Rajasthan.

**Materials and methods** This study was conducted on 1000 school going children and adolescent of Bikaner city. The study was approved by the Hospital's Institutional Review Board and consent was obtained by the school management, parents and the students prior to study. All the anthropometric measurements were taken in school premises. Participants were examined thoroughly.

**Results** In our study, we found the prevalence of overweight to be 13.8% and that of obesity 7.2%. We found that 145 (14.5%) candidates had elevated blood pressure, 147 (14.7%) were hypertensive out of which 107 (10.7%) had hypertension stage 1 while 40 (4.0%) had hypertension stage 2. In our study, the overall prevalence of pre diabetes and diabetes was 2.5% and 0.3% respectively.

**Conclusion** Based on observations of our study, it is recommended that strategies for obesity prevention, weight reduction, promotion of healthy lifestyles and regular monitoring are necessary during childhood and adolescence else the implications of this global phenomenon on future generations will be serious.



PP12

**Effective Management of Type 2 Diabetes Complications Through Combined Usage of Gymnadenia Orchidis Root Salep and Pumpkin Seed**

SH Arzoo • B Chattopadhyay

**Background and Aims** Diabetes mellitus is the fastest growing metabolic disorder, with which nearly 98 million Indians are affected. The main pathogenesis of diabetes is either the deficiency or inactiveness of Insulin. The diabetic condition alters metabolism and function of organs possibly due to oxidative stress and apoptosis. Diabetic people are advised to choose low-glycemic food and herbal products to manage diabetes. Pumpkin seed is a low glycaemic indexed food easily available in the Indian subcontinent and the Gymnadenia orchidis plant is found in the Himalayan terrain at 2400-4000 m. This study has proved the synergistically improved efficacy of Gymnadenia orchidis root Salep and pumpkin seed against the type2 diabetic complications on adult female mice.

**Materials and methods** Animals were divided into 6 groups of which 2 groups were taken as Normal and Food Control and rest 4 groups were made diabetic by Streptozotocin. One diabetic group was kept as control, and the other three diabetic groups supplemented with effective dose (200 mg/kg of body weight) of root Salep, pumpkin seed powder (5%) mixed food and both Salep and pumpkin seed food respectively. Changes in various biochemical and oxidative parameters along with apoptotic markers were noted after 21 days of treatment. Data were analyzed by ANOVA for statistical significance.

**Results** The diabetic mice presented significant (p < 0.001) changes in glucose level, HbA1c concentration, antioxidant parameters and apoptotic markers compared to the control group. Administered with root Salep and supplemented with pumpkin seed significantly (p < 0.001) restored the aforementioned parameters in the diabetic mice. Terpenoids, identified in root Salep and antioxidants of pumpkin seed has played an active role against diabetes. The combined usage of root Salep and pumpkin seed improved the condition of diabetic complications and could be a better management for type-2 diabetes.

PP13

**Type 2 Diabetes Mellitus Induced Apoptosis Amongst Different Prakriti Individuals**

S Banerjee • B Chattopadhyay

**Background and Aims** Type 2 diabetes mellitus now becomes a serious threat to public health. Macrovascular and microvascular complications and associated oxidative stress are the well known risk factors for diabetic mortality. The ancient knowledge of the Ayurveda has a system of classification of human individuals according to their basic constitution known as “Prakriti” which is fixed at the time of birth and remains invariant throughout the individual’s lifespan. As per Ayurvedic classification Prakriti is a combination of three Doshas- Vata, Pitta, and Kapha. Individual’s basic constitution describes its predisposition and prognosis to disease status and also the treatment for disease. The Tridoshas work

in harmony to maintain good health in an individual. Elevation of the doshas beyond an individual’s threshold causes specific doshic disorder. The study has shown the clinical, anthropological and biochemical variation which leads to apoptosis among the Prakriti groups having type 2 diabetes mellitus.

**Materials and methods** This study was performed with total seventy two participants (age 30-70 years), twenty four in each Prakriti groups having twelve of type-2 diabetes patients and twelve of healthy (without diabetes) participants. The selection was conducted as per the standard Prakriti assessment chart. The differences in clinical, anthropometrical and apoptosis were observed in each participant. P < 0.01 was considered statistically significant.

**Results** Significant differences were observed amongst the subjects belonging in different Prakriti groups. The study indicates that diabetic individuals mostly belong to the Vata groups was more prone to diabetic complications. The yield of Reactive Oxygen Species and total cell damage was significantly higher in Vata (p < 0.001) group in comparison to other Prakriti. These may help in creating personalized treatment of diabetes among individual Prakriti. A worldwide assessment is needed for better applicability.

PP14

**Effectiveness of Teneligliptin When Added to SGLT-2 Inhibitors in Patients Uncontrolled With Type 2 Diabetes Mellitus**

A K PAUL

**Background and Aims** Teneligliptin, a DPP4 inhibitor, is approved for the management of type 2 diabetes mellitus (T2DM) in Japan, in South Korea and in India. It is the most commonly prescribed DPP4i in India as an add-on to other antidiabetic drugs. To evaluate the effectiveness of Teneligliptin when added to SGLT-2 inhibitors in patients uncontrolled with type 2 diabetes mellitus

**Materials and methods** A Retrospective data of patients when initiated with Teneligliptin as an add-on to ongoing SGLT-2 inhibitor along with or without other antidiabetic agents for atleast three months in Jhamshepur, India was collected and analyzed. Effectiveness of Teneligliptin assessed by analyzing the mean changes in fasting (FPG), Post-prandial (PPG) plasma glucose and Glycosylated Haemoglobin (HbA1c) after 3 months of duration.

**Results** Total of 23 patient’s data who were prescribed Teneligliptin along with SGLT-2 inhibitor to ongoing antidiabetic agents. The mean age was 58.06 years. The Teneligliptin was prescribe in the ratio of 0.86:1 for male: female. Metformin and Glimepiride was commonly prescribed along with SGLT – 2 inhibitors. Dapagliflozin (n=10) was commonly prescribed SGLT-2 followed by Empagliflozin (n=9). There was significant reduction in FPG, PPG and HbA1c after initiation of Teneligliptin with significant reduction of 66.54 mg/dL (p < 0.0001), 137.14mg/dL(p < 0.0001) and 2.06% (p < 0.0001) for FPG, PPG and HbA1c respectively. Graph/Table :

Overall – 19	FPG (mg/dl)	PPG (mg/dl)	HbA1c (%)
Baseline	166.2± 20.2	307.6± 44.9	9.42± 1.4
3 months	99.66± 5.9	170.46± 12.0	7.4± 0.6
Change	-66.54	-137.14	-2.02

**Conclusion** After initiation of Teneeligliptin to ongoing SGLT- 2 inhibitors therapy with/ without other antidiabetic agents significantly reduced the FPG, PPG and HbA1c.

## PP15

### Insulin Like Protein From Camel Milk and Similarity With Human Insulin

R Agrawal • RP Agrawal

**Background and Aims** From experimental studies, clinical studies and epidemiological studies it is proved beyond doubt that camel milk has potential role in prevention and treatment of diabetes. The main purpose of the study to isolate camel milk protein and compare its similarity with human insulin so that camel milk can be used as adjunct therapy for diabetes.

**Materials and methods** 30ml of raw camel milk was used for isolation of protein and peptides. The complete process included trypsin digestion, peptide fractionation and LC-MS technique. Digested and fractionized peptide sample was processed further for liquid chromatography and mass spectra / tandem mass spectra were recorded in positive-ion and high sensitivity mode. MS/MS spectra were automatically calibrated during dynamic LC-MS. Raw data files were converted to Mascot Generic Format (MGF) and these MGF files were searched against UniPort, NCBI and common MS contaminant database.

**Results** In our study 13 proteins and 22 peptide sequences were found similar to insulin / insulin like growth factor and isoform. In our study some very large peptide sequence were identified which were seen similar to NUA family SNF1-like kinase and this peptide sequence gives evidence of role of camel milk effect in cancer treatment.

**Conclusion** Observing so many similar peptides in camel milk sample with human insulin, isoform of insulin, receptors and others give strong evidence that camel milk have proteins / peptides of such proteins similar to human insulin and give support to finding that camel milk contains insulin like molecule that mimics insulin interaction with its receptors.

## PP16

### Prevalence of Metabolic Syndrome and its Clinical and Angiographic Profile in Young Patients with Acute Coronary Syndrome

S Jain • S Reddy • V Jain • R Mittal

**Background and Aims** Metabolic syndrome (MetS) is known to increase morbidity and mortality from cardiovascular disease. Although western studies elucidate MetS as risk factor for premature Acute Coronary Syndrome (ACS), there is limited data available on association of MetS and early onset ACS in Indian population. To determine prevalence of MetS in patients < 40 years presenting with ACS; To study distribution of coronary plaques in culprit vessel by Coronary angiography and assess the relative influence of MetS on extent of coronary artery disease (CAD) in young adults.

**Materials and methods** A single centre observational study conducted at Department of General Medicine and Cardiology of GMCH-32, Chandigarh. Thirty three consecutive patients < 40 years presenting with ACS to Medicine Emergency/OPD were included and assessed for MetS as per modified NCEP-ATP III criteria. They were divided into two groups (with and without MetS), and their clinical and angiographic profiles were studied.

**Results** The prevalence of MetS in our study was 30.3%. Patients in MetS group were older ( $36.30 \pm 4.02$  vs.  $35.65 \pm 3.57$  years) with preponderance of men. Patients in MetS group had less tobacco abuse (50.0% vs. 69.56%), more alcohol abuse (80% vs. 26.08%), longer median hospital stay (4days vs 3days) and had more ST-segment elevation ACS (70.0% vs. 65.21%). Among the five components of MetS, high fasting blood glucose levels (100%) had highest positive predictive value for ACS, followed by high blood pressure (66.67%), increased triglyceride levels (35.71%) decreased HDL-C levels (32.0%), and increased waist circumference (31.58%). On echocardiographic evaluation, MetS group had lower mean ejection fraction vis-a-vis without MetS group ( $49.5 \pm 4.47\%$  vs  $52.09 \pm 7.9\%$ ). The angiographic profile in MetS group showed higher preponderance of triple vessel disease (70.0% vs. 30.43%) and more complex coronary lesions (tubular 60.0% vs. 26.08%; diffuse 40.0% vs. 39.13%). Left main coronary artery disease was more common in MetS population with predominance of proximal location of culprit plaques (70% vs. 69.56%).

**Conclusion** In our study population of ACS patients below 40 years, prevalence of MetS was 30.3%. Among its components, high fasting blood glucose levels had highest positive predictive value for ACS. There was a trend of more advanced CAD in patients with MetS.

## PP17

### A Clinical Study of Thyroid Dysfunction in Patients With Metabolic Syndrome in Jhalawar Medical College

S Baroopal • RP Gupta

**Background and Aims** Metabolic syndrome is associated with endocrine dysfunction including thyroid dysfunction. Metabolic syndrome and hypothyroid are both individually risk factor for coronary heart disease. Thyroid hormone has ubiquitous effect and influence the function of most organs. Thyroid hormone appears to serve as a general pacemaker accelerating metabolic process and may be associated with metabolic syndrome. The aim of the study was to find the prevalence, types and association of thyroid dysfunction with metabolic syndrome.

**Materials and methods** This is a study of 90 patients admitted in Jhalawar Medical College, Jhalawar (Raj.). Detailed history of medication and anthropometric measurements like height, weight, waist circumference were noted for a period of 6 months from Feb. to July 2019. Blood pressure was recorded in right upper limb in sitting position. Fasting blood sugar, lipid profile (HDL, LDL) and thyroid assay (FT4, TSH) were recorded. Following this all data were entered in Microsoft Excel and analysed.

**Results** In this study thyroid dysfunction prevalence is 18.88% among metabolic syndrome. Subclinical Hypothyroidism (16.66%) was the major thyroid dysfunction followed by Hypothyroidism (2.22%). There is no incidence of either Hyperthyroidism or subclinical Hyperthyroidism. Thyroid dysfunction was much common in female (63.33%) than males (36.66%).

**Conclusion** Thyroid dysfunction occurs in metabolic syndrome patients. Thyroid dysfunction prominently subclinical hypothyroidism has been observed more frequently in metabolic syndrome patients than general population. The present study identifies thyroid dysfunction as a common endocrine disorder in metabolic syndrome. Thyroid dysfunction was much common in female than male.

**KEYWORD:** NCEPATP III – National Cholesterol Education Programme and Adult Treatment Panel III, TSH - Thyroid Stimulating Hormone, FT4 – Free Tetraiodothyronine, HDL – High Density Lipoprotein, LDL – Low Density Lipoprotein, WC – Waist circumference.

**PP18****Ankle Brachial Index – a Small Price to Save a Limb!**

N Mishra

**Background and Aims** PAD (Peripheral arterial disease) is a common manifestation of atherosclerosis in diabetics. The true prevalence of PAD in diabetes patients is difficult to estimate, as most of them are asymptomatic. Therefore, the prevalence of PAD in diabetes needs to be established by a validated and reproducible test like the Ankle brachial Index. To estimate the prevalence of PAD in a population of diabetes patients by measuring Ankle brachial index and to compare it with color Doppler ultrasound of lower extremity arterial system.

**Materials and methods** Out of 250 patients enrolled in diabetes workshop, 48 patients with more than 50 years of age and at least 10 years duration of diabetes were selected. They underwent ABI estimation as per standard method. Values lower than 0.9 were considered abnormal. All of them underwent color Doppler ultrasound for patency of lower extremity arterial system.

**Results** Out of 48 patients 22 were found to have abnormal ABI and 26 had in normal range. Of the 22 positive patients, 19 had correlation with doppler ultrasound findings and 3 were found to be normal. Out of 26 normal ABI patients 2 patients had abnormal color doppler findings and rest were correlating with ABI. On using Medcalc, the sensitivity of ABI for detection of PAD was found to be 90.48% , specificity was found to be 88.89%, positive predictive value was 86.36 % , negative predictive value was 92.31%.

**Conclusion** Determination of ABI was found to be a simple, sensitive and specific method to diagnose PAD in diabetic patients. It is recommended that all patients of more than 50 years of age and duration of diabetes more than 10 years should have an annual screening for ABI measurement to detect PAD early and prevent further complications.

**PP19****A Study of Prevalence of Autoimmune Thyroid Disorder in Type 2 Diabetes Mellitus in North West Rajasthan**

Cp singh • S Kumar • V Singhal

**Background and Aims** Till date no clinical study has been conducted in Bikaner to know the prevalence of thyroid dysfunction in diabetes mellitus type and clinical correlation in between thyroid disorder and diabetes mellitus type 2. So I want to study the prevalence of thyroid dysfunction and auto antibodies in diabetes mellitus type 2.

**Materials and methods** This study was a cross sectional study. 234 adult  $\geq 40$  years of age with already diagnosed and newly diagnosed T2 diabetes mellitus (Criteria for the diagnosis of diabetes according to ADA 2017) were included. Detailed history and examination was done, Fasting blood samples of all the subjects were taken and at the same time samples were tested for HbA1C and thyroid profile (T3, T4 and TSH). The results were analyzed by EPI-Info software.

**Results** 64.10% cases of TYPE2DM were normal thyroid function and 22.22% cases were overt hypothyroidism, 9.83% cases were sub clinical hypothyroidism, 1.28% cases secondary hypothyroidism and 2.56% cases were hyperthyroidism.

**Conclusion** It is concluded that thyroid dysfunction may be one of the factors of poor management of T2DM and worsening in complications of T2DM.

**Keywords** - DM Type 2, Hypothyroidism, Hyperthyroidism.**PP20****SNP in KCNQ1 Gene is Associated with Susceptibility to Diabetic Nephropathy in Subjects with Type 2 Diabetes in India**

Chandrashekhar B • S Kumar • V Aswal

**Background and Aims** In this study, our aim is to find out the association of single nucleotide polymorphisms (SNPs) of rs2237897 within a KCNQ1 gene with diabetic nephropathy subjects with type 2 diabetes in Indian population.

**Materials and methods** This study was conducted jointly by a tertiary care hospital and Genetic centre Blood samples of 50 cases (DN) and 20 controls (T2DM without nephropathy) were collected. Patients with type 2 DM of age more than 30 years with Microalbuminuria or Macroalbuminuria included as cases and without diabetic nephropathy as controls. Patients with chronic kidney disease of etiology other than diabetes, pregnant females, patients having co-morbid condition except hypertension were excluded. Genomic DNA was extracted from venous blood, by the Guanidine Thiocyanate (GTC) procedure and dissolved in water. PCR primers were designed for RFLP analysis of rs2237897 using NCBI primers and subsequent restriction digestion with appropriate restriction enzymes was carried out to genotype the polymorphic sites. Genotype distributions were examined for significant departure from Hardy–Weinberg equilibrium by  $\chi^2$ -test. The risk of rs2237897 polymorphism was calculated by odds ratios. The chi-square test was used for comparison of genotype frequencies and Fisher's exact test was used for comparison of allelic frequencies.

**Results** In our study done in India, we found that the frequencies of rs2237897 were consistently higher in the nephropathy groups than in the control groups and the frequency of C allele is higher, so in our study C allele was the risk allele for diabetic nephropathy, which is different from the T allele of Japanese study. This difference will be most probably due to different ethnicity, race and genetic composition of different geographical area.

**PP21****Comparative Study of Change of PPBS with Voglibose and Teneligliptin on Ongoing Metformin monotherapy**

PP Datta • S Sen

**Background and Aims** To compare the change of level of PPBS between Metformin- Voglibose combination therapy and Metformin-Teneligliptin combination therapy on ongoing Metformin monotherapy.

**Materials and methods** It was a hospital based interventional longitudinal study carried out among type 2 diabetic patients on Metformin monotherapy attending general medicine OPD of a medical college of eastern India and during 1st visit the glycaemic control was inadequate (glycosylated haemoglobin above 7 and up to 10 and PPBS above 200mg/dl). Patients were randomized in two groups: one group received Teneligliptin (20mg twice daily) in addition to Metformin and other group received Voglibose (0.3mg twice daily) in addition to Metformin. Post prandial blood sugar (PPBS) assessed before introducing additional drug and 8 weeks after starting additional drug. Patients suffering from Type 1 diabetes mellitus, non ambulatory patients, unwilling patients, patients having isolated rise of fasting blood sugar with normal post prandial blood sugar and patients lost to follow up were excluded from the study. After collection of data it was compiled, tabulated and analyzed using SPSS.

**Results** Mean PPBS at the beginning of the study was 292 mg/dl. In two groups there were no significant difference between mean PPBS at the

beginning of the study ( $p > 0.05$ ). After completion of the study PPBS was significantly reduced in both groups ( $p < 0.05$ ). The change of PPBS in these two groups was compared using unpaired t test and found that Teneiglipitin with Metformin group had significant better result than Voglibose with Metformin group ( $p < 0.05$ ).

## PP22

### A Study Of Correlation Between Total Serum Adiponectin and Risk of Peripheral Vascular Disease in patients of Type 2 Diabetes Mellitus

H Gupta • S Kumar • A Gupta

**Background and Aims** Adiponectin has gained considerable research interest because of its pleiotropic effects. In addition to a consistently lower risk of type 2 diabetes, higher adiponectin concentrations have also been associated with lower risk of cardiovascular disease (CVD) in several studies. More recent epidemiological reports, observed weaker inverse associations after adjustment for high-density lipoprotein (HDL) cholesterol, questioning the putatively protective and independent role of adiponectin in atherosclerotic diseases. We aimed to evaluate the association between total serum adiponectin and risk of PVD in patients of type 2 Diabetes Mellitus.

**Materials and methods** We performed a case control study among 60 diabetic patients in tertiary center. Among 60 patients, 12 had symptoms of PVD and was confirmed using Ankle-Brachial Index and Doppler study. Using risk set sampling, controls were selected and matched on age, no smoking status, fasting status, lipid profile, HbA1c, RFT and BMI. 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** A total of 6 patients had PVD of which adiponectin levels were decreased in 10 patients and normal in 2, and on application of test of significance they were found to be statistically significant with p value of 0.01.

**Conclusion** Total adiponectin is inversely associated with risk of PVD in diabetes patients.

## PP23

### A Non-interventional Nationwide Registry to Identify Indian Phenotypic Characteristics in Diabetes Mellitus Patients in India: Indian Phenotype Registry

S Kalra

**Background and Aims** In India, there are 73 million persons living with type 2 diabetes mellitus (DM), which is projected to rise to 134 million by 2045. Obesity is a commonly associated comorbidity which further impacts various metabolic parameters. Insulin resistance linked with visceral obesity is believed to play a vital role in disease progression.

To evaluate total body fat content across various body mass index (BMI) categories in the study population and to analyse different characteristics of DM patients and correlate HbA1c level with various BMI categories.

**Materials and methods** The registry targets to enrol approx. 50000 participants with DM from 1000 sites. The study will be initiated after obtaining written approval of Independent Ethics Committee /Institutional Review Board. Interim analysis of 30000 patients is presented here.

**Results** In this interim analysis of 30000 patients recruited from 600 sites, 55.1% were male. Mean age, HbA1c and DM duration were 54 years, 8.3% and 6.78 years respectively. Mean body fat percentage, body weight and BMI were 32%, 71 kg and mean 27 kg/m<sup>2</sup> respectively.

**Conclusion** Our study suggests while mean BMI is 27 which falls under pre-obese category, the mean body fat percentage of 32 classifies them

under obese category. This substantiates the concept of the “thin fat Indian”, i.e. vis-à-vis Caucasians, Indians have more fat percentage in same BMI, which could potentially lead to an accelerated development of metabolic disorder as well as progression of disease.<sup>3,4</sup>

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## PP24

### Assessment of Use of Metformin and Insulin for Type 2 Diabetes Among Outpatients at an Apex Tertiary Care Institute in Central India

S Atal • P Singh • S Balakrishnan • R Joshi • N Jain

**Background and Aims** Metformin is universally accepted as the first choice drug for type 2 diabetes mellitus (T2DM), and insulin usually considered the last resort. Use of metformin is affected by inadequate dosing, unresponsiveness and intolerance. Timely/early institution of insulin is recommended for uncontrolled glycaemia and specific indications. The study aimed to assess the optimum use of metformin and insulin by comprehensively analysing different aspects of prescription of their formulations at a tertiary care centre catering to a diverse stratum of diabetics.

**Materials and methods** A prospective cross sectional observational study was conducted in the department of medicine at AIIMS Bhopal over 9 months. Persons with T2DM of either sex who attended the outpatient diabetes specialty clinic were included consecutively. Repeat or refill prescriptions were excluded. Demographic profile, clinical and treatment details on the day of visit were collected from the prescription charts.

**Results** Metformin was prescribed in 96% of the 320 T2DM prescriptions. Mean total daily dose prescribed was  $1511 \pm 559.87$  mg (median – 2000 mg). It was prescribed as twice daily in majority of prescriptions (68.7%). The total daily dose was 2000 mg in 53% and 1000 mg in 35.3 % cases. A total of 202 metformin containing FDCs were prescribed; most common was metformin + glimepiride ( $n = 142$ ) in different combinations containing 1000/500 mg metformin with 2/1 mg glimepiride. Metformin FDCs with DPP IV inhibitors were seen mainly with vildagliptin 50 mg (28) and teneiglipitin 20 mg (12). A total of 111 insulin preparations were prescribed in 18.4% prescriptions. The mean total daily dose prescribed (combining all insulins) was  $39 \pm 22.4$  U per day among type 2 diabetics (Median 46 U, Range 18 – 80 U/day). Insulin glargine was the most commonly prescribed formulation (45.9%) followed by regular human insulin (35.1%) and premixed insulin 30:70 (16.2%).

## PP25

### Epigenetic Regulation of Keap1-nrf2 Signaling in the Pathogenesis of Diabetic Foot Ulcer: Role of Nrf2-hdac Axis

T Rajan • J Ravichandran • R Kesavan • D Umamathy • RK Mohanram

**Background and Aims** Diabetic foot ulcer (DFU) is a major complication of diabetes mellitus. Oxidative stress and aberrant redox signaling are the chief causative factors in its pathogenesis. Nuclear factor erythroid2-related factor2 (Nrf2) a transcription factor, is a master regulator of redox homeostasis. Our recent studies demonstrated that the levels of Nrf2 and its downstream targets were reduced in diabetes. The precise molecular

mechanism remains unclear. In the present study, our objectives were to investigate the role of HDACs as an epigenetic marker in modulating NRF2 and also to analyse the clinical relevance of NRF2 promoter CpG methylation in regulating NRF2 gene expression among DFU subjects.

**Materials and methods** Study subjects were recruited from Hycare clinic, Chennai and were categorised into four groups (n=12 each) viz., normal glucose tolerant (NGT), Known diabetes mellitus (KDM), acute DFU and chronic DFU. Thereafter, profiling of HDACs was carried out by qPCR. Analysis of NRF2 promoter CpG methylation was carried out by qPCR amplification of DNA digested by Methylation Specific Restriction Enzymes (MSRE).

**Results** Among class I HDACs, HDAC1 and HDAC3 were found to be significantly increased in DFU subjects when compared to KDM, whereas HDAC2 and HDAC8 were significantly decreased.

Similarly, among class II and class IV, HDAC4 and HDAC11 respectively showed a significant increase in DFU subjects when compared to KDM. However, all the class III HDACs except sirtuin3 were significantly decreased in DFU subjects compared to KDM.

We also noticed a significant increase in NRF2 promoter methylation among DFU subjects when compared to control and KDM.

**Conclusion** Nrf2 expression is epigenetically regulated through CpG methylation sites in promoter and also through Nrf2/HDAC axis. Hence, targeting this potential avenue would be clinically relevant for the treatment of DFU.

## PP26

### Correlation of Obesity Indices with Heart Rate Variability in Young Adults

AR Joshi • L Chandler

**Background and Aims** Obesity has evolved as a critical public health issue because of its well known risk for hypertension, diabetes mellitus and cardiovascular diseases. Body fat may stimulate the sympathetic nervous system and induce autonomic dysfunction. The study was aimed to assess the correlation between the obesity indices and heart rate variability in young male adults.

**Materials and methods** The study was conducted on 110 young male adults between the age group of 18 and 22 years in the Department of Physiology, BVDUMC, Pune. Obesity was evaluated by body mass index (BMI), waist circumference (WC) and waist to hip ratio (WHR). The heart rate variability was determined by using ML4818 Power Lab 15T software. The variation in the heart rate was determined by Time Domain and Frequency Domain methods.

**Results** Data was analyzed by unpaired t- test. A statistically highly significant positive ( $p < 0.001$ ) increase in sympathetic markers and decrease in parasympathetic markers of HRV was observed in the study group compared to control group.

**Conclusion** The results of the present study showed that obese subjects had increase in sympathetic markers and decrease in the parasympathetic markers of HRV. We highly recommend to control weight in order to live a healthy life.

## PP27

### A Snapshot of Diabetic Peripheral Neuropathy Among People with Diabetes Using Michigan Neuropathy Screening Instrument(MNSI)

KD Edward T • SBA Khan • V Viswanathan

**Background and Aims** To estimate the prevalence of Diabetic peripheral neuropathy among people with Type 2 diabetes using MNSI as a tool for diagnosis and its associated risk factors.

**Materials and methods** A hospital based cross-sectional survey was carried out among 368 subjects with known diabetes mellitus (OPD and IPD) who had undergone a foot examination (including Biothesiometry) in the foot care department were included in the study. The Michigan Neuropathy Screening Instrument (Questionnaire ( $>4$ ) & Physical assessment ( $\geq 2.5$ )) which includes small and large fibre's for assessing neuropathy was used to identify diabetic peripheral neuropathy by a trained investigator. Demographic information such as age, height, weight, family history of diabetes, type of treatment, duration of diabetes and Biochemical parameter like BMI, blood Pressure, fasting and post prandial blood glucose, HbA1c, HDL, LDL & VLDL, including complications such as nephropathy and retinopathy were noted.

**Results** The overall prevalence of diabetic peripheral neuropathy by Questionnaire assessment was 9% and Physical assessment was 43% respectively. Using Chi square analysis it was found that among subjects with Retinopathy (21%), 38% had significant neuropathy and 62% with no retinopathy also had neuropathy ( $X^2 = 56.60$ ,  $p$  value  $< 0.0001$ ), in subjects with Nephropathy (83%), 89% had significant neuropathy and 11% with no nephropathy also had neuropathy ( $X^2 = 7.18$ ,  $p$  value  $< 0.0001$ ) at 95% confidence interval. On further analysis using binary logistic regression, HbA1c value of  $\geq 8.8$  (OR=2.88,  $p$  value  $< 0.0001$ , CI:1.776-4.691), Duration of diabetes with  $\geq 10$  years (OR=2.62,  $p$  value  $< 0.0001$ , CI:1.598-4.301), and Age with  $\geq 52$  years (OR=2.24,  $p$  value  $< 0.0001$ , CI:1.351-3.723) were identified as statistically significant risk factors associated with diabetic peripheral neuropathy among the subjects. Therefore MNSI is a convenient and effective screening instrument for assessing the presence of diabetic peripheral neuropathy.

Keywords- MNSI Instrument, Neuropathy screening in India, Diagnostic methods and diabetic peripheral neuropathy

## PP28

### Regular Hospital Visits and Treatment Outcomes Among Type 1 Diabetes Patients Attending a Diabetes Specialty Care Centre – 7 Years Study From South India

A Devarajan • S Viswanathan • V Viswanathan

**Background and Aims** Regular glucose monitoring and visits to diabetes care services at regular intervals remains as a challenging task for the patients with type 1 diabetes. Literature on how type 1 patients manage their condition is sparse. Aim of the study was to explore the profile, practice of regular monitoring of glucose and treatment outcomes among type 1 diabetes.

**Materials and methods** This is a retrospective study of type 1 patients who attended OPD at a diabetes specialty care centre in Chennai from 2012 to 2018. Anthropometric and Clinical data of 530 patients was collected from electronic medical records. A total of 239 patients with duration of diabetes more than 5 years and who had undergone screening for complications such as CKD, diabetic retinopathy (DR) were included for the final analysis. They were categorised into two groups – group 1 (N=141, 1-2 hospital visits/ year and group 2 (N=98,  $< 1$  hospital visit/ year). Statistical analysis was performed using SPSS version 20.0.

**Results** The mean age and duration of diabetes for group 1 and group 2 (age;  $22.4 \pm 8.8$  and  $27.1 \pm 9.4$  years,  $p < 0.001$ ) and duration;  $11 \pm 5.6$  and  $8.8 \pm 4.7$  years, ( $p = 0.003$ ) showed significant difference. The mean hospital visits were (group 1 vs. group 2;  $9.5 \pm 3.3$  vs.  $3.9 \pm 2.2$  times ( $p < 0.001$ ). No significant difference was seen in HbA1c levels among the groups. The practice of self-monitoring of glucose was high between group 1 (16.3%) compared to group 2 (2%), ( $p < 0.001$ ). The presence of CKD was found to be high among group 2 (8.2%) compared to group 1 (0.7%), ( $p = 0.004$ ) and noted the

presence of DR was also higher among group2, but did not reach statistical significance (15.3% Vs. 9.9%, ( $p=0.147$ ). No gender difference was observed in the presence of complications.

## PP29

### A Study of Thyroid Dysfunction in Type 2 Diabetismellitus in Tertiary Care Center

SM Reddy • S Seshadri

**Background and Aims** To study the proportion of thyroid dysfunction in type 2 diabetes mellitus. To determine the correlation of thyroid dysfunction with various metabolic parameters. (BMI, LIPIDPROFILE, WAIST CIRCUMFERENCE, FBS, PPBS, HBA1C)

**Materials and methods** A cross sectional prospective study was performed in patients admitted in tertiary care hospital in south india between September 2017 to june 2019.All patients of age above 30yrs with type 2 diabetes and non- diabetics were included in the study. Thyroid dysfunction was compared between the two groups and correlated with various metabolic parameters. **Results** A total of 496 patients of which 248 were type 2 diabetes and 248 were non-diabetics. Among type 2 DM patients 65.32% were males and 34.67% were females.20.16% with thyroid dysfunction, among these 13.30% are with subclinical hypothyroidism when compared to non-diabetics in whom thyroid dysfunction is seen in 9.274%,among which 6.048% were subclinical hypothyroid. Among type 2 diabetes mellitus. Among diabetes with thyroid dysfunction had high weight and BMI, compared to non-diabetics.

## PP30

### Diabetes in Society and Culture - Future of Use of Insulin Pumps in Elderly Type 2 Dm Patients With Fragility and Social Constraints in Developing India

S Gandhi

**Background and Aims** World over use of insulin pumps is well accepted in T1DM patients .Use of insulin pumps in T2DM patients require lot of criteria fulfillment in clinical settings. It is furthermore challenging in the elderly T2DM patients and that too in developing countries like India. Financial and social support is must while delivering such technological service in elderly patients. Clinically indicated setting would be like very high fluctuations in glucose variability in addition to high risk of severe hypoglycemia or may be physical disabilities as in our patient. This abstract presents a 73 year old lady who has high level of morbidity in addition to tendency of severe hypoglycemia and social restrictions since she is staying with elderly husband. Affordability is an additional limitation and important factor in developing countries like India. She has mastered the pump use over last two years and happy without hypoglycemia. To empower the use of insulin pumps inT2DM patients especially elderly patients in resource limited countries like India. **Materials and methods** I am presenting a 73 year old retired teacher who has been using insulin pump successfully over last 2 years. Mrs. AK has been suffering from T2DM over last more than 25 years. She was hospitalization with fracture of D10 vertebra due to fall in house because of hypoglycemia her glucose by SMBG even of insulin pump. She has not been very willing for monitoring gadgets like AGP or Dexcom . She was dependent on her husband for injection shots during MDI because of her tremors.

**Results** Mrs. AK used to take her MDI injections with help of her elderly husband. She has achieved good glycaemia control as well

as good quality of life and independence. Such cases would stand out as example of motivated T2DM patient with good understanding of importance of achieving the glycemic goal.

**Conclusion** Highly motivated clinicians in developing world can educate the patients regarding the importance of achieving treatment goals be it T1DM or T2DM patients. The most important restricting factor would be the cost of insulin pump and accessories and also the monitoring modalities. The insulin pumps must be made cheaper by resale and reuse in developing countries at least. This is supported by a set of Video of starting and 2 years of insulin pump use of MRS AK.

## PP31

### Type 2 Diabetes Mellitus In A 16 Year Old Boy With Intellectual Disability : A Rare Case Of Laurence-Moon-Bardet-Biedl Syndrome

D Gupta • V Singh • M Kumhar

**Background and Aims** Laurence Moon Bardet Beidl Syndrome is a rare Ciliopathic and Pleiotrophic human Autosomal recessive genetic disorder, which involves multiple organ system. Consanguineous marriage is usually the common cause. The characteristic feature of the disorder are progressive rod cone dystrophy, retinitis Pigmentosa, myopia, central obesity, mental retardation, Anisometropia, Astigmatism, Postaxial Polydactyly, Hypogonadism in males, renal involvement. It affects males and females equally. The treatment of Laurence Moon Bardet Beidl Syndrome is usually directed towards the specific symptoms that are apparent in each individual. We here present a case report of 16 year old male patient presenting in medicine department with fever and left eye lid abscess with hyperglycemia, progressive loss of vision, polydactyly and syndactyly. It was the hypogonadism, absence of sexual characters that made us suspect this disorder.

**Materials and methods** A 16 year old boy presented in the department of medicine ,JLN Medical College ,Ajmer with the complaints of fever and eye lid swelling and discharge for past 5 days. His routine investigations revealed a random blood sugar level of 450m/dl with no evidence of ketones in urine which attracted our attention to the glyemic status of the patient.

**Results** The patient was found to have a raised temperature and his vitals were stable. Central obesity, a moon shaped face, acanthosis nigricans, upper limb polydactyly and lower limb syndactyly, a small testicular size and absence of the pubic and the axillary hair.

**Conclusion** Fundus-features of retinitis pigmentosa. All the above features helped us in diagnosis and the raised HBA1c levels

## PP32

### Correlation of Diabetic Retinopathy with Glycemic Parameters, Lipid Profile and Carotid Intima Media Thickness

K Parihar • P Shah • P Keswani • S Sharma • R Sharma • A Bhargava

**Background and Aims** Diabetes mellitus (DM) has become a pandemic non-communicable disease. Hyperglycemia causes microvascular complications like diabetic retinopathy (DR) and macrovascular complications like Coronary Artery Disease, Cerebrovascular accidents etc. In this study we sought to correlate the severity of DR with glycemic parameters, lipid profile and CIMT (Carotid Intima Media Thickness).

**Materials and methods** A hospital based observational and analytical study involving 25 consecutive patients of type 2 DM in age

group 40-75 years were included and grouped as group A with PDR, group B with NPDR and group C with no DR. In all the patients, fundus photography, fundus fluorescein angiography and B-mode Ultrasonography for CIMT were performed

**Results** The mean fasting blood sugar (FBS), HbA1C and CIMT were 244.8 mg/dl, 10.6 % and 0.89 mm in Group A while it was 213.36 mg/dl, 9.78 % and 0.77 mm in Group B and 179.4 mg/dl, 8.76 % and 0.68 mm in Group C respectively. Serum cholesterol was 235 mg/dl, 197 mg/dl, and 178 mg/dl; serum triglyceride was 177 mg/dl, 153 mg/dl, 128 mg/dl; serum HDL was 39 mg/dl, 34 mg/dl, 42 mg/dl and serum LDL was 142 mg/dl, 121 mg/dl, 102 mg/dl in group A, B and C respectively.

**Conclusion** Hence the development of DR, both NPDR and PDR are associated with poor glycemic status, abnormal lipid profile and CIMT. As CIMT is a marker of atherosclerosis, severity of DR is associated with development of macrovascular complications.

**Keywords** : diabetes mellitus, diabetic retinopathy, carotid intima media thickness

### PP33

#### High-dose Insulin Therapy in Beta-blocker and Calcium Channel-Blocker Poisoning - A Rare Case Report

MO Shariff

**Background and Aims** Overdoses of  $\beta$ -blockers and calcium channel blockers can produce significant morbidity and mortality. High-dose insulin therapy along with glucose supplementation has been successful in reversing the cardiotoxic effects of these drugs.

**Materials and methods** Chief Complaint: Alleged history of consumption of 30 tablets of Amlodipine 5mg and Atenolol 50mg along with ethanol around 9:30 AM on 05/03/19 was brought to the emergency department at 8:30 PM

On Examination: Pulse:40bpm Bp:Not recordable Temperature:99F RR:38cpm

SpO<sub>2</sub>: 86%@RA

Systemic Examination : Normal

#### Results

CBC- HB 16.5 gm/dl,TC-21390 cells/cmm,Platelet count:2.1 Lakhs/cumm,RBC COUNT:4.45 mill/cmm,LFT- Total bilirubin:1.73 mg/dl,RFT-WNL,Sr.Electrolytes:WNL

FINAL DIAGNOSIS: Multiple drug poisoning(30 tablets of Amlodipine 5mg and Atenolol 150mg),Sepsis,Aspiration Pneumonia

1. Appropriate antibiotics,fluid resuscitation, vasopressors,oxygenation where given for Sepsis management

2. Appropriate antibiotics and oxygenation were given for Aspiration pneumonia

3. Beta-blocker and calcium channel-blocker poisoning Management: Gastrointestinal decontamination:Single dose of activated charcoal was given.

IV crystalloid,IV atropine,IV calcium salt,IV glucagon,IV high dose insulin and dextrose, vasopressor were given.

High dose insulin and dextrose

Bolus therapy:

Regular insulin:1 Unit/kg IV

Dextrose:25 to 50 grams IV;repeated for hypoglycemia;IV potassium was given for hypokalemia

Maintenance infusions:Regular insulin – start infusion at 0.5 Units/kg per hour IV; titrate upwards until hypotension corrected or maximum dose of 2 Units/kg per hour reached

Dextrose–0.5 grams/kg per hour;titrate to euglycemia

Mechanisms of Action of High-Dose Insulin/Glucose Therapy

1)Positive inotropy

2)Vasodilatation:Insulin dilates peripheral vessels

3)Metabolic effects:High-dose insulin/glucose therapy allows myocardial glucose uptake and provides a source of glucose.

High-dose insulin/glucose therapy is effective but why it is effective is not clear.

**Conclusion** More clinical data are needed,animal studies and human case reports demonstrate that high- dose insulin is a superior treatment in terms of safety and survival in both beta-blocker and calcium-channel blocker poisoning.High-dose insulin should be considered initial therapy in these poisonings

### PP34

#### Study Of Bone Mineral Density In Patients With Type 2 Diabetes Mellitus In Comparison To the Normal Population

A John • Shivashankar

**Background and Aims** To study and compare the bone mineral density in patients with Type 2 Diabetes Mellitus in comparison to the normal population, in a tertiary care hospital. To Assess the Bone Mineral Density (BMD) in patients with type 2 diabetes mellitus. To compare the bone mineral density of patients with T2DM against the Bone mineral density of non-diabetic patients. To assess whether duration of type 2 diabetes mellitus, glycemic control, Presence of microvascular complications have any relation to Bone mineral Density.

**Materials and methods** A cross sectional observational study was conducted In a tertiary care hospital in South India between October 2019 and May 2019. 172 patients with T2DM and 172 patients as Non- Diabetic Controls were included in the study after taking an informed consent. A detailed questionnaire including relevant history, examination and laboratory parameters were collected. Bone mineral density was measured by qualitative ultrasound measured at the calcaneum and reported as WHO compliant T score and Z scores.

**Results** A total of 172 Diabetic Patients and 172 non-diabetic patients were included in the study. 46.51% of the diabetic population and 34.89 % of the non-diabetic population had low bone mineral density. The Average T score amongst the diabetic population and non-diabetic population was - 0.83±1.21 and -0.51 ±1.25 respectively. Negative correlation was noted between duration of diabetes mellitus, HbA1c and Bone mineral density. No correlation was noted between presence of microvascular complications and low bone mineral density.

### PP35

#### To Study the Diastolic Function of Heart in Type 2 Diabetes Mellitus (T2DM) Patients

A dabas • P Sirohi

**Background and Aims** To study the diastolic function 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 <130/80) asymptomatic diabetic patients reporting in our hospital to evaluate the Presence of diastolic dysfunction through 2 dimensional transthoracic echocardiography and study the clinical history related biochemical investigation.

**Results** On echocardiographic evaluation of 100 patients, 68 cases (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.

### PP36

#### Cytokine response to life style modification with Yogasanas among subjects with type 2 diabetes – A preliminary report from South India

S Prathiba A • S Sivakumar • A Devarajan • S Kumpatla • V Viswanathan

**Background and Aims** Yoga has been shown to be cost-effective and beneficial for individuals with type 2 diabetes (T2DM). However, knowledge about cytokine response of performing yoga over a longer period remains limited. Hence, this study aimed to investigate the effect of yogaasanas on inflammatory markers among subjects with T2DM.

**Materials and methods** This is a randomised experimental study conducted between February 2017–January 2019 at a tertiary care centre for diabetes in Chennai, Tamil Nadu. A total of 210 M:F(107:103) subjects with T2DM were recruited and randomized into two groups. Group 1 (control) was advised to do walking and loosening exercise for one hour daily whereas Group 2 (test) subjects were trained to practice Yogaasanas for one hour daily. Both the groups were followed up after 3 months and diabetes treatment was unchanged during this period. Select cytokines were assessed at baseline and Follow-up (FU) using bioplex method. Out of 210, 160 (test – 80 and control – 80) completed 3 months FU and were included for final analysis. Statistical analysis was performed using SPSS version 20.0. Log (ln) transformation was done to obtain approximate normalisation as data was skewed and paired t test was performed.

**Results** There was a marked reduction in IL-6 levels in the test group Geometric mean: {Baseline Vs FU} (Test 9.5; 5.7;  $p=0.033$ ) Vs {Control 7.5;5.9;  $p=0.241$ ). Significant reduction in leptin levels was observed in the test group as compared to control group {Baseline Vs FU} (Test 17.4; 12.6;  $p=0.007$ ) Vs (Control 14.8; 13.9;  $p=0.484$ ). Adiponectin levels increased significantly in the test group compared to control group {Baseline Vs FU} (Test 1025;1364;  $p=0.005$ ) Vs (Control 1272.2; 1025;  $p=0.07$ ).hsCRP levels showed slight reduction in the test group but did not reach statistical significance. Twelve weeks of Yoga practice had a positive impact on inflammatory cytokine response among subjects with T2DM.

### PP37

#### Discordance In FPG, 2hPG, HbA1c Criteria For Diagnosis Of Diabetes : 5 Years Study From South India

S Kumpatla • R Parveen • U Juttada • V Viswanathan

**Background and Aims** Currently used methods to diagnose diabetes include FPG, OGTT, HbA1c. concordance or discordance of

these standard methods remains unclear. Aim was to assess the rate of diagnosis by HbA1c, FPG, 2 hrPG used for screening for diabetes in South Indian subjects.

**Materials and methods** A total of 2118 subjects [M:F1301:817] who underwent an OGTT and A1c measurements were selected from electronic data base of medical records from a tertiary care centre for diabetes between Jan 2014 to Dec 2018. Subjects who missed to take any one of the above test were excluded from the study. Anthropometric, biochemical details such as OGTT, HbA1c, Lipid profile were recorded. The screened subjects were divided into three groups; Group1 (n= 48) (FPG $\geq$ 126, 2hPG<200, HbA1c<6.5), Group2(n=170)(FPG<126,2hPG $\geq$ 200, HbA1c<6.5) and Group3 (n=97) (FPG<126, 2hPG <200, HbA1c $\geq$ 6.5) The subjects were classified as normal if HbA1c was [ $\leq$ 5.7], pre-diabetes [ $\geq$  5.7–6.4] and diabetes [ $\geq$ 6.5] according to the ADA criteria. Percentages are reported.

**Results** The mean age of total subjects was [45.8 $\pm$ 11.8] years. The rate of diagnosis by FPG, 2hPG, HbA1c criteria was 2.3, 8, 4.6% respectively where the other two criteria in each group was normal. When the two criteria was used to detect diabetes 1.9% were identified by FPG & HbA1c, 7.6% by 2hPG & HbA1c, and 3.6% were identified by OGTT (FPG & 2hPG), whereas 39.6% were identified by all the three criteria. Based on the HbA1c test, 550(26%) were normal, 436(20.6%) had prediabetes and 1132(53.4%) were classified as diabetes. The mean HbA1c was (Gp1)5.8, (Gp2)5.9 and (Gp3)6.7. There is a significant discordance in the standard methods used for diagnosis of diabetes. This discordance could have significant impact on clinical practice.

### PP38

#### Efficacy of Teneligliptin as an add on to Insulin Monotherapy In Patients With Type 2 Diabetes Mellitus

s Paniigrahi • B Pradhan

**Background and Aims** Uncontrolled glycemic status is an independent risk factor for macrovascular and microvascular complications. Insulin therapy is ultimately required by a substantial number of individual with type 2 DM. Some patients do not adequately achieve therapeutic goals despite titration of insulin dose. Dipeptidyl peptidase-4 (DPP) inhibitors increase the concentration of glucagon like peptide -1 and glucagon dependent insulinotropic peptide. It has been reported that addition of DPP-4 inhibitors is more effective than dose escalation of insulin. To find the efficacy of teneligliptin add on to insulin monotherapy in patients with uncontrolled type-2 DM.

**Materials and methods** It was a prospective open label observational study of 40 patients with inadequate glycemic control with insulin. Keeping the baseline insulin dose fixed, teneligliptin 20 mg was added daily for a period of 12 weeks. The primary outcome measure was measured by change in HbA1c, FBS and PPBS at 12 weeks.

**Results** In 40 patients, teneligliptin was used as add-on treatment in patients receiving insulin as monotherapy. From baseline to 12-weeks, there was a change in mean HbA1c (9.50  $\pm$  2.07 to 8.01  $\pm$  1.34%) ( $p=0.0003$ ), mean FBS (250.08  $\pm$  107.6 to 155.2  $\pm$  58.7 mg/dl) ( $p=0.0003$ ) and mean PPBS (303.3  $\pm$  118.31 to 200  $\pm$  44.4 mg/dl) ( $p=0.0002$ ). Reduction in these glycemic parameters was thus found to be significant in patients with teneligliptin as add-on to insulin. Overall, 20 % patients reached the target HbA1c of <7% after 12-week treatment.

**Conclusion** Teneligliptin is a useful add on in patients of uncontrolled glycemic status with insulin monotherapy.



## PP39

**Impact of Digital Therapeutic on Improving Glycemic Control in Patients With Type 2 Diabetes**

A Krishnakumar • V Mattoo

**Background and Aims** Lifestyle modification and self-management are essential for the optimal management of diabetes. This study aimed to assess the effect of lifestyle and behavioral modifications delivered via the Wellthy Care™ (WC) digital therapeutic (Dtx), on glycemic control of patients with T2D.

**Materials and methods** Patients from India were enrolled in a 16 weeks self-management program, based on AADE7™ self-care behaviours, delivered via the WC app. This program provides real-time feedback via an AI-powered chatbot and periodic, planned health coaching through certified diabetes educators via voice calls and chats. At the end of the program the first reported HbA1c was compared to the last reported HbA1c and the change in HbA1c was correlated to the interactions with the WC app.

**Results** 60 patients that completed the program and reported 2 HbA1c readings showed a mean reduction of -1.26% (95% CI: -0.79 to -1.72%,  $P < 0.0001$ ). Seventy Seven percent (46/60) of the patients showed a reduction in HbA1c, 70% of the patients (42/60) reduced their HbA1c more than -0.3%, and 32% of the patients (19/60) achieved an HbA1c of <6.5%. A direct relationship was noted with frequency of app engagement. Patients in the highest tertile of app interaction showed a mean reduction of -1.73% (95% CI: -0.82 to -2.76%) in HbA1c, patients in the middle tertile showed reduction of -1.23% (95% CI: -0.84 to -1.60%) of reduction, and those in the lowest tertile showed a mean reduction of -0.37% (95% CI: 0.13 to -0.89%;  $P < 0.0001$ , lowest vs highest)

**Conclusion** Lifestyle and behavioral modifications delivered via the WC Dtx improve glycemic control. The WC dtx can be an effective tool for improving glycemic control in a resource constrained country like India.

## PP40

**Experience of Perioperative Glycemic Management In patients Undergoing Cardiac Transplantation at a Tertiary Care Centre**

L Kumbar • P Kalra • Nagamalesh • R Shetty K

**Background and Aims** Glycemic management in patients undergoing cardiac transplantation poses specific challenges, these patients being exposed to heavy doses of steroids and immunosuppressive drugs. We present here our experience of managing 18 patients undergoing cardiac transplantation at our tertiary care centre.

**Results** A total of 18 patients with a mean age of 46.72±16.94 years(mean+SD) and median age of 48.5 years, underwent cardiac transplantation (males-14, females-4). Of these patients, 4 had postoperative diabetes mellitus, and their HbA1c ranged from 5.4% to 12.5 % (mean+SD=8.711±2.47) median of 8.4%. In the period 2 weeks preceding surgery, plasma glucose levels were maintained in the range of 80-160mg/dl. Serum creatinine in these patients was 1.06±0.34 mg/dl (mean+SD) and median of 1.03 mg/dl. The mean insulin requirement of insulin on postoperative day 0, 1, 2 and 3 were 1.396, 0.503, 0.490 and 0.537(IU/kg/day) in patients with diabetes, whereas in non – diabetic individuals it was 1.955, 0.561, 1.19 and 0.61respectively ( $p = NS$ ). Postoperatively, plasma glucose was maintained in the range of 140-180 mg/dl. The mean insulin at the time of discharge in patients with diabetes was 0.698±0.43 IU/kg/day(mean+SD) and

median of 0.54 IU/kg/day, while non – diabetic patients it was 1.285±1 IU/kg/day(mean+SD) and median of 1.483.( $p = NS$ )

**Conclusion** In our experience, we found that the perioperative insulin requirement of our patients was higher compared to other perioperative patients. Perioperative glycemic control is very essential for successful cardiac transplantation at our centre has been largely successful.

## PP41

**A Prospective Observational Study to Assess Functional Exercise Capacity by Six Minute Walk Distance in Type-2 Diabetes Mellitus Patients as Compared to Healthy Controls**

N Bishnoi • S Kumar • BB Sharma • R Sharma

**Background and Aims** Six minute walk distance (6MWD) is a valuable tool to measure functional exercise capacity (FEC), as it measures sub-maximal aerobic exercise capacity. Exercise capacity is reduced in T2DM patients. Duration and intensity of exercise is distinct for a particular diabetic patient. So formulation of individualized exercise capacity is a key component in exercise prescription and management of T2DM patients.

**Materials and methods** 65 patients with T2DM (34 men, 31 women) and 65 (33 men, 32 women) age-sex matched healthy controls participated in this prospective observational study. FEC was assessed using the six-minute walk distance (6MWD). Anthropometric, cardio-pulmonary, cognitive functions and Ankle Brachial Index (ABI) were also measured.

**Results** Mean age of total 130 participants was 53.81±8.18 years. Patients with T2DM and controls were similar in age ( $p > 0.05$ ). Mean 6MWD for diabetics was 362.06±56.50 meters and for controls was 492.69±64.56 meters, the difference was statistically significant ( $p$ -value<0.001).T2DM patients were having significantly compromised underlying cardio- pulmonary functions ( $p$ - value <0.001).. There were significant inverse relationships between 6MWD and Body mass index ( $r = -0.162$ ) and FBS ( $r = -0.126$ ). 6MWD was significantly and positively correlated with MMSE ( $r = 0.577$ ) in patients with T2DM.

Significant difference was observed between pre and post 6MWT parameters eg, SBP,DBP and SpO2 ( $p$ -value <0.001).

**Conclusion** Functional exercise capacity (FEC) of T2DM patients as measured by 6MWD is significantly lower as compared to healthy controls. This might be due to presence of underlying cardio- pulmonary dysfunctions in diabetes patients. High body mass index and fasting blood glucose were significantly associated with lower functional exercise capacity. Higher level of cognition had significantly higher FEC.

## PP42

**Effectiveness Of Teneigliptin In Type 2 Diabetes Mellitus Patients With Renal Impairment: Subgroup-Analysis Of Treat India – 2 Study**

A Rathod • M Tiwaskar • S Ghosh • S Suryawanshi • A Petare • W Siddiqui • MA Agharia • H Barkate

**Background and Aims** This subgroup analysis of TREAT INDIA – 2 study was conducted to assess the effectiveness of Teneigliptin in Type 2 Diabetic patients with CKD

**Materials and methods** A predesigned structured proforma was used to collate patient profile information from hospital records of 18 centers across India. Independent Ethics Committee (Suraksha Ethics committee. Reg No: ECR/644/Inst/MH/2014/

RR-17) approval was obtained prior to commencement of the study. Patients in whom treatment with Teneeligliptin was initiated and continued for minimum follow up period of 3 months were considered for the study. Data with respect to glycemic parameters along with estimated glomerular filtration rate (eGFR) was captured and further analyzed for the mean change in fasting plasma glucose (FPG), postprandial plasma glucose (PPG), Hemoglobin A1c (HbA1c) and eGFR from baseline to 3 months.

**Results** 549 patients out of 10653 were found to have mild to moderate CKD. Mean eGFR of this 549 patients was 53.24 mL/min/1.73m<sup>2</sup> before initiation of Teneeligliptin therapy. After initiation of Teneeligliptin therapy it was observed that there was significant improvement in eGFR from 53.24 + 5.0 to 66.93 + 7.0 mL/min/1.73m<sup>2</sup> with a mean change of 13.69 mL/min/1.73m<sup>2</sup> ( $p < 0.0001$ ). Compared to baseline, there was significant reduction in FPG and PPG at 3 months from 177.59 + 11.67 to 118.88 + 13.12 mg/dL and 266.37 + 33.16 to 173.63 + 32.49 mg/dL with a mean change of 58.71 mg/dl; ( $p < 0.0001$ ) and 92.74 mg/dl; ( $p < 0.0001$ ) at 3 months respectively. HbA1c was significantly reduced from the baseline at 3 months with mean change of -0.76% (8.2% + 0.73% to 7.07% + 0.82%;  $p < 0.0001$ ).

**Conclusion** Teneeligliptin was significantly effective in reduction in the glycemic parameters in mild to moderate CKD patients with improvement in eGFR.

Keywords : Diabetes mellitus Type 2, Teneeligliptin, Chronic Kidney disease.

#### PP43

##### Prevalence of Undiagnosed Depression in Patients With Type 2 Diabetes: A Real World Study

AS Prakash • D Agarwal

**Background and Aims** In India it has been noticed and documented that type 2 diabetes is associated with a wide range of adverse consequences such as higher fasting glucose and HbA1c levels which leads to higher health expenditures and thus reduced adherence to the prescribed treatment regimen and lower quality of life. Main objective of the study was to assess the depression among T2DM patients attending diabetic clinics in patna and Guwahati city.

**Materials and methods** This was a real world observational study conducted in two diabetes care centre in patna (Prakash Diabetes Hospital) and in Guwahati (ARH Diabetes Center). Patient were recorded in two type of clinical set up, one in OPD Clinics where maximum time spend with the patients was 15 mins and in Special clinic where the average times allocated to the patient was 45 min. Depressive symptoms were assessed by using a pre designed questionnaire based on Beck Depression Inventory.

**Results** Out of 560 diabetic patients approached, 398 were within our inclusion criteria and agreed to participate in this study (Response rate of 71%). Maximum participants had T2DM for <10 years (310, 78%), were under oral hypoglycemic treatment only (382, 96%), and had good medication adherence (374, 94%). The overall depression prevalence was 17%. When we assessed the level of depression amongst participants in association with their socio demographic and clinical characteristics, there was a significant difference between gender ( $p < 0.001$ ); educational level ( $p < 0.001$ ); nationality ( $p < 0.001$ ); age groups ( $p < 0.001$ ); and employment status ( $p < 0.01$ ). Higher prevalence of depression in T2DM females than males (14.5 vs. 18.5%,  $p < 0.001$ ). The type of clinic in which the T2DM patients were attending (e.g., diabetes OPD vs. Special Clinic) was also significantly associated with depression ( $p < 0.001$ ).

**Conclusion** Our results demonstrate that the psychological aspects of T2DM patients appears to be more benefited depending on the intensive service given to the patients with higher duration of time. We have identified a need for the establishment of counseling clinics along with educational and diet clinic which is not only comprehensive in the clinical service and diagnosis but it also appears to affect the long-term improvement of the psychological outcome of the patients.

#### PP44

##### Relationship Of Glycemic Parameters And Lipid Profile In Hypothyroid And Euthyroid Patients With Type 2 Diabetes Mellitus

S Goswami • P Keswani • S Sharma • R Sharma • P Meena

**Background and Aims** Diabetes mellitus and thyroid dysfunctions are two common endocrinopathies in adult population. Autoimmune thyroid diseases are more prevalent in Type 1 Diabetes mellitus. Most studies reveal that in patients with type 2 diabetes mellitus prevalence of thyroid dysfunction is more than general population. Type 2 diabetic patients with hypothyroidism have been found to be associated with dyslipidemia as compared to euthyroid patients. To study the relationship of glycemic parameters and lipid profile in hypothyroid and euthyroid patients with type 2 Diabetes Mellitus.

**Materials and methods** A hospital based comparative study was done in S.M.S. Medical College including 304 consecutive type 2 diabetes mellitus patients. Out of total patients, 101 patients with hypothyroidism were considered as group 1 and 203 euthyroid patients were taken as group 2. Lipid profile and HbA1C were done in both groups

**Results** The mean HbA1C was 9.94+2 % in group1 and 8.51+1.46 % in group 2. The mean total lipid, total cholesterol, HDL, LDL, and triglycerides were 647.18, 194.33, 41.43, 129.72 and 215.13 mg/dl respectively in group 1 while it were 609.16, 182.72, 41.86, 110.28 and 199.08 mg/dl in group 2 respectively. Except HDL all lipid parameters and HbA1C were significantly raised in Group 1 patients.

**Conclusion** Lipid profile and glycemic parameters were more deranged in hypothyroid patients than euthyroid patients with Type 2 Diabetes Mellitus. Keywords : Diabetes Mellitus, Hypothyroidism, Euthyroid.

#### PP45

##### Total Adiponectin and Risk of Symptomatic Lower Extremity Peripheral Vascular Disease in Diabetes Mellitus

K Narula • BK Gupta • S Meena • A Gupta

##### 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. Among 60 patient, 6 developed PVD. Using risk set sampling, controls were selected and matched on age, no smoking status, fasting status.

**Results** We found a strong inverse 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, 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. Correlation 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.

#### PP46

##### Reasons for Discontinuation of Insulin Therapy: Results From the International Diabetes Management Practices Study (IDMPS)

P Aschner • JJ Gagliardino • H Ilkova • F Lavalle • A Ramachandran • G Kaddaha • JC Mbanya • M Shestakova • J Chantelot • JC Chan

**Background and Aims** Adherence to insulin therapy is often sub-optimal. 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  $\geq 2$  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	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

Supported by: Sanofi

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

#### PP47

##### Comparison of Glucose Excursion in Patient with T2DM After the Effects of Treatment with Dulaglutide Injection by use of Continuous Glucose Monitoring system A case report!

S Shah

**Background and Aims** Comparison of glycemic excursion in patient with T2DM after the effects of treatment with Dulaglutide injection by use of

Continuous Glucose Monitoring (CGM) technology with FreeStyle Libre ProTM. A 52 years male businessman with history of diabetes for 15 years. He is on basal Insulin Glargine 24 units s/c before breakfast (BBF) along with gliclazide metformin 80/500 1 tablet 2 times a day BBF and before dinner. He is also on sitagliptin metformin 50/500 1 tablet before lunch and before dinner. Regardless of following instructions for food habits and being compliant in taking his medications, he was unable to achieve optimal glycemic control. He was recently found to have microalbuminuria and retinopathy with HbA1c of 8.6%

**Materials and methods** Patient was initiated on the CGM—FreeStyle Libre Pro to understand his glycaemic profile. During 1st 5 days of CGM monitoring; peaks were seen even after taking his daily oral antihyperglycemic medications. After 3 days he was started on Dulaglutide 1.5mg s/c injection on 1st July after dinner and his sitagliptin metformin combination were discontinued to help him to maintain his optimal blood sugar levels.

**Results** When comparing the first 5 days with the next 5 days daily glucose reports, the average blood glucose level reduced from 200mg/dL to 114mg/dL; Time in target increased from 12% to 86% and Time above target reduced from 80% to 11% and Time below target reduced from 30% to 3% in 10days.

**Conclusion** Administration of Dulaglutide injection was well-tolerated, and it improved his glucose concentration as adjunct to other oral antihyperglycemic medication. Moreover, CGM technology demonstrated the effects of the change of therapy had on his glycaemic parameters.

#### PP48

##### Relationship of Glycemic Parameters and Diabetic Nephropathy in Hypothyroid and Euthyroid Patients with Type 2 Diabetes Mellitus

P meena • S Mukherjee • P Keswani • S Sharma • R Sharma

**Background and Aims** Diabetes mellitus and thyroid dysfunctions are two common endocrinopathies in adult population. Autoimmune thyroid diseases are more prevalent in Type 1 Diabetes mellitus. Most studies reveal that in patients with type 2 diabetes mellitus prevalence of thyroid dysfunction is more than general population. Type 2 diabetic patients with hypothyroidism have been found to be associated with greater prevalence of diabetic nephropathy as compared to euthyroid patients.

To study the relationship of glycemic parameters and diabetic nephropathy in hypothyroid and euthyroid patients with type 2 Diabetes Mellitus.

**Materials and methods** A hospital based comparative study was done in S.M.S. Medical College including 304 consecutive type 2 diabetes mellitus patients. Out of total patients, 101 patients with hypothyroidism were considered as group 1 and 203 euthyroid patients were taken as group 2. Urine for microalbumin and HbA1C were done in both groups.

**Results** The mean HbA1C was 9.94±2 % in group1 and 8.51±1.46 % in group 2. The diabetic nephropathy positive in 28.71% and negative in 71.29% in group 1 while it were positive in 12.81% and negative 87.19% in group 2. HbA1C were significantly raised in Group 1 patients.

**Conclusion** Hypothyroidism was associated with greater prevalence of diabetic nephropathy and glycemic derangements than euthyroid patients with Type 2 Diabetes Mellitus.

Keywords : Diabetes Mellitus, Hypothyroidism, Euthyroid.

#### PP49

##### A Study of Asymptomatic Hypogonadism in Type 2 Diabetes Mellitus Male Patient and its Association with Cardiovascular Risk

V Gupta • L Meena • A Agrawal • R Sharma • S Mahavar

**Background and Aims** Asymptomatic hypogonadism may be defined as person who do not manifest any symptom of erectile

dysfunction in spite of low serum testosterone level. Diabetes is an established risk factor for sexual dysfunction in men.

**Materials and methods** Study was done at SMS Hospital Jaipur. Total 228 type 2 diabetes mellitus male patients of 30 - 65 year age were taken for study. Routine investigation including CBC, blood sugar, RFT,LFT, serum electrolyte, lipid profile, glycated Hb, serum free testosterone were taken. Future cardiovascular risk was assessed by Framingham and UKPDS Cardiac risk score. Clinical erectile dysfunction was determined by IIEF 5 (International index of erectile function) Questionnaire. Score of 21 or less indicated erectile dysfunction. Low testosterone was marked for below 4.5 pcg/ml. Study population were divided in 4 groups. A. Asymptomatic and low testosterone level(n- 34) B. Asymptomatic and normal testosterone level(n- 82) C. Symptomatic and low testosterone level(n- 76) D. Symptomatic and normal testosterone level(n-36)

**Results** Total frequency of hypogonadism was found in 48.24% of which asymptomatic hypogonadism were 14.91% cases . Hypogonadism patients had more duration of diabetes, higher mean weight, more number of hypertensive, high total cholesterol, high LDL value, high glycated Hb, high Framingham & UKPDS Cardiac risk score.

**Conclusion** Duration of Diabetes & serum cholesterol made a significant contribution to prediction for asymptomatic hypogonadism while serum LDL made significant contribution to prediction for symptomatic hypogonadism in type 2 DM male patients. It is important to recognize low testosterone level in spite of no symptoms of sexual dysfunction in type 2 diabetes mellitus male patients as it can indicate future cardiovascular risk

#### PP50

##### Prevalence, Clinical Profile and Follow up of Recurrent Urinary Tract Infection in Patients with Type 2 Diabetes Mellitus

T Nabi • N Rafiq

**Background and Aims** Patients with Type 2 Diabetes (T2D) are at increased risk of infections, with the urinary tract being the most frequent site and good diabetic control has been recommended as a means of decreasing this risk. Adult women with diabetes are at increased risk of Urinary Tract Infection (UTI), especially recurrences. The identification of risk factors can help pinpoint modifiable factors amenable to a disease prevention strategy for Recurrent UTI. To study the clinical, etiological profile, complications and follow up of UTI in T2D patients.

**Materials and methods** This was a hospital based prospective study done on consecutive 200 T2D symptomatic UTI patients admitted in the Endocrinology department having age >30 years. Various clinical, biochemical parameters and urine examination and culture were monitored. All the patients were followed for 6 months with respect to number of UTIs, glycemic control and renal parameters.

**Results** UTI was more common in females (81%) as compared to males (19%). Lower UTI (cystitis) was present in 55.5% and pyelonephritis 44.5%, EPN in 9.5% and bacteremia in 58.1% of UTI patients. EPN was present only in females. Of the 169 T2D UTI patients followed till 6 months, 67(39.6%) developed recurrent UTI. Presence of CKD, uncontrolled diabetes and renal calculi increased the risk of recurrent UTI in T2D females. While in males poor glycemia and lower eGFR increases risk of recurrent UTI. The recurrent UTI patients had significantly higher HbA1c at follow up than at baseline but renal parameters did no differ.

**Conclusion** Recurrent UTI is consequences of and lead to uncontrolled glycemia. Significant number of patients develops recurrent UTI on follow up. Recurrent UTI patients have poor glycemic control on follow up while renal parameters did no differ.

Keywords : Urinary Tract Infections; Type 2 Diabetes; Symptomatic Bacteriuria; Glycemic Control; Renal Parameters

## PP51

**Once Weekly Dulaglutide Therapy in Type 2 DM Subjects, Real-World Evidence From Diabetes Care Center in North Gujarat**

P Goswami • P Khatri • K Patel • V Abhichandni • B Patel

**Background and Aims** To Evaluate real world evidence for efficacy and side effects profile of once a weekly dulaglutide in north Gujarat for type 2 diabetes patients

**Materials and methods** This retrospective observational study for 40 patient who were prescribed dulaglutide were analyzed. Data were analyzed primarily for change in HbA1c, weight, FPG from baseline to 12th week follow-up visit for efficacy and occurrence adverse event for safety as well as adherence/discontinuation. Final analysis was done on 15 patients. Additional parameters were analyzed for change in insulin dosage and other oral drugs used.

**Results** The primary endpoints showed 1.6% reduction in HbA1c from baseline ( $8.91 \pm 1.88$  Vs  $7.31 \pm 1.03$ ,  $p < 0.001$ ). There was 4.59 Kg weight loss from baseline ( $81.95 \pm 10.09$  Vs  $77.36 \pm 11.70$ ,  $P < 0.001$ ). There was 86.28 mg/dl FBS reduction from baseline ( $216.61 \pm 94.95$  Vs  $130.33 \pm 28.01$ ,  $P < 0.05$ ). Total insulin daily dosage of 9.29-unit reduction were reported from baseline ( $23.7 \pm 13.73$  Vs  $11.43 \pm 13.50$ ,  $P < 0.05$ ). There were 25% (1.00mg to 0.75mg), 8.7% (28.57mg to 25 mg) reductions of cumulative dosage of Glimiperide, acarbose respectively from baseline. There were 100% increased cumulative dosage of pioglitazone baseline (4.50mg to 9.00mg). There was diarrhea and stomach ache in 3 patients in whom we had stopped dulaglutide. Skin rash were noted in 1 patient. 25 patients had discontinued dulaglutide due to various region

**Conclusion** Our Real-world evidence is well aligned with randomized control trial in terms of Hba1c reduction. (RCTs Vs Our Real-world evidence 1.1% to 1.5 % Vs 1.6% respectively). There were no major adverse events reported.

Keywords : Real world evidence, Dulaglutide, type 2 diabetes mellitus

## PP52

**Migration of Indian Women to Urban Areas and Cardiometabolic Risk Scenario in Rajasthan**

N Sen • S Tanwar • A Jain

**Background and Aims** Migration to cities may increase cardiometabolic risk factors in developing countries. We examined rural and urban individuals who were born in the same villages and shared similar childhood experiences To assess the cardiometabolic risk difference between urban and rural Indian women and find out the reason to develop risk after migration to urban areas.

**Materials and methods** Blood lipids and glucose, blood pressure, anthropometry, body composition, physical activity, and food, tobacco and alcohol consumption were examined in 3629 women from rural area and 3170 women, 19–29 years old, living in their village of birth 760 commuted to work in Jaipur City and 430 women living in Ajmer city.

**Results** Rural and urban women had similar prevalence of overweight (28%), elevated body fat ( $29.8 \pm 6.1\%$ ) and low physical activity (83%). Compared to rural women, more urban women were sedentary (79 versus 27%), and they had higher body fat ( $15.3 \pm 5.3\%$  versus  $13.3 \pm 5.7\%$ ), serum cholesterol ( $4.27 \pm 0.75$  versus  $3.90 \pm 0.70$  mmol/l [ $165 \pm 29$  versus  $151 \pm 27$  mg/dl]), low density lipoprotein [LDL]-cholesterol ( $2.66 \pm 0.72$  versus  $2.30 \pm 0.62$  mmol/l [ $103 \pm 28$  versus  $89 \pm 24$  mg/dl]) and total cholesterol/high density lipoprotein [HDL]-cholesterol ratio ( $4.6 \pm 1.0$  versus  $4.1 \pm 0.9$ ). Women had higher blood pressure in urban

(systolic  $129 \pm 32$  mmHg and diastolic  $79 \pm 21$  mmHg ) than rural areas (systolic  $118 \pm 17$  mmHg and diastolic  $72 \pm 14$  mmHg ). Women had higher fasting blood glucose in urban ( $159 \pm 31$  mg/dl) than rural areas ( $146 \pm 24$  mg/dl). Urban residents ate/drank more saturated fats, red meat and sweetened beverages, and less legumes.

**Conclusion** High proportions of young urban Indian women were overweight and sedentary. Migration to a city increased sedentarism and undesirable eating habits among urban women; became hypertensive and their blood glucose, lipid profile worsened.

## PP53

**A Study of Metabolic Associations with Psoriasis**

S Mandal • S Bajaj • R Prajapati • KG Singh

**Background and Aims** Psoriasis is a chronic and debilitating inflammatory disease associated with serious co-morbidities in which insulin resistance (IR) is often considered as its central component. In recent years, psoriasis has been recognised as a systemic disease associated with metabolic disorders like obesity, diabetes, prediabetes, hypertension, dyslipidemia and microvascular and macrovascular complications associated with these diseases. To study the correlation of psoriasis with insulin resistance and association of psoriasis with metabolic disorders and its complications.

**Materials and methods** A case control study was conducted with 102 psoriasis patients with varying severity and equal number of apparently healthy controls. Insulin resistance was calculated with HOMA-IR formula.

**Results** The IR was higher for severe cases of psoriasis as compared to mild ones. The prevalence of diabetes, hypertension, prediabetes were significantly higher among psoriasis as compared to controls. Triglycerides, LDL-cholesterol were significantly higher in psoriasis. HDL-cholesterol were significantly lower among cases with no significant difference in total cholesterol. The prevalence of nephropathy and retinopathy and coronary artery disease were significantly higher among psoriasis patients.

**Conclusion** Thus psoriasis as a disease entity has an association with IR and may be considered as a hallmark of IR. The detection of IR has an important value in reducing the risks of diabetes mellitus and other metabolic disorders and their complications.

Keywords : Insulin resistance, psoriasis, diabetes, metabolic disorders.

## PP54

**To Study Non-invasive Predictors Of Liver Fibrosis By Fibroscan, APRI & FIB4 Score To Predict Diabetic Hepatopathy In Type 2 DM Patients**

J Sahu • D Sharma

**Background and Aims** Liver diseases related to diabetes (either caused or aggravated by) may be called diabetic hepatopathy. Virtually the entire spectrum of liver disease is seen in patients with diabetes. Diabetes leads to a significantly increased prevalence and severity of NAFLD. NAFLD encompasses a broad spectrum of disease severity, ranging from isolated steatosis (NAFL) to a more severe non-alcoholic steatohepatitis (NASH). Among the various histological features of NASH, fibrosis strongly correlates with end stage liver disease and higher mortality. Patients with diabetes have more fatty liver as compared to age, gender and BMI matched controls. Thus easy rapid accurate non-invasive screening tests needed. Newer technique transient elastography (Fibro scan) is more accurate and is preferable where equipment and cost is not an issue. Simple blood tests such as

AST, ALT and platelet counts are inexpensive and easily available. These levels can be used to calculate AST, platelet ratio index (APRI) and FIB4 scores which correlate with severity of fibrosis and can be used in resource limited settings such as our population. Screening of fibrosis in type2 DM through ultrasonography of abdomen, APRI, FIB-4 & FIBROSCAN. Comparison between FIBROSCAN, APRI & FIB-4 Score in detecting fibrosis in type2 DM patients.

**Materials and methods** 50 patients of DM 2 were included in study. All cases underwent detail clinical history, physical examination & relevant laboratory investigation including FIBROSCAN, CBC and LFT.

**Results** In this study we found a positive correlation of FIBROSCAN and APRI and FIB-4 to predict stage 3 or 4 fibrosis in diabetes patients

#### Conclusion

Hence APRI & FIB-4 can be used as first line tests for perdition of fibrosis as it is cheaper and easily available then FIBROSCAN.

#### PP55

##### Study Of Development Of Non-alcoholic Fatty Liver Disease (NAFLD) Among Type-2 Diabetes Mellitus

NS Rajput • S Bansal

**Background and Aims** Diabetes Mellitus and Non-alcoholic fatty liver disease have become serious global health problems. NAFLD and type-2 diabetes mellitus (T2DM) frequently coexist because they share the risk factors of excess adiposity and insulin resistance. The estimated prevalence of NAFLD in an unselected apparently healthy and asymptomatic population as detected by ultrasonography in this study was found to be 24.5%.

#### Materials and methods

This is a cross sectional case control study carried out in Santosh Medical College and Hospital in 2010-2013. Total number of 150 cases of type-2 diabetes mellitus population and 50 controls of healthy population were recruited in the study. All cases and controls underwent ultrasonography of liver to diagnose non-alcoholic fatty liver disease by non-invasive means. And then NAFLD is classified based on ultrasonography. Other parameters that are done in study are Height, Weight, BMI, Waist circumference, Hip circumference, Blood Pressure, and Laboratory investigations also done like; Lipid profile and Glycated Hemoglobin.

**Results** In this study of diabetic population, the prevalence of NAFLD is found to be 66.66%. In present study, control of general adult population free of diabetes, has prevalence of NAFLD to be 18%. This study found to have BMI, Weight, Waist circumference, Waist-HIP ratio, Triglyceride levels have strong association in development of NAFLD. Both Systolic and Diastolic Blood Pressure being important risk factor in developing NAFLD in T2DM.

**Conclusion** It is observed that prevalence of NAFLD in type-2 diabetic population is 40% more as compared to same age group of general (non-diabetic) population. Combination of markers like TG, ALT, HbA1C, Blood Pressure, BMI, WC, WHR and screening by Ultrasonography of liver can act as group of non-invasion markers predicting the prevalence of NAFLD in diabetic population.

#### PP56

##### Levels Of Glycemic Indices In Acute Myocardial Infarction And Its Impact On Adverse Cardiac Events

B Sejoo • A Rajpurohit

**Background and Aims** Acute Myocardial infarction (MI) (ie, heart attack) is the irreversible death (necrosis) of heart muscle

secondary to prolonged lack of oxygen supply (ischemia). The prognostic value of the glycemic control level, as measured using glycosylated hemoglobin (HbA1c) level, in patients with acute coronary syndrome is still undetermined. The aim of this study was to demonstrate the influence of HbA1c level at admission on the incidence of major adverse cardiac events (MACE).

**Materials and methods** A hospital based observational, analytic and comparative study involving 55 subjects (group-1) and 45 subjects (group-2) (acute myocardial infarction with serum HbA1c < 6 & blood glucose level < 180 and HbA1c > 6 blood glucose level < 180 respectively) was done. Development of complications were compared between two groups and also correlated with HbA1c levels.

**Results** Major cardiac events (Presence of Basal crepitation, S3 gallop, raised JVP, heart failure, arrhythmias & cardiogenic shock) were compared in these two groups and was found 40% subjects in group-1 had major cardiac events while 48% in group-2. There were 23.1% of patients who develop arrhythmias in group-2 and 12.5% patients had arrhythmias in group-1. Cardiogenic shock was present in 15.4% patients of group-1 and in 10.4% patients of group-2. 25% patients of group-2 patients had heart failure while in group-1 there was 18.8% heart failure patients. But difference between two groups for above mentioned complications were insignificant. Similarly insignificant difference was found between two groups for mortality

**Conclusion** Our study showed that prior long term abnormal glucose level (elevated HbA1c) was not a good predictor of adverse outcome and mortality in acute myocardial infarction but depends on blood glucose level at the time of admission.

**Keywords** : Acute Myocardial infarction, Glycosylated hemoglobin (HbA1c), Major adverse cardiac events (MACE).

#### PP57

##### Hepatic Derangements In Patients Of Type 2 Diabetes Mellitus

A Mor • LA Gauri

**Background and Aims** Diabetes mellitus is an important and commonest forms of endocrine disorders. Apart from kidney, eye and blood vessels, liver is also directly or indirectly effected by diabetes mellitus. This includes abnormal liver enzymes, non alcoholic fatty liver disease (NAFLD), cirrhosis and acute liver failure. Liver plays an important role in carbohydrate metabolism and homeostatic regulation of blood sugar level. Not enough studies are done on hepatic derangements in diabetic patients. This study aims to describe the hepatic dysfunction in type 2 diabetic patients.

**Materials and methods** 200 type 2 diabetic patients newly diagnosed or on follow-up were selected, as per inclusion and exclusion criteria. It is a cross sectional study. Detailed history was taken and examination performed. Blood samples and other investigations was done. Data compared and analysed as per Chi-square test and student t test.

**Results** Out of 200 patients, 130 (65%) were male and 70 (35%) female. Out of 130 males included in the study, 80 patients (61.5%) had fatty liver, 50 (38.5%) were without fatty liver. Out of 70 females, 40 (57.1%) had fatty liver and the remaining 30 (42.9%) were without fatty liver. SGPT/SGOT ratio was compared between fatty liver and without fatty liver group. Mean ratio in fatty liver group was 1.34 and that of without fatty liver group was 0.71. The difference was significant.

**Conclusion** We conclude that prevalence of NAFLD is high amongst type 2 diabetes mellitus patients. Considering the increased mortality among these patients NAFLD should be actively sort out and treated in patients with diabetes.

**PP58****Association of Fasting and Postprandial Blood Glucose with HbA1c in Type 2 Diabetes Patients: A Cross-sectional Retrospective Data Analysis of Indian Data**

J Gopal • S Shah • S Das • CS Dwarakanath • K Dash • RM Manikandan • JP Sai • B Jaganmohan • S Paul • SP Manohar • V Krishna K • KG Seshadri • Apollo Research Group

**Background and Aims** To determine the relative contributions of FBS and PPBS in the determination of HbA1C in Indians.

**Materials and methods** A cross-sectional retrospective data analysis of patients with type 2 diabetes mellitus (T2DM) seen in Apollo Sugar Clinics from January 2017 to December 2018. T2DM patients aged  $\geq 18$  years were analyzed. Patient's demographics and clinical data were selected from electronic medical records. Data were analyzed using descriptive statistics mean (SD) for continuous variable and frequency (percentage) for categorical variable. Statistical tests ANOVA, Pearson's correlation and multiple regression analysis were used to test the results. Statistical significance was set at  $p \leq 0.05$  (2-tailed).

**Results** A total of 3548 patients (Males 2323 (65%) and females 1225 (35%), mean (SD) age 53.6 (11.4) years, duration of disease 8.6 years, body mass index 27 kg/m<sup>2</sup>) were included in the analysis. The mean HbA1c was 8.5%, fasting blood glucose (FBG) 162 mg/dL, postprandial (PPBG) 244 mg/dL. 73% of the patients had uncontrolled diabetes with HbA1c  $> 7\%$ . Majority of them were on oral (67%) antidiabetes drugs, followed by oral+insulin (28.6%), and only 4.2% were on only insulin. Both FBG and PPBG were significantly correlated with HbA1c (0.68 and 0.65;  $p < 0.0001$ ). Further multiple regression analysis using stepwise method showed significant association of FBG and PPBG (independent variables) in prediction of HbA1c (dependent variable) where  $R^2 = 0.509$ , Standardized coefficient FBG is 0.435 (95% CI: 0.013 to 0.015;  $p < 0.001$ ) and PPBG is 0.324 (95% CI: 0.006 to 0.008;  $p < 0.001$ ). However, the contribution of FBG is higher than PPBG at lower HbA1C and the contribution of PPBS was more at HbA1C  $> 11\%$ . The duration of diabetes did not determine the relative contributions of FBS and PPBS to HbA1C.

**Conclusion** Prior studies have shown a significant contribution of PPBS (more than FBS) to HbA1C in Indians, which was noted to be different from the Caucasian data and which has been attributed to the high carbohydrate load in our diet. The current analysis, which includes patients from all parts of India, with varied diets, shows equal contributions of FBS and PPBS to HbA1C.

**PP59****Therapeutic Efficacy of Canagliflozin Versus DPP-4 Inhibitor (Teneligliptin) as Add on Terapy Over Metformin in Type 2 Diabetes**

T Chattopadhyay • S Kundu • BK Murmu

**Background and Aims** To evaluate the efficacy of canagliflozin, a sodium glucose cotransporter 2 inhibitor, compared with teneligliptin in subjects with type 2 diabetes inadequately controlled with metformin.

**Materials and methods** In this 1 year, single blind randomized controlled interventional comparative study, 100 subjects using stable metformin received canagliflozin 100 mg or teneligliptin 20 mg daily. Primary end point was change from baseline in A1C at 52weeks. Secondary end points included change in fasting plasma glucose (FPG) and systolic blood pressure (BP), and percent change in body weight, triglycerides, and LDL cholesterol. Safety was assessed based on adverse event (AE) reports.

**Results** At 52weeks, canagliflozin 100 mg demonstrated superiority to teneligliptin 20 mg in reducing A1C ( $-0.76\%$  and  $-0.64\%$ , respectively;

Greater reductions in FPG, bodyweight, and systolic BP were observed with canagliflozin versus sitagliptin ( $P < 0.001$ ). The incidence of serious AEs and AE-related discontinuations was low for both groups. Higher incidences of genital & urinary tract infections were observed with canagliflozin, which led to one discontinuation. Hypoglycemia rates were similar in both groups.

**Conclusion** This study suggests that canagliflozin may be a better alternative than teneligliptin in view of glycemic control and body weight reduction, but with increased genital infections in subjects with type 2 diabetes using metformin.

**PP60****Profile of auto-antibodies in type-1 diabetes**

M Basu • SA Mondol • S Pramanik • M Banerjee • K Pandit • P Mukherjee • S Ghosh

**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 Anti-GAD 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  $15.37 \pm 4.46$  and mean age of diabetes onset  $8.11 \pm 3.5$ . 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.

**PP61****Circulating Adiponectin Level with Epicardial Adipose Tissue Thickness in Overweight and Obese Patients Presented in A Tertiary Care Hospital**

AM Chakraborty • S Ghosh • C Yadav

**Background and Aims** Epicardial Adipose tissue (EAT) is considered as ectopic fat which is defined as deposition of triglycerides within cells of non-adipose tissue that normally contain only small amounts of fat. There is a potential link between inflammation and macrophage-induced lipolysis in the progression from ectopic lipid-induced insulin resistance to impaired glucose tolerance and thus type 2 diabetes. Epicardial adipose tissue (EAT) which is now considered as endocrine organ, is a potential source of bioactive molecules. Circulating Adiponectin has an anti-

inflammatory and anti-obesogenic property. Adiponectin reduces as obesity and insulin resistance increases. Objective in this study was to assess the circulating Adiponectin level among obese and overweight patients and its relationship with Epicardial Adipose tissue thickness.

**Materials and methods** We studied 74 patients with overweight (BMI  $\geq$  23 Kg/M<sup>2</sup>) and obesity (BMI  $\geq$  25 Kg/M<sup>2</sup>) presented in Obesity and lifestyle diseases clinic of IPGME&R, Kolkata. EAT assessment was done by trans thoracic echocardiography and adiponectin assessment done by Adipogen mouse kit (ACRP 30; Adipo Q).

**Results** Strong negative correlation exists between Adiponectin level and EAT (R: -0.5696;  $p < 0.05$ ). Although Adiponectin level was negatively correlated with PBF (R: -0.5321;  $p < 0.05$ ) and Visceral fat (R: -0.6140;  $p < 0.05$ ), there was no relation with BMI (R: 0.0918;  $p > 0.05$ ).

**Conclusion** Adiponectin is an anti-obesogenic molecule secreted from Adipose tissue and regulate body fat deposition and inflammation. We have shown a strong inverse correlation between circulating Adiponectin level and EAT in this study. Adiponectin level was inversely correlated with PBF and Visceral fat, but BMI as being most frequently used parameters for obesity assessment had no correlation with reduced adiponectin level. Thus, low Adiponectin may be considered detrimental as per as visceral adiposity and ectopic adiposity is concern.

## PP62

### Efficacy of Hydroxychloroquine as add-on Therapy Among Type 2 Diabetes Mellitus Patients Ineptly Controlled on Dual Therapy of Metformin Plus Sulfonylurea

AK Chandra • AP Singh • V Kumar

**Background and Aims** The main aim of the study is to evaluate the efficacy of add-on therapy of hydroxychloroquine (400 mg once daily) among type 2 diabetes mellitus (T2DM) patients inadequately controlled on dual therapy of metformin (MF) plus sulfonylurea (SU).

**Materials and methods** It is a prospective, observational study conducted in 250 patients from the outpatient department of various diabetic clinic located at Patna, Bihar, India. The efficacy of hydroxychloroquine was assessed by measuring the change in the glycated haemoglobin (HbA1c), Fasting Plasma Glucose (FPG), Post Prandial Blood Glucose (PPG) levels at baseline and 48 weeks. The primary endpoint was change in HbA1c levels at 48 weeks as compared to the baseline levels. The secondary endpoints were changes in FPG, PPG levels at 48 weeks as compared to baseline levels. Along with, serum cholesterol, triglycerides (TG), high-density lipoprotein (HDL) and low-density lipoprotein (LDL) levels were measured both at baseline and after 12 weeks. Retinopathy was excluded at baseline for all participant.

**Results** At study end, HbA1c levels were reduced from baseline by 1.2% ( $P = 0.0005$ ). The mean changes in FPG levels from baseline to week 12 were -41.6 mg/dl ( $P \leq 0.0001$ ) and the mean PPG levels were reduced upto 66.7mg/dl ( $P = 0.0003$ ). After 48 weeks of study, the reduction levels of TG, total cholesterol (TC), LDL was -74.3 ( $P = 0.0973$ ), -18 ( $P = 0.0501$ ), 28.6 ( $P \leq 0.0008$ ) mg/dl respectively. There was significant increase in HDL levels 5.3 ( $P \leq 0.0001$ ) mg/dl. No eye had developed any grade of retinopathy or any type of retinal abnormality over 48 weeks.

**Conclusion** Hydroxychloroquine 400 mg provided additional HbA1c lowering to that achieved with MF and SU which was even seen after long duration of treatment. Hydroxychloroquine showed significant changes in HbA1c, HDL, TC, triglyceride levels and significant changes in FPG, PPG and LDL levels. Reduction in HbA1c and plasma lipids slows down the diabetes progression and decreases the risk of microvascular and macrovascular complications

## PP63

### Cardiovascular Risk Factors in T2DM Patients with Microalbuminuria and Macroalbuminuria: Cross Sectional Retrospective Data Analysis from Apollo Sugar Clinics, India

S Shah • NK Narayanan • CS Dwarakanath • S Venkataraman • D Shantharam • U Ayyagari • M Chavan • RM Manikandan • JP Sai • B Jaganmohan • S Das • K Dash • SP Manohar • V Krishna K • KG Seshadri

**Background and Aims** The purpose of this study was to assess 2 major cardiovascular therapeutic targets in T2DM subjects with micro- and macroalbuminuria, at the time of registering a patient in Apollo Sugar Clinic.

**Materials and methods** This is a cross sectional retrospective data analysis of T2DM patients registered at Apollo Sugar Clinics, pan India from May 2018 to May 2019. At Apollo Sugar Clinics, patient's data is captured in electronic medical records for the analysis and to deliver excellent care. T2DM patients with urine albumin creatinine ratio (ACR) data along with demographics and clinical details were included. Patients with UACR data were categorised to normal ACR ( $< 30$ mg/g), microalbuminuria (30-300 mg/g) and macroalbuminuria ( $> 300$ mg/g). In each category two major CV risk factors LDL $> 100$  mg/dl and systolic blood pressure (SBP)  $> 130$  mmHg were assessed. Descriptive statistics were applied to analyse the data.

**Results** Total 2929 T2DM patients were analysed. Mean age was 52 years, 62% were males and 38% were females. The mean HbA1c was 8.6%, FPG was 166 mg/dL, and PPG was 245 mg/dL. SBP  $> 130$  mmHg was observed in 33% patients and LDL  $> 100$ mg/dL was noted in 36% of patients. In the current data patients with microalbuminuria and macroalbuminuria were 43% and 7% respectively, whereas 51% of patients were normoalbuminuric. The mean HbA1c of microalbuminuria and macroalbuminuria group was 8.5% and 9.6% respectively. The CV risk among normoalbuminuria, microalbuminuria and macroalbuminuria patients, with respect to SBP  $> 130$  mmHg was 23% vs 30% vs 42% and; for LDL  $> 100$  mg/dl was 35% vs 22% vs 37%.

**Conclusion** T2DM patients with microalbuminuria and macroalbuminuria, run a higher future CV and renal risk, and require SBP, LDL and HbA1c at targets to minimize the risk progression. Our data analysis demonstrates, one third or more of the high risk patients in general population, are not at therapeutic target for SBP and LDL. Abnormal UACR could be a clinical indicator to intensify ABC management to prevent future micro and macrovascular complications in diabetes patients.

## PP64

### Incidence and Severity of Mental Depression in Diabetic Patients Attending Private Clinic

V Sardesai

**Background and Aims** Diabetes is a major stress for many patients. Management of diabetes with daily routine is perceived as a challenge by most of them. This may lead to mental depression.

To find out incidence of mental depression in diabetic patients attending private clinic. To find out the severity of depression in these patients. To find out the correlation of control of diabetes with incidence and severity of depression

**Materials and methods** 100 consecutive diabetic patients attending private clinic were interviewed using PSQ9 questionnaire for mental depression. The score was calculated. Each patient was examined thoroughly and height, weight, BMI was measured. Fasting and post prandial blood sugar as well as HbA1C values were measured.

**Results** It was found that depression is common in diabetic patients and needs to be dealt with treating physician for proper management



of diabetes. More severe depression is seen with poor control of diabetes.

#### PP65

##### Impact of Calcium Supplementation on Serum Levels of Vitamin B12 and its Tissue Markers in Metformin Treated Type 2 Diabetes Mellitus Patients

P C P • V Ayyar • G Bantwal • B George

**Background and Aims** Metformin is universally recommended and most widely prescribed treatment for individuals with type 2 diabetes mellitus (Type 2 DM). Though Metformin has been associated with the risk of developing vitamin B-12 deficiency since the 1970's, the precise duration of exposure required and the mechanisms of metformin induced B12 deficiency are still debatable.

To compare the effects of calcium and B12 supplementation on Vitamin B12, Homocysteine and Methylmalonic Acid levels in de novo Metformin treated Type 2 DM patients

To assess how early B12 deficiency may develop in de novo Metformin treated Type 2 DM patients.

**Materials and methods** Study included Type 2 Diabetes patients attending Endocrinology OPD in St Johns Medical College & Hospital between January 2017 to November 2018. Among type 2 diabetes patients initiating treatment with metformin, vitamin B12 levels were checked as part of standard of care. Samples for Methylmalonic acid and Homocysteine were collected as "0" sample. All patients received a standard dosage of Metformin 1000 mg/day in two divided doses along with other oral hypoglycemic agents or insulin according to standard of care. One group of patients received only Metformin (Group A), one group received oral Calcium carbonate at a dose of 1.2gm/day as a single dose (Group B) and another group received oral Vitamin B12 (methylcobalamin) at a dose of 500 microgm/day as a single dose (Group C). All patients were followed up after a period of four months. At the end of 4 months, baseline characteristics such as weight, BMI and Blood pressure were recorded. Tests for FBS, PPBS and HbA1c were repeated. Repeat samples for Vitamin B12, Homocysteine and Methylmalonic acid were collected.

**Results** 32 subjects were included in the final analysis among which 10 subjects were in placebo group and 11 subjects each in Calcium and B12 groups. In Placebo group, there was a mean decrease in B12 of 27.6 pg/ml with an increase in MMA of 0.14 micromol/l and Homocysteine of 3.35 micromol/l. There were minimal changes in levels of B12 and metabolites in the group receiving Calcium whereas there was a substantial increase in B12 levels of 146.9 pg/ml and significant decreases of MMA (0.27) and Homocysteine (3.73) in the group receiving B12 supplementation.

**Conclusion** Type 2 DM patients treated with metformin should be closely monitored for B12 status even after short term treatment with metformin. Patients on metformin should be advised to increase their dietary intake of calcium and be prescribed calcium supplements in appropriate situations which may help to prevent vitamin B12 malabsorption

#### PP66

##### Prevalence of Diabetes Mellitus in Stable COPD Patients

A Agarwal • A Mathur • A Jharwal • K Meharada

**Background and Aims** Presence of diabetes mellitus is frequent in COPD which is likely to impact the prognosis. In COPD patients

treatment of diabetes mellitus may reduce pulmonary infections and exacerbations. To find out prevalence of diabetes mellitus in COPD patients and to correlate these with COPD related factors like severity, BMI etc.

**Materials and methods** The study was carried out in 77 stable COPD patients attending the department of Medicine at SMS Hospital Jaipur rajasthan, India in March 2018- December 2018 .The blood sugar of the patients was assessed and patients were classified according to severity of disease and their blood sugar level. Correlation of blood sugar with severity of COPD was done.

**Results** 10.4% and 14.3% patients were diabetics and prediabetics respectively. There was positive correlations between fasting blood sugar (FBS) and smoking index (SI), body mass index (BMI), total duration of illness (TDI), severity of disease, exacerbation. None of them were statistically significant

**Conclusion** The majority of diabetics & prediabetics had moderate COPD. Fasting blood sugar increased with increase in age, smoking index (SI), body mass index (BMI), total duration of illness, severity of disease, exacerbation of COPD.

Keywords: COPD, DM, BMI, SI

#### PP67

##### Cutaneous Manifestations in Diabetic Patients and its Correlation with HbA1c Level

V Soni • A Chaurasia • R Pandey

**Background and Aims** Long standing Diabetes Mellitus(DM) leads to permanent and irreversible functional damage in cells of the body,which may be a cause for various complications. Skin changes mostly appear later to DM but may be the first clinical presenting sign or even precede the diagnosis by many years. To see the association of skin manifestations with HbA1c in diabetes patients

**Materials and methods** 300 known case of diabetic patient were taken and After taking the informed consent, demographic details, duration of diabetes, mode of treatment for diabetes, and glycemic profile were documented. Complete history and examination of all the patients with regards to onset of cutaneous manifestations was taken.

**Results** 300 patients (45.7% male and 54.3% female), mean age was 53 + 10.2 years and mean duration of diabetes 7.1 + 4 years. Mean HbA1c was 8.7 + 2.7 with 68.7% patients having poor glycemic control. Most frequently observed skin disease was bacterial infections (24%), followed by fungal infections (22.7%), acanthosis nigricans (20.4%), diabetic foot (13.7%), nail changes (6.6%), acrochordons (12%), necrobiosis lipoidica (7.8%), viral infections (4.7%) pruritus (9%) and xanthelasma (6.2%). There was significant association of unsatisfactory glycemic control with bacterial (p = 0.013) fungal (p = 0.005) and viral infection (0.045). Females especially had a higher frequency of acanthosis nigricans (p = 0.048) and acrochordons (0.037).

**Conclusion** Patients with type 2 DM have high frequency of infections especially bacterial and fungal. Other manifestations like acanthosis nigricans and diabetic foot are comparatively less common.

#### PP68

##### Assessment of Microvascular Complications in Type 2 Diabetes Mellitus Patients With Special Reference to Hba1c and Platelet Indices(MPV)

A yadav • P Nigam • BB Yadav

**Background and Aims** Diabetes mellitus (DM) is not a single disease entity but rather a group of metabolic disorders sharing

the common underlying features of hyperglycemia. Platelet volume, a marker of the platelet function and activation, the higher the MPV, the larger and younger the platelets are and more is the risk for thrombosis and are associated with increased risk for hyperglycemic complications. To assess correlation of microvascular complications in T2DM patients with special reference to HbA1c and platelet indices (MPV)

**Materials and methods** This cross-sectional analytical study was carried out in our institution for duration of 1 year. Detailed clinical and demographic profile including duration of diabetes and presence of microvascular complications was noted. The data was analysed using SPSS Version 16.

**Results** MPV is significantly higher in patients with poor glycemic control (HbA1c >7) and presence of microvascular complications in comparison to patients with good glycemic control (HbA1c ≤7) and absence of microvascular complications (p value is <0.05 which is highly significant).

**Conclusion** Our study showed significantly higher MPV values in poor glycemic control group patients with presence of microvascular complications. Hence MPV can be used as a simple and cost-effective indicator for the glycemic control and microvascular complications in T2DM patients.

#### PP69

##### Assessment for the Measures for Peripheral Arterial Disease, Nephropathy and Dyslipidemia in Type 2 Diabetes: Evidence from the Comprehensive Care Program

Rs M Rohtagi • S Ghodke • D Alfred

**Background and Aims** Type 2 Diabetes (T2DM) is a major risk factor of peripheral artery disease (PAD), leading to increased morbidity and mortality as well as an accelerated disease course. Microalbuminuria is an indicator for overt nephropathy and early cardiovascular disease

**Materials and methods** We analysed the data from the patients attending a single center (n=100) advanced diabetes care centre delivering a comprehensive care approach, who had any of the values beyond the normal targets, for either of HbA1c, LDL-C, Ankle Brachial Index (ABI), Toe Brachial Index (TBI) or Albumin Creatinine Ratio (ACR). The percentage of patients achieving the target values were classified as ATV (Achievers for the Target Value). Descriptive statistics was used for the analysis

**Results** A total of 100 patients (53 males, 47 females) were evaluated for the glycemic and non-glycemic parameters (lipid profile, ABI, TBI, UACR). The mean age was 52 years (minimum 20, maximum 78, SD ± 12, 95% CI 50 to 54). The mean duration of the diabetes was 7.3 years (minimum 0.1, maximum 30, SD ± 5.7, 95% CI 6.2 to 8.4). The mean HbA1c was 8.7 % (minimum 5.3, maximum 15, SD ± 2.1, 95% CI 8.3 to 9.1). 4 patients reported macroalbuminuria (ACR > 300) and 36 patients had microalbuminuria (ACR 30-300). The HbA1c and non-glycemic measures as a marker for comprehensive diabetes care are depicted in the table

**Conclusion** The achievement of the TBI (left side) was the most compromised for just 8 % of the patients within the desired values, followed by TBI (right side) within the normal values in 21% of the patients and HbA1c of < 7 was not achieved by 77% of the patients. The highest proportion of ATV were for the ABI value (76%). The analysis of our comprehensive care approach complements the clinical decision-making tool to allocate the resources to intervene early to minimise the complications of diabetes and improve outcomes

#### PP70

##### Standardization and Efficacy of Polyherbal Formulation on Lipid Profile in Type 2 Diabetes Mellitus (T2DM) Patients

I Mukherjee • N Verma

**Background and Aims** To assess the efficacy of a polyherbal formulation on lipid profile and other biochemical parameters such as glucose level HbA1c, LFT, KFT and hypoglycaemic activity of the formulation in T2DM patients

**Materials and methods** Six individual herbs of *Berberis aristata*, *Cedrus deodara*, *Cyperus rotundus*, *Embllica officinalis*, *Terminalia chebula* and *Terminalia berllirica* were used for making PHF. Newly diagnosed T2DM patients as per ADA diagnostic criteria and screened for inclusion and exclusion criteria. Total of 194 patients were randomly allocated to PHF with metformin group (n=98) and metformin only treatment group (n=96). Initially 1 gm of the PHF and 500 mg of Metformin was chosen as starting dose which was increased to 3 gm per day for PHF. After a follow-up period of 6 months the results were analysed.

**Results** A significant reduction in total cholesterol, p-value <0.0001; triglyceride, p-value <0.0001; LDL-cholesterol, p-value 0.008 and VLDL-cholesterol, p-value 0.016 was observed in PHF with metformin group in comparison to metformin only treatment group. Fasting and Post prandial blood glucose level decreased in both the groups but the % reduction in FBG was greater in group 2 with metformin (31.46%) than group 1 with PHF (25.52%)

**Conclusion** No significant difference was observed with liver enzymes and bilirubin between the 2 groups in LFT.

#### PP71

##### Comparison of Measurement of Ankle-Brachial Pressure Index by Oscillometric and Hand Held Doppler Method

AR Pande • D Kumar • S Chaudhary

**Background and Aims** Peripheral artery disease (PAD) is a common macrovascular complication of diabetes mellitus. Ankle-brachial index (ABI) is an easy and non-invasive test useful in the diagnosis of peripheral arterial disease (PAD). The objective of this study was to compare two devices, Diabetik Minilab and Omron VP-1000 plus, for measurement of ankle-brachial pressure index.

**Materials and methods** In this study, 59 patients with diabetes were enrolled. Ankle-brachial Index were measured using Diabetik Minilab (hand held Doppler) and Omron VP-1000 plus (oscillometric method). To compare the test results with the two devices Chi-Square Test was used for statistical analysis.

**Results** There were 52 individual were patient of diabetes and 7 without diabetes. Average age of the patients was 50.37 years (range 17–81 years). There were 57.6% male patients. There were 17.3% of patients with neuropathy and 1.9% of the patients had cases had nephropathy and retinopathy. It was found that 94.9% of patients had 1.0 – 1.4 (normal) ankle brachial index by using Omron VP-1000 plus on the right side which was comparable to the 96.4% found using Diabetik Minilab. Similar results were also observed on the left side. This difference between the results observed by the two devices was not statistically significant. On Bland-Altman plot there was strong correlation between the 2 method

**Conclusion** The two devices Diabetik Minilab and Omron VP-1000 plus were not found to be significantly different in the measurement of ABI. Omron VP-1000 plus is reliable less time consuming method of measurement of ABI

## PP72

**Oxygen Uptake Responses (VO<sub>2</sub> Max) in Type 2 Diabetes Mellitus (T2DM) and Healthy Individuals Using Cardiopulmonary Exercise Testing.**

A Joshi • R Shinde • A Page • S Shinde

**Background and Aims** To study the exercise capacity in healthy individuals and T2DM patients using advanced VO<sub>2</sub> max direct measurement checked during cardiopulmonary exercise test (CPET), as against using formulae and nomograms. It has been reported that Patients with T2DM have decreased maximal Oxygen consumption (VO<sub>2</sub> Max) and slowed oxygen uptake kinetics as compared to healthy individuals

**Materials and methods** A total of 10 healthy adults of age 30 to 47 years (mean 38.3 years) 8 males and 2 females with average BMI of 23.17 kg/m<sup>2</sup> compared to 10 diabetes patients of age 30 to 69 years (mean age 49.5 years) 7 males and 3 females with average BMI of 28.35 kg/m<sup>2</sup>. Subjects underwent CPET using bicycle ergometer - Schillar CS-200 and Ganshorn PowerCube Ergo Software to obtain VO<sub>2</sub> max.

**Results** Healthy subjects had VO<sub>2</sub> max readings from minimum 15.17 ml/kg/min to maximum 51.8 ml/kg/min with mean value of 28.63 ml/kg/min. T2DM patients had VO<sub>2</sub> max readings from minimum 7.84 ml/kg/min to maximum 25.7 ml/kg/min with mean value of 14.05 ml/kg/min. The difference between the two groups is statistically significant with p value 0.002159 (< 0.05)

**Conclusion** Reduced exercise capacity is noted in patients of T2DM as compared to healthy individuals. The difference is statistically significant. Endothelial dysfunction leads to reduction in maximum oxygen consumption capacity. Exercise training and therapies targeted to improve insulin sensitivity improve physical fitness in patients with T2DM. Early intervention to reduce oxidative stress, endothelial dysfunction, peripheral muscle dysfunction and cardiac dysfunction helps in improving the exercise capacity and VO<sub>2</sub> max values in T2DM. VO<sub>2</sub> max should be recommended early in T2DM, prediabetics, first degree relatives of known diabetics and patients suffering from polycystic ovarian syndrome as well.

## PP73

**Comparison Of Lipid Parameters Among GDM And Non GDM Pregnant Women - A Hospital Based Study**

J Menaka

**Background and Aims** Altered maternal lipid metabolism is common in pregnancy. In women with GDM physiological changes in insulin resistance and lipid levels are exaggerated during pregnancy, leading to significant alterations in lipid levels. Comparison of lipid parameters among pregnant women with and without diabetes.

**Materials and methods** A hospital based case control study was done in the Institute of Diabetology, Rajiv Gandhi Govt. General Hospital, Chennai, with sample size of 100 pregnant women. 50 cases of GDM (confirmed by OGCT) and 50 controls (non GDM cases) pregnant women were included in the study. The study period was 6 months. Mean age of presentation of women was 20-32 yrs. Ethical committee clearance was obtained and consent from control and cases were taken. Fasting lipid profile was estimated. Parameters obtained were statistically analyzed.

**Results** There was no statistical difference in age and parity between control and case group. Triglyceride (cases- 251.14±105.65 mg/dl) (controls-146.82±25.46mg/dl), total cholesterol (cases-228.22±53.05 mg/dl) (controls -161.18±21.53mg/dl), VLDL (cases-57.90±14.63 mg/dl) (controls-29.44±4.94mg/dl), LDL (cases-115.46±

52.96) (controls-98.28±21.3) showed statistically significant values (p value<0.01). HDL values did not show any statistical significance (p value >0.05) among GDM and non GDM group. Lipid profile was performed predominately in women in II trimester

**Conclusion** Serum triglyceride, total cholesterol, VLDL & LDL levels are significantly higher among women with GDM. Mothers with GDM have poor metabolic control in addition to glucose intolerance which leads to metabolic complications.

## PP74

**EFFECT OF INTRAVITREAL BEVACIZUMAB COMBINED WITH MACULAR LASER IN A CASE OF PROLIFERATIVE DIABETIC RETINOPATHY WITH CLINICALLY SIGNIFICANT MACULAR EDEMA**

P Mathur • R Porwal • S Nainiwal • N Mathur

**Background and Aims** A 50 year old female known case of T2diabetes mellitus of 8years and recently diagnosed hypertension came to the opd with the complaint of diminution of vision in both eyes.(re>le). BCVA in re was fc3mt and BCVA in left eye was6/36. Intraocular pressure was within normal limits in both eyes. Fundus fluorescein angiography in both eyes shows proliferative diabetic retinopathy with clinically significant macular edema. On optical coherence topography patient showed increased macular thickness in both eyes. Patient then had one dose of intravitreal bevacizumab(Anti VEGF)1.25 mg in 0.1ml injection . patient underwent followup at 15days, 1 month,2months and 3months. Macular thickness by oct , BCVA ,fundus examination and iop monitoring was done at followups. Patient underwent macular laser in both eyes at the end of 2nd month. At the end of 3 months there was a significant reduction in the macular thickness, improvement in BCVA from fc 3mt to fc5mt in right eye and from 6/36 to 6/18 in left eye. Iop remained normal after the intervention.

**Conclusion** combined approach of macular laser with intravitreal antiVEGF(bevacizumab) for achieving better clinical outcome compared to single therapy alone.

## PP75

**Assessment of Gonadal Functions in Women with Subclinical Hypothyroidism in Western UP**

A Tiwari • M Srivastav

**Background and Aims** In females, hypothyroidism can cause menstrual disturbances mainly oligomenorrhea. Thyroid dysfunction has also been linked to reduced fertility and pregnancy complications. Several studies have been done to evaluate gonadal dysfunctions in overt hypothyroidism but very few studies are there regarding subclinical hypothyroidism. Present study evaluates the gonadal functions of women with subclinical hypothyroidism. To assess the basal gonadotropin and estradiol levels in women of reproductive age group with subclinical hypothyroidism and compare them with euthyroid controls.

**Materials and methods** 20 females of age 18 to 35 years with newly diagnosed subclinical hypothyroidism were taken as cases and 20 age and body mass index (BMI) matched healthy females were taken as controls. Both in cases and controls, basal FSH, LH, estradiol were measured on 3rd or 4th day of menstrual cycle at 8 AM on fasting. Thereafter Leuprolide 20mcg/kg was given subcutaneously on the same day. 1hour after injection, LH and

estradiol were measured. Basal and stimulated values were compared between both groups

**Results** Basal LH was significantly higher in controls ( $6.63 \pm 2.38$  m IU/ml) when compared to cases ( $6.06 \pm 2.10$  m IU) with a P value 0.01 ( $<0.05$ ). No significant differences were found between stimulated LH and estradiol in both the groups.

**Conclusion** To conclude, in mild thyroidal failure the response of pituitary gonadotrophs to leuprolide is normal in contrast to overt hypothyroidism where the response is sluggish. This is the first study to be done in subclinical hypothyroid subjects to assess both basal and stimulated gonadotropin levels. Further studies are required in large samples to confirm these findings.

#### PP76

##### **Demonstrating How Use of Ambulatory Glucose Profile Reveals Underlying Issues in Diabetes and Helps to Formulate Individualized Treatment in a Patient With T2DM'**

DS Mohan

**Background and Aims** Utilizing Ambulatory Glucose profile in patient with Diabetes to reveal underlying issues to help formulate an appropriate treatment plan for the patient with Type 2 Diabetes. A 62-year male, with diabetes/hypertension and Hypertrophic non-obstructive cardiomyopathy for 15 years on treatment, presented to clinic with Fasting blood sugar (FBS) 130 mg/dl; Post-prandial (PPBS) 198 mg/dl and an HbA1c of 7.2. For last 8 months, patient persistently had near normal FBS and A1c with slightly deranged PPBS. Patient mentioned discordance between his reports and feeling of being unwell. Medications comprised of Metformin, Glimepiride and Insulins – Aspart & Glargine which were titrated from time to time. There was a gap in understanding the cause of the discordance.

**Materials and methods** Patient was initiated on the CGM – FreeStyle Libre Pro to evaluate his glycaemic profile. Patient was asked to report after 14 days. He was advised to continue his normal lifestyle and medication and record every symptom that he experienced during the two weeks of wearing CGM. Patient reported after 14 days for his sensor removal and CGM report was downloaded to study his glycaemic profile.

**Results** The CGM recorded the data in various formats for the 14 days. The Ambulatory Glucose profile clearly showcased early morning hypoglycaemia roughly between 4:00am to 8:00am. This was followed by the post-breakfast rise in glucose values that then remained persistently high not returning to baseline. Lunch intake led to worsened hyperglycaemia in the second half of the day continuing till early morning 2:00am. These findings were consistent with daily summary profiles of the CGM report. Despite of his A1c being 7.2 his actual time in target as per CGM report was only 40%; 50% time being above target which is alarming and needs intervention. The patient was under the impression of having a decent diabetes control with good FBS/A1c which was contradictory to the rest of the day which was spent in hyperglycaemia – major burden of glycaemic exposure. This could never have been covered with FBS/PPBS or HbA1c.

**Conclusion** Ambulatory Glucose Profile using CGM revealed underlying hyperglycaemia in the second half of the day and undetected hypoglycaemia in the first half in a patient with otherwise appearing controlled T2DM. This picture of his glycaemic profile helped diagnose the issues in the patient enabling formulation of an appropriate treatment plan which targets improvement in his time in Target. This shall be further evaluated with another repeat CGM/ AGP as the interventional tool.

#### PP77

##### **Demonstration of Significant Improvement in Glycaemic Control in a Patient with T2DM Using the CGM Tool - A Case Report**

L Purohit • S Purohit • K Shah

**Background and Aims** To target better glucose control in a patient with uncontrolled T2DM via interventions guided by using Continuous Glucose Monitoring (CGM) tool. A 61-year-old, with 10 years history of diabetes, presented to clinic with an HbA1c of 12.8 and Mean Glucose 321 mg/dl. Medications comprised of a sulfonylurea, minimal dose of DPP4. Inhibitor and metformin. Despite of attempting discipline in meal timings, compliance in medications, and optimal physical activity as advised, she was unable to achieve optimal glycaemic control and complained of giddiness and feeling unwell.

**Materials and methods** During her first visit, patient was initiated on CGM to study her glycaemic profile in detail. The Diagnostic AGP was evaluated to find significant post-meal hyperglycaemias, more pronounced in the second half of the day. The daily summary in the CGM report was co-related with the patient's history to get to the cause of the glucose fluctuations. Interventions were made accordingly in her treatment to target optimal glycaemic control. Sulfonylurea was stopped; DPP4-Inhibitor was replaced with another potent DPP4-Inhibitor and metformin was continued. Patient continued medicinal and lifestyle advice for almost a year with improvement in her overall well-being. An interventional AGP was initiated to record the response to therapy advised.

**Results** The interventional AGP showcased clear reduction in post-meal peaks with significant reduction in glucose exposure. On comparing the two AGPs, there was significant improvement of Time in Target from 18% to 75%; reduction of Time above Target from 82% to 22%, with average glucose improving from 181 mg/dl to 118mg/dl. These report findings were consistent with the haematological profile of the patient; HbA1c reduced to 5.9 from 12.8; mean glucose reduced to 123 mg/dl from 321 mg/dl; Fasting glucose reduced from 214 mg/dl to 68 mg/dl. Patient also recorded a significant overall improvement in the feeling of well-being.

**Conclusion** CGM used appropriately helped devise an apt treatment strategy for the patient with uncontrolled T2DM and demonstrated significant improvement as a response to therapy over a period of time.

#### PP78

##### **Diabetic Ketoacidosis As An Initial Presentation Of Scrub Typhus**

S Gupta • SP Dalai

**Background and Aims** A 40 year old male presented with complaints of high grade fever, tachypnea for last 8 days and altered sensorium for last 1 day. Patient is a known diabetic for 7 years, irregularly on OHA and insulin. His blood glucose at presentation was 454mg/dl. Serum lactate :6.3mmol/l, pH: 7.04, Bicarbonate: 14, serum osmolarity:295mosm/kg, ketone bodies were positive which was suggestive of diabetic ketoacidosis(DKA). On physical examination a macular rash with a typical eschar was noted on the left flank [fig.1]. A clinical diagnosis of Scrub Typhus, T2DM with DKA was made. Patient received aggressive fluid therapy, I.V and subcutaneous Insulin and Inj. Doxycycline following which his mental status and clinical symptoms improved within 48 hours. Lab investigations revealed normal CBC, RFT, a mildly deranged LFT, HbA1c of 9.8%. IgM ELISA for Scrub Typhus was positive (OD=2.84).

Results of urine and blood culture were negative. Chest Xray and ultrasound revealed no abnormality. He was discharged 7 days after admission on OHA (Metformin and Vidalaglipitin), Regular Insulin and oral Doxycycline. Patient was afebrile at follow up after 14 days of discharge. At follow up after 2 months HbA1c level was 7.5%.

**Materials and methods** Three cases of Scrub Typhus complicated by DKA have previously been reported [1]. Our patient, a Type 2 diabetic for last 7 years clinically diagnosed as a case of acute Scrub Typhus based on fever and eschar which was later confirmed by IgM Scrub Typhus presented with DKA

**Results** The onset of Scrub Typhus in this non compliant patient leading to respiratory distress might be the precipitating factor for DKA. Acute Scrub Typhus might be considered as a precipitating factor for DKA especially in endemic areas during monsoon season [2].

## PP79

### Pulmonary Functions in Patients with Type 2 Diabetes Mellitus Attending Tertiary Care Centre in Central India

B Katyal • S Dube

**Background and Aims** To assess pulmonary functions in patients with type 2 diabetes mellitus (T2DM). To correlate pulmonary function tests (PFT) with duration of diabetes, glycemic control (HbA1c), BMI and waist hip ratio.

**Materials and methods** Fifty T2DM patients of age group 18–60 years were included in the study. Patients with acute or chronic complications due to diabetes, smokers, patients with acute or chronic respiratory illness or cardiovascular diseases, tobacco consumers and on medications which can alter PFT were excluded from the study. Subjects underwent screening tests to exclude any illness compromising PFT. Pulmonary functions were measured by the electronic spirometer, model-RMS Helios-702 in accordance with the standards of lung function testing of the American Thoracic Society/European Respiratory Society (ATS/ERS). PFT report included patient's gender, height, weight, age and smoking status. Standard spirometric measures included, forced vital capacity (FVC), forced expiratory volume in one second FEV1, FEV1/FVC, forced expiratory flow rates and peak expiratory flow rate (PEFR). The pulmonary functions were then correlated with extent of diabetes, glycemic control (HbA1c), BMI and waist hip ratio.

**Results** Fifty patients with T2DM were enrolled in the study and PFT of 46 patients was analyzed. Mean age 49±11 years; M:F::35:11. PFT of 50% of studied T2DM patients depicts compromised lung functions in the form of obstructive, restrictive as well as early small airway disease pattern with predominance of restrictive patterns in these patients.

**Conclusion** Thus, it is concluded that there is some form of involvement of lungs in patients with T2DM with increasing duration of disease and poor glycemic control. Hence evaluation of pulmonary functions with non invasive methods like spirometry should be considered in these patients as an early diagnostic sign of diabetic complications.

## PP80

### Echocardiographic Evaluation of Diastolic Dysfunction in Normotensive Type 2 DM

P Kaur • VK Goyal • S Saini • A Baweja

**Background and Aims** Diabetes has structural myocardial involvement termed “DM Cardiomyopathy” which can be detected early with the help of echocardiography. To study the prevalence of diastolic dysfunction and heart failure in normotensive diabetic patients with the help of

echocardiography. Echocardiographic assessment of left ventricular functional and structural abnormalities in normotensive and cardiac asymptomatic Type 2 DM patients. To assess the relationship between duration of DM and development of LV structural and functional abnormalities.

**Materials and methods** A cross sectional study with 48 normotensive type II DM patients was carried out. 48 Healthy normotensive controls were selected for comparison. Patients and controls aged >60 yrs who had hypertension, history of CHF or renal failure or ischemic or valvular heart disease were excluded. Patients were evaluated by 2D and Doppler Echocardiography to assess ejection fraction, LV mass and LV diastolic dysfunction.

**Results** 48 patients (20 males and 28 females) and 48 healthy controls (21 males and 27 females) were enrolled. Mean age of patients was 50.76 ± 8.13 years and 51.33 ± 6.84 years for controls. Mean ejection fraction was 60.4% ± 7.47% and 60.52% ± 7.94% in patients and controls. Seven (14.58%) patients had ejection fraction less than 55% compared to three (6.25%) in controls. Impaired diastolic function was found in 31 patients 64.58% of patients compared to 14 patients 2.9% of controls Left ventricular mass index of 0.99 kg/m<sup>2</sup> in females and 0.115 kg/m<sup>2</sup> in males was considered abnormal. The left ventricular mass index was also higher in patients than in controls (95.17 ± 25.67 g/m<sup>2</sup> versus 85.40 ± 18.0 g/m<sup>2</sup>).

**Conclusion** Left ventricular diastolic dysfunction is prevalent among Type 2 DM patients without symptomatic heart disease

Keywords : Type II DM, diastolic dysfunction, echocardiography

## PP81

### Correlation of Fasting Serum Magnesium with Glycemic and Nephropathy Status in Type 2 Diabetes Mellitus

A Dhanawat • L Mohanty • AP Mohanty

**Background and Aims** Hypomagnesemia causes defective insulin receptor phosphorylation leading to insulin resistance. Oxidative stress is responsible for progression of diabetic nephropathy and it reduces Transient Receptor Potential Melastatin 6 (TRPM6) activity which is responsible for decreased magnesium reabsorption from the renal tubules. The aim of our study was to estimate fasting serum magnesium levels in T2DM patients and to correlate it with glycemic and nephropathy status.

**Materials and methods** It was a cross-sectional study conducted at KIMS, Bhubaneswar between October 2017 to September 2019 which included a total of 187 T2DM patients. Correlation of serum magnesium with HbA1c and Urine ACR was calculated using Pearson Correlation Coefficient test.

**Results** Forty-nine (26.2%) patients were found to have hypomagnesemia. In the poor glycemic status group, 30% of patients had hypomagnesemia as compared to 26% in the intermediate and 19% in the good glycemic status group. The mean serum magnesium levels in poor, intermediate and good glycemic status groups were 1.86 ± 0.32, 1.90 ± 0.41 and 1.95 ± 0.30 mg/dL respectively which was statistically significant (p=0.046). In the macroalbuminuria group, 41.3% patients had hypomagnesemia as compared to 17.6% in the micro-albuminuria group and 4.5% in the non-nephropathy group. The mean serum magnesium levels in macroalbuminuria, microalbuminuria and non-nephropathy groups were 1.75 ± 0.34, 1.98 ± 0.33 and 2.05 ± 0.20 mg/dL respectively which was statistically significant (p<0.0001). There was a negative correlation between serum magnesium and HbA1c (r=-0.04, p=0.62) and urine ACR (r=-0.17, p=0.02).

**Conclusion** There was a weak negative correlation between serum magnesium and HbA1c but it was not statistically significant. There was a negative correlation between serum magnesium and

urine ACR which was statistically significant. Further studies on oral supplementation of magnesium on improving the glycaemic status would help delineate role of magnesium in diabetic patients

## PP82

### Co-relation of Obesity with Serum 25 Hydroxy-vitamin D3 Levels in Type 2 Diabetic Patients

M Nawal • A Samaria

**Background and Aims** Hypovitaminosis D is associated with diabetes mellitus (DM). Aim of our study was to determine the relation of obesity with vitamin D levels in type 2 diabetic patients

**Materials and methods** We examined 100 type 2 diabetic patients and made a correlation analysis in all parameters. Then we classified our diabetics according to their body-mass indices and compared their 25 hydroxy vitamin D3 levels.

**Results** We found negative correlation between 25OH D and body mass index (BMI) (P: <0.001, r: -0.23). When we classified our diabetics according to their body mass indices as normal, overweight and obese, and compared their 25 hydroxy vitamin D3 levels, we determined that in every BMI group 25 hydroxy vitamin D levels were not found to be significantly different.

**Conclusion** These results suggest that at least in an Indian population with type 2 DM vitamin D levels are low and correlate with BMI, but when vitamin D levels are so low, as obesity worsens vitamin D levels does not lessen.

## PP83

### Utilization of CGM to Target Improvement in Glycaemic Control in a Patient with Uncontrolled T2DM -A Case Report

KK Kumar • S Kumar

**Background and Aims** To target improvement in glucose control in a patient with uncontrolled T2DM via insights generated from the Ambulatory Glucose Profile and other reports generated by the Continuous Glucose Monitoring (CGM) tool. A 61 year old gentleman with history of Type II Diabetes Mellitus for the past 10 years presented to our clinic with persistent hyperglycemia. His current HbA1C was 12.8 % and the Mean Glucose was 321 mg/dl. His medication comprised of 1g metformin, 4 mg Glimiperide and multiple injections of rapid acting insulin. The patient complained of progressive weakness and tiredness along with significant weight loss. His major concern was failure to control his disease despite regular exercise, medication and Insulin. He was fearful of hypoglycemia and wished to reduce the number of pricks.

**Materials and methods** After going through the detailed history of the patient, he was initiated on AGP to look for actual concerns in his glycaemic profile in detail. The graph showed hyperglycaemias throughout the day, with an average glucose reading above 376 mg/dl with constant persistent hyperglycemia with time above target being 100%.

The patient's diet and exercise regime was reviewed and he was appropriately counselled. He was initiated on Inj Degludec 10 units per day in addition to existing medication. He visited the clinic on alternate days and was scanned for the readings and appropriate changes were made in his treatment as and when required in order to target optimal glycaemic control. A DPP-4i (Linagliptin 5 mg) was added on day 4. The multiple injections of rapid acting insulin were gradually reduced and ultimately stopped on day 7.

**Results** The patient's AGP report showcases clear reduction in hyperglycaemia from Day 4 to Day 14 with significant reduction in the

area under the median curve that signifies the glucose exposure. There was a significant improvement of Time in Target from approx. 0% to 24% between the week 1 and week 2; similar benefits also being duplicated in Time above Target from 100% to 76%. There was no significant hypoglycaemia throughout the study (Time below Target 0%). Mean Glucose improved from 376 mg/dl to 156 mg/dl. Patient reported significant overall improvement in the feeling of well-being together with the satisfaction of reducing multiple insulin injections to a single injection per day. On further follow-up after 4 months, the patient continues to exhibit improved control with his HbA1c coming down to 7.1% from 12.8%.

**Conclusion** AGP gives a clear insight into glucose trends, diurnal variability and post-meal glucose excursions. By using AGP, we can unmask underlying issues posing hurdles to optimal glycaemic control in an uncontrolled T2DM. It helps in precise and appropriate meal planning and treatment strategy and may well emerge as a useful and valuable tool for treatment strategies in Diabetes

## PP84

### Estimation of the Prevalence and Risk Factors of Diabetes Mellitus in the Rural Population of Rajasthan

V Saini • SP Sharma

**Background and Aims** To estimate the prevalence and risk factors of diabetes among rural population. The assessment of the prevalence and risk factors of diabetes mellitus and assessing the usefulness of the Indian diabetes risk score in the detection of undiagnosed cases of diabetes mellitus in a rural village of Jaipur, Rajasthan.

**Materials and methods** The study was conducted at a village in Jaipur district, Rajasthan, India. A total of 4556 subjects were screened using the Indian diabetes risk score criteria (IDRS)

**Results** Out of the 4556 subjects screened, 2410 (53%) were males and 2145 (47%) were females, in the age range of 18 - 55 yrs. 32 % subjects had education upto graduate level or more, 36% had higher secondary, 23 % upto secondary and 9% were illiterate. 2505 (55%) belonged to middle section, 5% to the higher sections and 40% were from economically weaker sections of the society. Majority of them 3916 (86%) were involved in mild to moderate physical activity. 456 (10 %) had family history of diabetes mellitus. 1641 (36%) were in the overweight category (>25 BMI) and 71% of them had high diabetic risk score. Prevalence of diabetes in present study was 9.8% and out of these 77% were known cases of diabetes mellitus with high (>60) IDRS. Significant association (pvalue < .005) was seen between high BMI and IDRS.

**Conclusion** The study thus states the usefulness of Indian diabetes risk score criteria in the identification of undiagnosed high-risk diabetic subjects and establishes its association with risk factors for developing diabetes. IDRS should be used as an inexpensive and indispensable tool of mass screening camps.

## PP85

### Efficacy and Safety of Sitagliptin in Patients of Type 2 Diabetes When Added to Insulin Therapy Alone or in Combination With Metformin

S Singh • DP Singh • SS Singh • AK Srivastava

**Background and Aims** Sitagliptin and insulin have complementary effect on fasting and postprandial glucose control. Thus the present study evaluates the efficacy and safety of sitagliptin, when added to regimens of stable ongoing insulin therapy with or without metformin in patients of type 2 Diabetes Mellitus. Patients included were > 21 yrs age. Body mass index (BMI) > 20kg/m<sup>2</sup>, taking insulin (>15U/day) alone or with metformin (>1500 mg/day) and

had inadequate control (HbA1c 7.5–11%). Patients of type 1 DM, FPG < 130mg. Cardiac disease. Hepatic and renal impairment were excluded. Screened eligible inadequately controlled patients continued their current insulin ± metformin regimen and entered a two weeks, single blind placebo run in period, which is followed by baseline measurements and then randomized. Metformin and insulin dose remained stable throughout the study. Primary endpoint was HbA1c change from baseline, at six months. Out of 910 insulin treated patients screened, a total of 468 randomized to either once daily sitagliptin 100mg (n=236) or in placebo (n=232) group for 6 months. Mean baseline characteristics were similar between sitagliptin and placebo groups, including HbA1c (8.5 Vs 8.4), diabetes duration (11 Vs 10 yrs), BMI (30.8 Vs 31.2 kg/m<sup>2</sup>), total daily insulin dose (48 Vs 50 IU) respectively. Addition of sitagliptin significantly (p<0.001) reduced HbA1c by 0.8% compared with placebo

(0.0%). A greater portion of proportion of patients achieved HbA1c level < 7% while randomized to sitagliptin as compared with placebo (12 Vs 5% respectively; p<0.001). Similar HbA1c reduction were observed in patients strata defined by type of insulin (long acting, intermediate acting or premixed) and by baseline metformin treatment. Addition of sitagliptin significantly (p<0.001) reduced FPG by 18 mg/dl (1.0m mol/l) and 2 hour post meal glucose by 39.7 mg/dl (2.2 m mol/l) relative to placebo. Higher incidence of adverse experiences was observed with sitagliptin (56%) compared to placebo (42%) mainly due to increased incidence of mild hypoglycaemia (sitagliptin 18% Vs placebo 8%). When sitagliptin was added to ongoing, stable dose insulin therapy with or without concomitant metformin it improved Glycaemic control and was well tolerated in patients with type 2 diabetes.

## VISION STATEMENT

To be recognized as a global leader for clinical care, education, training, research, advocacy and capacity building in the field of diabetes.

## MISSION STATEMENT

1. Promotion of excellence in diabetes care to make India the Diabetes Care Capital
2. Empowerment of persons living with diabetes
3. Support for diabetes research
4. Dissemination of information and knowledge in diabetes care
5. Advocacy for the cause of diabetology

## RSSDI Research Grants

- For providing research grants, RSSDI invites proposals from Indian scientists, interested in conducting original research in the field of diabetes mellitus. Furthermore, limited grants are also available for the students of medical colleges for smaller projects.
- There is no deadline for submission of the proposals, which can be sent throughout the year. These proposals may fall into one of the following three categories:
  1. Projects involving funding up to Rs 40,000 per project (preference will be given to young scientists <40 years).
  2. Projects involving funding up to 10 lakhs.
  3. We also invite proposals for more than 10 Lakhs as major projects but these have to be preferably multicentric.
- The detailed proposals should include the following:
  - ◇ Title, names of principal and co-investigators, summary, introduction/background, review of literature, aims, methodology, study design, and detailed plan of work and bibliography. Brief biodata of principal investigator and other co-investigators
  - ◇ Importance of work in the context of national priorities. Detailed budget sought along with full justification/ proposed utilization, of funding sought from RSSDI
  - ◇ Whether the project is being partly funded from any other source? If yes, please mention the source and the amount received.
  - ◇ Ethical committee clearance of the institution or other bonafide body.

## Travel grants for young diabetes researchers to attend International Conferences

Criteria's for the travel grant are as follows:

- Applicant should apply 2 months in advance.
- Travel Grant is open only to the RSSDI members.
- Applicant should submit Oral paper / Poster acceptance document to RSSDI Secretariat.

- Applicant should submit Declaration that he/she has not receiving grant from any other agency / Organization – In case of receiving grant from any other Organization, RSSDI shall pay only the exceeding amount not covered by that agency.

## ADVANCED CERTIFICATE COURSE IN DIABETOLOGY

(IN ASSOCIATION WITH JAIPUR NATIONAL UNIVERSITY)

Research Society for the Study of Diabetes in India (RSSDI) was founded by Prof. M.M.S. Ahuja in 1972. RSSDI is the largest body of professional doctors and researchers in Asia, working in the area of Diabetes & is the National Body recognized by IDF (International Diabetes Federation). One of the key areas of focus is to train doctors at all levels to better manage Diabetes and its complications. RSSDI recognizes this problem and runs a well-structured, full time, residential “Advanced Certificate Course in Diabetology”. This two-year course is like any other post graduate course and has immensely helped doctors to practice better diabetes care. RSSDI has carefully looked into all aspects of this course & has accredited & recognized 18 centres across India at present and more centers are being inspected for accreditation. National Faculties and experts of RSSDI chosen from Academia visit these centers from time to time to ensure high standards. Now this Advanced Certificate Course has Dual Accreditation from RSSDI and Jaipur National University.

### List of RSSDI Accredited Centres

S.N.	Institute Name	Institute Location
1.	Diacon Hospital	Bengaluru, Karnataka
2.	North Delhi Diabetes Centre	New Delhi, Delhi
3.	Prithvi Hospital	Tumkur, Karnataka
4.	Total Diabetes Hormone Institute	Indore, Madhya Pradesh
5.	Dia Care A Complete Diabetes Care Centre	Ahemdabad, Gujarat
6.	Sonal Diabetes Hospital	Surat, Gujarat
7.	Jothydev's Diabetes and Research Center	Trivandrum, Kerala
8.	Advanced Endocrine & Diabetes Hospital	Hyderabad, Telangana
9.	G D Hospitals and Diabetes Institute	Kolkata, West Bengal
10.	Aditya Diagnostics & Hospital	Dibrugarh, Assam
11.	Sunil's Diabetes Care N' Research Centre Pvt Ltd.	Nagpur, Maharashtra
12.	Marwari Hospital and Research Centre	Guwahati, Assam
13.	Down Town Hospital	Guwahati, Assam
14.	St.Theresa's Hospital	Hyderabad, Telangana
15.	Aegle Clinic	Pune, Maharashtra
16.	Tulip Hospital	Sonipat, Haryana
17.	Lilavati Hospital & Research Centre	Bandra West, Mumbai
18.	Srajan Hospital	Udaipur, Rajasthan



## **COURSE DETAILS**

**Name of the Course:** Advanced Certificate Course in Diabetology

**Duration:** 2 Years – Post MBBS & 1 Year - Post MD / DNB  
(Gen - Medicine )\* (Full Time) Educational.

**Qualification:** A candidate must possess MBBS degree from ANY of the recognized university approved by Medical Council of India (\*The duration of the course is 1 Year for those with MD/ DNB in Internal Medicine. Candidates having MD degree in other specialties will have to do the course over 2 Years).

**Number of seats:** 2 seats per year for every eligible teacher as per rules of Medical Council of India (MCI).

**Selection of Candidates:** Selection for the Certificate course is through a performance evaluation by Theory test for 90 marks (90 minutes duration) which is conducted at all accredited centres. The result is displayed WITHIN 3 days on the Web site of JNU and RSSDI. Post MD (Internal Medicine) will be given preference.

### **COURSE FEES:**

- Rs 30000/- (for post MD/DNB (internal medicine), 1 year program)
- Rs. 50000/- (for post MBBS, MD in other branches, 2 years program)

**Session:** Two sessions are run annually, in January and in July. Prospectus details are available on the RSSDI website. All applications must be sent to Jaipur National University.

## **Announcements**

Dear Member,

Please update your Membership details like Complete Postal Address, Email Id, Pan No. & Mobile no. after log in your membership area on our website [www.rssdi.in](http://www.rssdi.in) under sub heading Membership corner, so that we can send you RSSDI Newsletter & Journals.

## **47th Annual Conference of RSSDI –RSSDI 2019**

November 7-10, 2019 at JECC, Jaipur, Rajasthan

Themes:

MMS Ahuja Symposium : "Validation of RSSDI therapeutic Wheel in Indian clinical practice"

BB Tripathy Nutritional Symposium : "Diet and Inflammation"

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