

body weight (last observation carried forward [LOCF] analysis) at end of trial was +2.75 kg and +3.76 kg for IDegAsp BID and IDeg OD plus IAsp, respectively (ETD  $-1.04$ , 95% CI  $-1.99$ ;  $-0.10$ ,  $p < 0.05$ ).

Fewer confirmed hypoglycemia episodes (self-reported plasma glucose  $< 3.1$  mmol/L) were reported for IDegAsp BID vs IDeg OD plus IAsp (11.6 vs 13.6 events/patient-year of exposure [PYE] [Relative Rate (RR) 0.81, 95% CI 0.61; 1.07,  $p = \text{not significant (NS)}$ ]). Frequency of nocturnal confirmed hypoglycemia episodes (onset 00:01–05:59 h) was lower with IDegAsp BID vs IDeg OD plus IAsp (1.23 vs 1.55 events/PYE, RR 0.80, 95% CI 0.50; 1.29,  $p = \text{NS}$ ). Both regimens were well tolerated with similar adverse event rates.

**Conclusion:** HbA<sub>1c</sub> was reduced with IDegAsp BID and IDeg OD plus IAsp, with no significant difference between the regimens. The 95% CI for the HbA<sub>1c</sub> treatment difference did cross the pre-specified non-inferiority margin for the primary analysis (however, all pre-specified sensitivity analyses did achieve non-inferiority). IDegAsp BID was associated with significantly lower total daily insulin doses and less weight gain, with non-significant lower rates of confirmed and nocturnal confirmed hypoglycemia episodes compared with IDeg OD plus IAsp. Thus, IDegAsp BID offers the potential for a simple alternative to basal-bolus treatment in patients who require intensification of basal-insulin regimens, especially where adherence to more complex regimens may be challenging.

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#### PO344

##### HYPERURICEMIA IS INVERSELY CORRELATED WITH GLYCEMIC CONTROL IN TYPE 2 DIABETES MELLITUS

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**Background:** Diabetes is considered a major health problem with increasing prevalence, and leading cause of morbidity, mortality and vast complications. Cardiovascular disease is the most life-threatening consequences of diabetes mellitus with mortality rates up to two to four times higher for persons with diabetes mellitus. Landmark and historical research trials have shown a positive association between impaired glycemic control and the risk of coronary heart disease (CHD) and other diabetes complications such as nephropathy. Controlling hyperglycemia is important to reduce complications. For monitoring diabetes, A1C is now a standard methodology in diabetic clinics, which measures patient's glycemic control for the past 2–3 months. There are several diseases related to insulin resistance including type 2 diabetes mellitus (T2DM), prediabetes, metabolic syndrome,

hypertension, dyslipidemia, hyperuricemia, obesity and low testosterone. Hyperuricemia is closely linked to metabolic syndrome's component in type 2 diabetic subjects. Currently, uric acid is still not considered a potential biochemical marker and target while managing diabetes. Furthermore, exact association between serum uric acid levels and diabetes mellitus (hyperglycemia) is still not clear. Aim of this study was to investigate the relationship between hyperuricemia and glycemic control in T2DM.

**Method:** The study was a cross sectional analytical study which has enrolled T2DM patients who were on routine follow up in private out patients diabetic clinic. The study included type 2 diabetic patients. Patients with age  $< 30$  years and pregnant were excluded from the study. Patients with end stage renal disease or on dialysis and with active hepatic disease were again excluded from the study. Patients on diet control or only on oral hypoglycemic agents therapy were selected, and all those patients with insulin therapy were excluded from the study. Uric acid and A1C was measured. Statistical analysis was performed using Pearson correlation test.

**Result:** Enrolled patients were 126 subjects, 76 male (60.3%) and 50 female (39.7%); mean of age was  $49 \pm 18.4$  years. The laboratory results of uric acid level was  $6.3 \pm 3.2$  mg/dl. and A1C level was  $8.69 \pm 2.43$  %. Statistical test showed that uric acid significantly and inversely correlated with A1C ( $r = -0.266$ ;  $p = 0.004$ ).

**Conclusion:** There was significant inverse correlation between uric acid level and A1C in T2DM.

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#### PO345

##### ADIPONECTIN IS INVERSELY CORRELATED WITH LIPOPROTEIN(A) IN TYPE 2 DIABETES MELLITUS

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**Background:** Diabetes is considered a major health problem with increasing prevalence, and leading cause of morbidity, mortality and vast complications. Cardiovascular disease is the most life-threatening consequences of diabetes mellitus with mortality rates up to two to four times higher for persons with diabetes mellitus. Adiponectin has been identified as the “adipocytokines” that are derived from adipose tissue. Adiponectin plays a crucial role in insulin resistance and type 2 diabetes mellitus (T2DM) especially in obese people. Adiponectin has protective role in the initiation and progression of atherosclerosis through anti-inflammatory and anti-atherogenic effects. Many clinical studies have demonstrated that low plasma adiponectin level (hypoadiponectinaemia) associate closely with obesity-related diseases, including atherosclerotic cardiovascular diseases, T2DM, hypertension and dyslipidemia. Lipoprotein(a) is composed of a low-density lipoprotein particle and a glycoprotein molecule known as apolipoprotein(a) and is considered a pro-atherogenic, pro-thrombotic risk factor for coronary heart disease. Lipoprotein(a) have been reported to impact arterial endothelial function and have been proposed

as independent risk factor for cardiovascular disease in diabetic patients. Aim of this study was to investigate the relationship between adiponectin and lipoprotein(a) in T2DM.

**Method:** The study was a cross sectional analytical study which has enrolled T2DM patients who were on routine follow up in private out patients diabetic clinic. The study included T2DM patient with age >40 years old. Informed consent was obtained from all patients. Exclusion criteria for the study group were: history of alcohol abuse, history having cardiovascular disease or cerebrovascular disease. Patients with end stage renal disease or on dialysis and with active hepatic disease were again excluded from the study. Adiponectin and lipoprotein(a) was measured. Statistical analysis was performed using Pearson correlation test.

**Result:** Enrolled patients were 82 subjects, 50 male (61%) and 32 female (39%); mean of age was 57.17±13.3 years. The laboratory results of mean adiponectin level was 6.79±4.6 µg/mL and mean lipoprotein(a) level was 17.98±9.77 mg/dL. Statistical analysis showed that adiponectin significantly and inversely correlated with lipoprotein(a) ( $r = -0.648$ ,  $p = 0.001$ )

**Conclusion:** There was significant inverse correlation between adiponectin and lipoprotein(a) in T2DM

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#### PO346

##### THE USABILITY OF 34 GAUGE NEEDLE FOR PEN INJECTORS IN PATIENTS USING INSULIN/GLP-1 ANALOG

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**Background:** Insulin injection is useful for improving favorable glycemic control. However, all the patients who require insulin do not perform insulin injections. One of the reasons is that some patients fear insulin injections. To alleviate this anxiety, the development of thinner and shorter insulin injection needles has been advocated, and a 34 gauge × 4 mm (hereinafter referred to as 34G) needle, the thinnest needle, was developed. This is expected to contribute to the alleviation of pain caused by injection and the improvement of quality of life (QOL) for patients receiving insulin therapy. We conducted a questionnaire survey on the usability and preference of 34G needles.

**Method:** We evaluated 230 diabetic patients at least 20 years of age visiting the outpatient department of Juntendo Shizuoka Hospital and who had been performing self-injection of insulin or a GLP-1 preparation with pen injectors for at least 6 months. In total, 190 patients using a 31 gauge × 5 mm (31G) needle for pen injectors were assigned to the 31G group and 40 patients using a 32 gauge × 6 mm (32G) needle were assigned to the 32G group. After obtaining informed consent from all patients, they switched to 34G needles, and a questionnaire survey was conducted before use and then again 3 months after starting the use of this needle. The baseline HbA1c of Group 31G and 32G were 7.44±1.41% and 7.47±1.42%, respectively. Primary endpoints were evaluation of pain caused by injection using the visual analogue scale (VAS) and QOL, as assessed by Diabetes Treatment Satisfaction

Questionnaire (DTSQ) and Insulin Therapy Related-QOL (ITR-QOL). Patients who could not judge pain and had difficulty answering the questionnaires were excluded.

**Result:** The VAS score improved significantly from before (28.3±24.3 mm) as compared to 3 months after (15.4±17.9 mm) starting use of the 34G needle ( $p < 0.001$ ), with both the 31G group and 32G group showing significant improvements with the use of 34G needle (16.3±18.1 mm, 10.9±16.0 mm) as compared to before (29.2±24.7 mm, 24.4±22.5 mm) using the 34G needle ( $p < 0.001$ ,  $p = 0.001$ ). When a decrease of at least 5 mm in the VAS score was defined as "pain improvement," we observed that pain improved in 53% of patients in the 31G group and 60% in the 32G group. The ITR-QOL score showed no significant difference before versus after the intervention. The DTSQ score improved significantly after using of the 34G needle in the 31G group, but only for the question "How often have you felt that your blood sugars have been unacceptably high recently?" HbA1c at 3 months after starting 34G needle use was 7.21±1.36% in the 31G group and 7.30±1.87% in the 32G group, with the 31G group showing significant improvement ( $p = 0.004$ ).

**Conclusion:** The 34G needle is currently the thinnest and shortest of all needles available for pen injectors. The VAS score improved in both groups, a result consistent with those of a past report showing a thinner and shorter insulin injection needle to reduce pain (J Diabetes Sci Tech. 2007). The percentage of patients with pain improvement was greater in the 32G group, which may be attributable to injection needle length. Only the 31G group showed significant improvement in the question, "How often have you felt that your blood sugars have been unacceptably high recently?", suggesting that the thinner needle achieved painless injection, resulting in the improvement of blood glucose levels.

#### PO347

##### RISK FACTORS RESPONSIBLE FOR HYPOGLYCEMIA IN PATIENTS WITH DIABETES: A CROSS-SECTIONAL, SINGLE-CENTERED QUESTIONNAIRE-BASED STUDY

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**Background:** While stringent glycemic control is critical to prevent diabetes complications, hypoglycemia should be minimized, especially in the elderly or patients already having severe diabetic complications. To better understand the risks of hypoglycemia in patients with diabetes, the current study was performed using questionnaires by patients treated at Kansai Electric Power Hospital.

**Method:** Hypoglycemia-related questionnaires of patients with diabetes who visited Kansai Electric Power Hospital between October 1, 2013 and December 27, 2013 were used. Those having at least one hypoglycemic episode in the past ( $n = 714$ ; % male, 62.9%; age 64.3±12.5 years; BMI 24.4±4.29 kg/m<sup>2</sup>) were analyzed for associations of hypoglycemia with duration of the disease and their use of anti-diabetic medications.

**Result:** One hundred and eighty two patients (25.5%) having no hypoglycemic episodes and 76 patients (10.7%) having a hypoglycemic episode more than once a week during the previous 1 year were included. Categorical dependent variable regression analyses revealed a significant increase of hypoglycemia with use of sulfonylureas and insulin, compared with use of dipeptidyl peptidase-4 inhibitors and glucagon-like peptide-1 receptor agonists as well as glinides. Categorical regression analyses revealed that insulin-dependency was significantly associated with increased risk of hypoglycemia, while obesity was associated with