



2ND WORLD CONGRESS ON INTERVENTIONAL THERAPIES FOR TYPE 2 DIABETES

March 28-30, 2011

Hilton New York • New York, NY • USA

CONGRESS DIRECTOR
Francesco Rubino, MD



ABSTRACT BOOK

www.wcidt.org

HOSTED BY



Weill Cornell Medical College

NewYork-Presbyterian Hospital
Weill Cornell Medical Center

FONDAZIONE
GIOVANNI LORENZINI
MILAN, ITALY



GIOVANNI LORENZINI
MEDICAL FOUNDATION
HOUSTON, TX, USA

ABSTRACTS

CLINICAL OUTCOMES TRACK

1

THE INTERACTION OF SOME BIOCHEMICAL PARAMETRES IN PATIENTS WITH TYPE 2 DIABETES AND ARTERIAL HYPERTENSION

Manana Akhvediani¹; Tamar Vakhtangadze²; Marina Balavadze²; Marika Emukhvari¹; Maia Khubua³; Tamar Kvantaliani⁴

¹Laboratory of Clinical Biochemistry, Research Institute of Clinical Medicine, Tbilisi, Georgia; ²Functional Diagnostics, Research Institute of Clinical Medicine, Tbilisi, Georgia; ³Endocrinology, Research Institute of Clinical Medicine, Tbilisi, Georgia; ⁴Coronary Heart Disease, Tsinamdzgvrishvili Institute of Cardiology, Tbilisi, GA, Georgia

The object of the work was to develop diagnostic criteria of some biochemical parameters in the patients with type 2 diabetes and arterial hypertension. 70 patients were studied with type 2 diabetes who displayed arterial hypertension (group I) Group II comprised 52 patients with arterial hypertension mentioned in anamnesis, but they had no diabetes. Blood lipids, HBA1c and CRP were estimated in the all patients. Our studies showed that T chop, LDL, Apo B and Lp (a) were increased in 88 % of group I patients who were mentioned to have HBA1c increased (7.4±0.3%). In 22% of patients hyperlipidemia was observed even when HBA1c ≤ 7.0%. In 53% of patients of this group, provided HBA1c increased, CRP appeared to be increased as well 6.6±0.4 mg/l. in group II, HBA1C increased(7.1±0.2%) in those patients (11%) only whose Lp (a) and CRP were high. Simultaneous increase of Lp (a), HBA1c and CRP in patients with arterial hypertension might point at their interaction, the more so, in type 2 diabetes the development of arterial hypertension is in correlation with hyperlipidemia and the inflammation process.

2

METABOLIC SYNDROME-VARIABILITY IN CULTURES AND INTERVENTIONAL MANAGEMENT

Pablo I. Altieri¹; Héctor L. Banchs²; Nelson Escobales²; María Crespo²; Yolanda Figueroa²

¹Departments of Medicine and Physiology, University of Puerto Rico, Medical Sciences Campus, Humacao, PR, PR; ²Departments of Medicine and Physiology, University of Puerto Rico, Medical Sciences Campus, San Juan, PR, PR

Obesity linked to Diabetes Mellitus is the Epidemic of the 21Th Century. The above diseases with lipid abnormalities, plus hypertension, are clustered under "metabolic syndrome" (MetS). Hispanics with MetS usually shows low coronary artery disease, when compared with the U.S.A. We studied 169 patients (P.) with MetS in Puerto Rico- a U.S. Hispanic Island. 97% were diabetics Type II and 3% Type I. None showed myocardial infarction or stroke. The Ejection Fraction was reduced when compared to our normal group (49 ± 4 vs. 62 ± 12%) P<0.001 due to diabetic cardiomyopathy. The lipid profile was normal: HDL= 48 ± 16, LDL= 83 ± 30. Triglycerides 166 ± 13, Cholesterol= 166 ± 25 [mg/dl], probably explaining the low myocardial and brain ischemia.

In U.S.A. a two fold increase in ischemic heart and strokes have been reported when compared to our data. We have shown that the expression of MetS accompanied with coronary artery disease is different in Puerto Rico than in U.S.A. Probably this is due to genetics and social networking.

We think that all P. with MetS should be intervened after treatment of the basic complications (Diabetes Mellitus with Hyperlipidemia, Hypertension-Arrhythmias) with Enalapril, which we have shown to reduce proliferation of the smooth muscle cells and migration to the endothelium reducing the progression of coronary disease. Also, the use of Omega 3 which reduces insulin resistance and drugs which reduces intracellular oxidative stress are also useful in reducing apoptosis and necrosis of myocytes. The experimental data will be discussed.

3

COMPARISON OF INFLAMMATORY STATE AND WAIST-TO-HIP RATIO BETWEEN DIABETIC AND NON-DIABETIC OBESE PATIENTS

Sérgio Arruda¹; Maycon Luiz Silva Oliveira¹; Rômulo Medeiros Santos¹; Estevão Cubas Rolim¹; Karyne Pereira Quirino de Sousa¹; Cibele Ferreira Neves²; Mariana Silva Melendez Araújo²; Fábio França¹

¹Department of Medicine, Clinica Sergio Arruda, Brasília, Brazil; ²Deapartment of Nutrition, Clinica Sergio Arruda, Brasília, Brazil

Background: A sensitive marker for systemic inflammation is the acute-phase C-reactive protein (CRP). Subclinical inflammation, detectable by measurement of plasma-based inflammatory biomarkers has also been related to diabetes.

Statistical Tests: Mann-Whitney, Pearson correlation and unpaired T test

Methods: 418 patients submitted to Roux-en-Y gastric bypass were analyzed and divided into two groups: diabetic (D), 69(16,5%), and non-diabetic(ND), 288(83,5%). They were compared regarding Body Mass Index (BMI), C reactive protein (CRP), age and waist-to-hip ratio(WHR)

Results: From all patients, 357 were women (85,4%). Mean age was 37,6 ±11 (16-67). Mean BMI was 41,5± 5,1 (33-75). Mean RCP was 7,2± 9,5 (0,03-90,5). Correlation between WHR and RCP r=-0,003 p=0,94. Correlation HOMA-IR and WHR r=0,28 p<0,0001. 69 subjects (16,5%) had diabetes(D). Comparisons between D versus ND: Age: 45,5 ±10,3 versus 36,0±10,4 [p<0,0001]. BMI: 41,1±5,4 versus 41,6±5,0 [p=0,16].RCP: 8,0 ±8,4 versus 7,11±9,7 [p=0,13]. Correlation RCP and WHR: r=-0,16 p=0,18 versus r=0,008 p=0,86. WHR: 0,89±0,07 versus 0,83±0,08 [p<0,0001]. Correlation between WHR and HOMA-IR in group D r=0,20 p=0,10.

Conclusions: Diabetic patients were older and had WHR higher than non-diabetic. There was correlation between HOMA-IR and WHR in the whole group of patients. There was no difference in BMI and mean CRP between D and ND. There was no correlation between RCP and WHR in the population of this study.

4

HBA1C LEVELS AFTER ONE YEAR OF POST-OPERATIVE BARIATRIC SURGERY DECREASES IN TYPE 2 DIABETIC PATIENTS

Sérgio Arruda¹; Maycon Luiz Silva Oliveira¹; Rômulo Medeiros Santos¹; Estevão Cubas Rolim¹; Cibele Ferreira Neves²; Karyne Pereira Quirino de Sousa¹; Fábio França¹; Mariana Silva Melendez Araújo²

¹Department of Medicine, Clínica Sergio Arruda, Brasília, Brazil; ² Department of Nutrition, Clínica Sergio Arruda, Brasília, Brazil

Background: Elevated plasma levels of A1c hemoglobin (HbA1c) were described as a good predictive factor of inadequate treatment of type 2 diabetes. Low levels of HbA1c and Homa-IR after bariatric operation reflects a successful treatment for obese and type 2 diabetic patients.

Objective: Compare pre-operative HbA1c plasma levels of patients who underwent bariatric procedure and after one year of Roux-en-Y gastric bypass.

Methods: We reviewed medical records of 79 patients submitted to bariatric operation between January/2004 and June/2010 regarding to sex, operative mean age(MA), mean operative BMI (mBMI), type 2 diabetes (DM2), pre-operative(pre-op) and a year post-operative(post-op) plasma levels of: glucose (GL), insulin (IL), HbA1c (HbA1cL) and Homa-IR. Patients were divided in two groups: diabetics (PDM2) and non diabetics (NPDM2) and submitted to a sectional collecting data: pre-operative and after one year. The results were performed by Microsoft Access® and GraphPad InStat® softwares.

Results: Ours institution (470 patients) mean: follow-up is of 1,54±1,31(0,07-6,15) years; and HbA1cL is of 5,41±0,74(4-14,8).NPDM2 and PDM2: Total of 79. Number of NPDM2: 66(83,55%). Number of PDM2: 13(16,45%). Males: 10(12,65%). Females: (69/79). MA: 37,65±10,8(18,2-64,9). mBMI: 41,7±5,15(34,5-57,3). Pre-op HbA1cL: 5,86±0,85(4,2-10). Pre-op GL: 97±19,63(69-190). Pre-op IL: 18,21±9,78(1,03-50). Pre-op Homa-IR: 4,33±2,5(0,25-12,470). PDM2Pre-op vs. PDM2Post-op data: Homa-IR: 4,58±2,5(1,9-9,4) vs. 1,11±0,589(0,53- 2,24);p=0,0014. HbA1cL: 6,49±1,129(5,2-9,4) vs. 5,6±0,77(4,3-7,4); p=0,043. NPDM2Pre-op vs. NPDM2Post-op data: HbA1cL: 5,87±0,76(4,8-10) vs. 5,23±0,43(4,4-6); p<0,0001.

Conclusions: Bariatric operations are a protective procedure for preventing post-operative high HbA1cL in non diabetic patients (p<0,0001) and in diabetic patients (p=0,043). Diabetic patients after bariatric procedure improve their Homa-IR levels (p=0,0014).

5

EVIDENCE OF REGRESSION OF ATHEROSCLEROSIS IN MSCT IMAGING IN CASES WITH METABOLIC SYNDROME AND PRE-DIABETIC STATES WITH AGENTS PRIMARILY KNOWN FOR METABOLIC CONTROL

Debasis Basu

Metabolic Diseases & Preventive Cardiology, Apollo Gleneagles Sugar & Heart Centre, Kolkata, India

Background: Impaired Fasting Glucose (IFG) and metabolic syndrome (MetS) frequently coexist. Both are associated with cardiovascular disease (CVD). Atherosclerotic vascular disease is more common in these individuals especially with a visceral adiposity (VA). However, the contribution of obesity to cardiovascular risk, independent of the presence of the metabolic syndrome remains controversial.

Methods and Result: We examined 205 men and women with both MetS and IFG with VA. Screening for novel risk factors plus subclinical atherosclerosis were advised to them (134 men and 71 women), to estimate future CVD risk; 64 Slice MSCT to detect asymptomatic coronary artery calcium (CAC) was correlated with VA. CAC shows the highest sensitivity in the detection of coronary atherosclerosis. MetS patients with 61%, 75%, 16% of the 3 categories of VA and 75% IFG with VA were associated with significant CCS. Only 33 who did not merit any other therapy as such were subjected to acarbose and metformin therapy in MetS group and only metformin in IFG with VA group. After 2-year period 24% reduction of VA in MetS and that of 31% in IFG with VA were observed. Unit decrease in VA was associated with reduction in 17% and maintenance in 83% of CCS or major adverse cardiovascular event along with improvement of metabolic status.

Conclusions: The MetS with lower grade VA and IFG with VA predict future cardiovascular risk. Although it remains prudent to aggressively treat MetS and Prediabetes yet reduction in VA additionally with one or similar kind of drug/s should be considered the ultimate goal.

6

BEFORE AND AFTER BPD-DS: EVOLUTION OF INSULIN TREATED DIABETES TYPE II IN MORBIDLY OBESE

Frederic-S. Hould; Laurent Biertho; Fady Moustarah; Stefan Lebel; Simon Marceau; Odette Lescelleur; **Simon Biron**

Department of Surgery, Laval University, Quebec, Canada

Biliopancreatic diversion with duodenal switch (BPD-DS) was performed in 272 patients in 2006: 119 (44%) were diabetics; 87 were on oral hypoglycemic therapy and 31 were on insulin therapy (one patient with type I diabetes was excluded).

At the first visit, these 31 patients weighed 137 ± 20 kg (99-185) with a BMI of 51 ± 6 kg/m² (38-63). Eleven were then on 2 or 3 oral hypoglycemic agents and no insulin. Twenty were on insulin 84 ± 76 u/d (6-240).

Because of restricted health care resources, a 23 ± 11 months delay (range 3-60) occurred between the first visit and surgery. During this delay, the endocrinology and dietetic team oversaw diabetes therapy. One patient began chronic renal dialysis.

At the time of surgery, these 31 patients weighed 144 ± 24 kg (93-188) with a BMI of 53 ± 6 kg/m². All were on insulin 109 ± 104 u/d (12-472). Pre-op HbA1c was 0.084 ± 0.018.

At the last follow up 33 ± 13 months later (8-53), they weighed 84 ± 14 kg (55-120) with a BMI of 32 ± 6 kg/m². Twenty four had no diabetes therapy; only two patients were on insulin. HbA1c was 0.056 ± 0.016. One patient died of cardiac insufficiency 25 months post-op.

Conclusions: Insulin treated diabetics suffered weight gain during delays for bariatric surgery. BPD-DS was beneficial: insulin was no longer needed in 93%. Diabetes therapy ceased altogether in 77%, and was reduced in 23% while HbA1c was normalized.

7

TYPE 2 DIABETES AFTER GASTRIC BYPASS: REMISSION IN FIVE MODELS USING HBA1C, FASTING BLOOD GLUCOSE, AND STATUS OF MEDICATIONS**Robin Blackstone**¹; Joy C. Bunt²; Melisa C. Cortes¹; Hamed Abbaszadegan³; Harvey Sugerman⁴¹Bariatrics, Scottsdale Healthcare Bariatric Center, Scottsdale, AZ, USA; ²Phoenix Epidemiology and Clinical Research Branch, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Department of Health and Human Services, Phoenix, AZ, USA; ³Department of Internal Medicine, Banner Good Samaritan Medical Center, Phoenix, AZ, USA; ⁴Department of Surgery, Virginia Commonwealth University, Richmond, VA, USA**Background:** Reports of remission of type 2 diabetes mellitus (T2DM) following Roux-en-Y gastric bypass (RYGB) vary according to HbA1c and/or fasting blood glucose levels and medication status.**Methods:** Five models using different combinations of criteria for defining remission (no diabetes medications plus: 1) fasting blood glucose (FBG) <100mg/dl, 2) HbA1c of <5.7 or 3) <6.0%, or 4&5) FBG + HbA1c of <5.7 or <6.0%) were compared in 667 obese patients with T2DM at one year after undergoing RYGB in a community hospital bariatric center of excellence. Secondary aims were to determine the effects of pre-operative severity or length of diagnosis.**Results:** 32.8% of patients achieved remission using the most stringent criteria (no medications + HbA1c <5.7% and FBG of <100) versus 55% using no medications + FBG <100 mg/dL (p<.0001). Remission rates were higher for patients not taking insulin (41.9% vs. 12.3%, p<.0001) or had a shorter preoperative T2DM duration (11.6 vs. 9.0 years, p<.0001), which predicted remission in all 5 models. Patients who met criteria by three months maintained remission at one year, independent of weight loss (42.0% EWL in patients with diabetes vs. 45.5% EWL in patients in remission, p=.478).**Conclusion:** Regardless of how defined, remission was achieved in many patients with T2DM at one year after RYGB. A more recent diagnosis of T2DM and absence of pre-operative insulin therapy were significant predictors, independent of %EWL. Long-term follow up is needed to document persistence of remission.

8

SLEEVE GASTRECTOMY AND ILEAL INTERPOSITION IN THE TREATMENT OF TYPE 2 DIABETES - EXPERIENCE OF 11 CASES**Alcides Branco**; Joao Antonio Schemberk, Jr.*GI Surgery, Hospital Vita Batel, Curitiba, Brazil*

The current clinical treatments for type 2 diabetes, controlling blood glucose levels, but with the over the years that the blood glucose levels worsen. The UKPDS also showed that there is a progressive deterioration of pancreatic beta cell function, regardless of the treatment, and 9 years after treatment only 25% of diabetic patients continue to respond to monotherapy, the association the multiple resources to improve the control glycemic.

The goal of creating a surgical treatment is to try to promote healing of type 2 diabetes, as all current treatments are only for control of glucose levels rather than cure.

This retrospective study by BRANCO, SCHEMBERK et al where we selected all patients who were using high doses of insulin and some oral medication associations, were conducted during 2008 to 2009. With 11 patients as follows:

Sex M (10) and F (1)

BMI ranged between 24,7 - 40,0

BMI postoperative period ranged between 20,1 -29,4

Currently five patients are without medication with normal blood glucose levels, and six patients stopped using insulin and are alone, with improvement of clinical conditions.

We think it is a current proposal for the treatment of type 2 diabetes, with excellent results in relation to quality of life that can provide this group of patients.

9

LONG TERM CARDIO-VASCULAR RISK REDUCTION AND CORONARY EVENTS IN MORBID OBESE PATIENTS TREATED WITH LAPAROSCOPIC ADJUSTABLE GASTRIC BANDING (LAGB) BEFORE THE YEAR 2000**Luca Busetto**¹; Fabio De Stefano¹; Mariangela Marangon¹; Gianni Segato²; Maurizio De Luca²; Franco Favretti²¹Department of Medical and Surgical Sciences, University of Padova, Padova, Italy; ²Department of Surgery, Regional Hospital of Vicenza, Vicenza, Italy**Introduction:** We analyzed multiple cardio-vascular risk factors and rate of coronary events in morbid obese patients treated with gastric banding (LAGB) with >10 years follow-up.**Methods:** Multiple cardio-vascular risk factors (type 2 diabetes, hypertension, hypetriglyceridemia, low HDL-cholesterol levels) have been determined in 650 patients treated with LAGB from 1993 to 1999 (Obes Res 2004;12:1256-63). Cardio-vascular risk status and rate of coronary events were re-analysed in 2010.**Results:** 302 patients (55 men and 247 women) were retrieved. Age at surgery was 38.6±10.5 years. BMI was 46.8±7.2 kg/m². Follow-up was 12.7±1.4 years. Long-term weight loss was 17.4±14.9% of baseline body weight. Rates of long-term recovery were 73.5% in patients with diabetes at surgery, 37.0% in patients with hypertension, 74.3% in patients with high triglycerides, and 59.0% in patients with low HDL levels. In patients without altered risk factors at baseline, incidence of new cases was 6.7% for diabetes, 23.0% for hypertension, 12.9% for hypertriglyceridemia, and 19.5% for low-HDL levels. Five fatal or non-fatal coronary events (1.7%) were recorded. Observed events were lower than expected according to baseline 10-years probability of myocardial infarction calculated with the PROCAM score (2.0%). Events reduction was more important in groups with higher events probability (men: 3.6% observed vs 5.8% predicted; patients >50 years old: 5.4% vs 7.2%; diabetics: 2.7% vs 4.6%).**Conclusion:** Good rates of long-term recovery and incidence of new cases were observed for multiple cardio-vascular risk factors in morbid obese patients after LAGB. Observed coronary events were lower than expected according to calculated 10-years probability.

10

SINGLE INCISION LAPAROSCOPIC SURGERY (SILS) AND NOTES IN BARIATRICS: THE RESULTS OF A PRELIMINARY EXPERIENCE**Elie K. Chouillard***General and Minimally Invasive Surgery, Centre Hospitalier Intercommunal, Poissy, France*

Background: Natural Orifice Transluminal Endoscopic Surgery (NOTES) is an evolving concept. Many variants have been described including « pure » NOTES, « Hybrid » NOTES, single incision laparoscopic surgery (SILS), or even NOTES-inspired endoscopic surgery. The potential advantages of such techniques may include less postoperative pain, less abdominal wall complications, faster return to activity, and better cosmesis.

Methods: All patients were prospectively included after a written informed consent. The Ethical Board of the Hospital approved the study. All types of bariatric procedures could be theoretically included.

Patients: From April 2008 to December 2010, SILS or NOTES was attempted in 69 selected bariatric patients. Exclusion criteria comprised mainly prior open abdominal surgery, more than 50 Kg/m² BMI, ASA III status, organ insufficiency, hemostasis disorders. The success rate without conversion to laparoscopy or laparotomy was 80 % (55 patients). Procedures included Sleeve gastrectomy, adjustable band gastroplasty, adjustable band retrieval, gastric bypass, StomaphyX endoplication, Gastric placcation, and miscellaneous.

Results: Mortality rate was nil. The overall complications (mainly minor) rate was 7.2 %. One patient was reoperated (1.4 %) for bleeding. The median length of stay was 2.9 days (as compared to 4.1 days in a matched series of patients operated by standard laparoscopic techniques) (p<0.05).

Conclusions: SILS and NOTES procedures are safe and feasible in selected patients with morbid obesity. Advantages regarding post-operative pain and length of hospital stay could be demonstrated. However, larger scale, prospective, controlled, randomized studies are needed for further evidence-based analysis.

11

ROUX-EN-Y GASTRIC BYPASS MAY BE BETTER THAN SLEEVE GASTRECTOMY IN MORBIDLY OBESE PATIENTS WITH TYPE 2 DIABETES**Elie K. Chouillard***General and Minimally Invasive Surgery, Centre Hospitalier Intercommunal, Poissy, France*

Background: Laparoscopic sleeve gastrectomy (SG) is gaining popularity as a procedure for the treatment of morbid obesity and type 2 Diabetes Mellitus. Preliminary results suggest that weight loss and resolution of comorbidities with SG could be comparable to those of laparoscopic Roux-en-Y gastric bypass (RYGB). In a multicenter, retrospective study, we analyzed the weight loss, the resolution of comorbidities including type 2 diabetes, and the morbidity on a case-control basis.

Methods: A retrospective, case-control, comparative analysis was performed on 200 patients in each arm who underwent either SG or RYGB from January 2005 to March 2008. Patients were matched for age, sex, and body mass index. The percentage of excess weight loss (EWL), the resolution of comorbidities, and the complications in each group were compared at 6, 12, and 18 months, respectively.

Results: Overall mortality rates were similar in both groups. However, the morbidity rate was significantly higher in the RYGB group (20.5 %) as compared to the SG group (6.5 %) (p<0.05). The percentage of EWL at 6 months and the overall remission of type 2 diabetes were significantly better in patients who had RYGB (p<0.05). However, the percentage of EWL at 12 and 18 months as well as the resolution of other comorbidities were comparable.

Conclusions: As compared to SG, the RYGB is associated to a higher short-term morbidity. However, RYGB leads to a better short-term weight loss. Furthermore, RYGB may control more efficaciously type 2 diabetes, at least in the first two years following surgery.

12

DUODENO-JEJUNAL BYPASS (DJB) FOR MANAGEMENT OF TYPE II DIABETES MELLITUS IN NONOBESE PATIENTSVenkata Bodavula; **Srinivasulu Conjeevaram**; Jonathan Pinto; Leonard Maffucci; Madhu Rangraj*Department of Surgery, Sound Shore Medical Center of Westchester, New Rochelle, NY, USA*

Background: Bariatric surgery has been found to cure Type 2 Diabetes Mellitus (T2DM) in morbidly obese patients. Rubino and Gagner showed, in animal experiments, that excluding the duodenum and proximal jejunum achieved glycemic control in nonobese diabetic rats. We analyze the use of DJB for the management of T2DM in nonobese patients.

Method: A prospective study was conducted to analyze the benefits of DJB in resolution of T2DM in nonobese diabetics. 13 patients, of mean age 56, underwent medical evaluation before undergoing Laparoscopic DJB. The first part of the duodenum was transected 2 cm distal to the pylorus. The bilio-pancreatic limb was divided 40 cm below the ligament of Treitz and anastomosed to the alimentary limb 80 cm down. Patients were kept on Metformin 6 months post-operatively. We report the outcome of BMI, HbA1c, and fasting glucose during 1 year follow up.

Results: Mean BMI: Pre-Op :29.56, 6 months Post-Op: 28.49, 1 year Post-Op: 27.99. Mean HbA1c Pre-Op: 9.19, 6 months Post-Op: 8.32, 1 year Post-Op: 7.83. Mean Fasting Glucose Pre-Op: 172.85, 6 months Post-Op: 163.15, 1 year Post-Op: 143.25. 6 patients were on insulin pre-op. No patients were on insulin post-op. 9 patients decreased the number and amount of oral hypoglycemics taken.

Conclusion: 8 patients were cured of, or significantly improved their T2DM. The time to resolution of diabetes was variable. All patients maintained their weight. Gastric stasis appears to be a post-op concern. This small series of patients shows promising results in the resolution of T2DM by DJB.

13

SUBCUTANEOUS LOOP - NEW TYPE OF ACCESS TO THE EXCLUDED STOMACH AND BILIARY TREE AFTER ROUX-EN-Y GASTRIC BYPASS IN BARIATRIC SURGERYRicardo Cotta-Pereira¹; Isabella Cardoso²; Antonio Carlos Ribeiro Iglesias¹¹Department of Surgery, Gaffre & Guinle University Hospital, Rio de Janeiro, Brazil; ²Department of Internal Medicine, Gaffre & Guinle University Hospital, Rio de Janeiro, Brazil; ¹Department of Surgery, Gaffre & Guinle University Hospital, Rio de Janeiro, Brazil

Roux-en-Y gastroplasty and disabsorptive surgeries have been the most used procedures for the surgical treatment of grade III obesity. However, from an anatomical point of view, this technique makes it impossible to obtain access to an excluded stomach and biliary tree via endoscopy. We have thought up a technique for obtaining access to excluded stomach and biliary tree via endoscopy, without modifying the surgical anatomy of the procedures at issue.

14

ONE YEAR RESULTS OF AN ENDOSCOPIC, DUODENAL-JEJUNAL EXCLUSION DEVICE FOR WEIGHT LOSS AND CONTROL OF TYPE 2 DIABETESEduardo Guimaraes Hourneaux de Moura¹; Bruno C. Martins²; Guilherme Sauniti Lopes²; Ivan Orso²; Suzana Lopes de Oliveira²; Manoel dos Passos Galvao Neto³; Marco A. Santo⁴; Paulo Sakai⁵; Almino Cardosa Ramos⁶; Arthur Belarmino Garrido Junior⁴; Marcio C. Mancini⁷; Alfredo Halpern⁷; Ivan Ceconello⁴

¹Gastrointestinal Endoscopy Unit, Hospital das Clinicas-University of Sao Paulo, Sao Paulo, Brazil; ²Endoscopic Unit Hospital das Clinicas, University of Sao Paulo, Sao Paulo, Brazil; ³Gastrointestinal Surgery Department, Gastro Obeso Center, Sao Paulo, Brazil; ⁴Gastrointestinal Surgery Department, University of Sao Paulo, Sao Paulo, Brazil; ⁵Gastrointestinal Endoscopy Unit, University of Sao Paulo, Sao Paulo, Brazil; ⁶Gastro Obeso Center, University of Sao Paulo, Sao Paulo, Brazil; ⁷Endocrinology Department, University of Sao Paulo, Sao Paulo, Brazil

Background: The duodenal-jejunal bypass liner (DJBL, GI Dynamics, Inc., Lexington, MA) is an endoscopic implant that mimics the intestinal bypass component of the Roux-en-Y gastric bypass. Previously reported studies have shown promising improvements in type 2 diabetes (T2D) and weight loss for up to 6 months. This report describes improvements in T2D and metabolic changes in subjects with T2D who were implanted with the DJBL for one year.

Methods: This is a prospective, non-randomized, open label study with 22 patients enrolled. Inclusion criteria: Age \geq 18 years and \leq 65 years, BMI \geq 35 kg/m² and type 2 diabetes with or without other co-morbidities, unsuccessful history with nonsurgical weight reduction methods, candidates for bariatric surgery.

Results: At one year (n=13 patients), observed absolute weight loss of 20.4 kg (p<0.001), excess weight percentage loss of 35.3% (p<0.0001), body mass index of 7.4 kg/m² (p<0.0001) and waist circumference of 10.1cm (p=0.0001) was observed. Likewise, glucose levels decreased from 175.6 to 126.7 mg/dL (p<0.0001) and glycosylated hemoglobin from 8.8 to 6.4% (p<0.0001). The use of diabetic medications, except metformin was reduced and 19.2% of patients no longer required any anti-diabetic drugs. Insulin (p=0.02) and C-peptide (p=0.015), cholesterol (p=0.001), LDL (p=0.01), and triglycerides (p=0.006) levels were normalized at 1 year.

Conclusions: The endoscopic DJBL has a durable effect on glucose control, weight loss and metabolic function for one year, suggesting this new device is a candidate for the primary therapy of T2D and obesity.

Funding Source: GI Dynamics Inc., Lexington, MA

15

FIRST AUSTRALIAN EXPERIENCES WITH AN ORAL VOLUME RESTRICTION DEVICE TO RETRAIN EATING BEHAVIOURS & ASSIST WEIGHT LOSS – POTENTIAL APPLICATION FOR METABOLIC & BARIATRIC SURGICAL PATIENTSToni McGee¹; Mariee Grima¹; Ian Hewson²; Kay Jones³; John Dixon⁴

¹Human Neurotransmitters, Baker IDI Heart & Diabetes Institute, Melbourne, Australia; ²The Alfred Dental Services, The Alfred, Prahran, Australia; ³Department of General Practice, Monash University, Notting Hill, Australia; ⁴Vascular & Hypertension - Obesity Research, Baker IDI Heart & Diabetes Institute, Melbourne, Australia

Background: To achieve successful weight-loss, most patients must modify eating behaviours as well as diet composition. Especially when choosing bariatric surgery, taking smaller bites and eating slower are crucial to avoid complications. A novel custom-made removable oral device (Sensor-Monitored Alimentary Restriction Therapy, "SMART," Scientific Intake) has been designed to be worn in the upper palate while eating to reduce bite-size, increase chewing and slow eating-rate to enhance satiety and reduce caloric-intake. The device's acceptability and impact on weight-loss and eating behaviours were assessed during this 4-month open-label study.

Method: Twenty overweight/obese Australians (M:6, F:14, BMI 27-33kg/m²) each received a SMART-device and a nutritionist-delivered calorie-restricted diet based on DASH principles. Weight, compliance and adverse events were recorded fortnightly, with metabolic markers measured at baseline and 4-months.

Results: Mean weight-loss (+/-SEM) was 6.0+0.9kg (6.3+/-1% initial bodyweight). There were no significant adverse events. Reported compliance was high (mean 12+/-1.3 meals/week) and correlated positively with weight-loss (R= -0.55, p=0.025). Fasting plasma insulin reduced by 3.9mU/L from baseline (baseline: 11.2+/-1.6, 4-months: 7.3+/-1.0, mU/L, p<0.005), with a trend toward reduced fasting glucose and blood pressure. Subjects reported that the device slowed eating-rate, reduced meal-size and increased satiety. All reported greater awareness of food choices and portion-sizes.

Conclusion: The SMART-device should be explored as an adjunct to dietary behaviour-change, both in lifestyle-based weight-management programs and in metabolic/bariatric surgical settings, to assist patients to modify eating behaviours, achieve successful weight-loss and potentially avoid post-surgical complications including pouch dilatation, obstruction and dumping syndrome.

Funding Source: This study was funded by Scientific Intake Inc. (Atlanta, GA, USA). Scientific Intake Inc. owns the trademark for the SMART device and manufactures the device commercially.

16

METABOLIC INTESTINAL BYPASS-SURGERY FOR TYPE 2 DIABETES IN PATIENTS WITH BMI<35 KG/M2. COMPARATIVE ANALYSIS OF 16 PATIENTS UNDERGOING BPD, BPD-DS OR RYGB

Michael Frenken; Eun Young Cho
Department of Surgery, St. Josef Krankenhaus, Monheim, Germany

Background: Metabolic surgery for type 2 diabetes mellitus in patients with low BMI is a novel concept. Early studies show the surgery being safe and effective, but the studies are inconclusive regarding the most effective procedure.

Methods: Metabolic intestinal bypass-surgery was performed in n=16 patients with type 2 diabetes and BMI <35 kg/m² (mean age 56 years, range 36-68; 8 females; mean BMI 32 kg /m², range 26-34.5). BPD-DS, BPD and RYGB were performed in 7, 5 and 4 diabetic patients, respectively. Mean preoperative duration of medical antidiabetic therapy was 16 years (range 4-40). 13 patients used insulin on average for 6 years (range 1-12), the mean insulin requirement was 92 I.U. per day (range 30-140). The analysis was accomplished retrospectively from data prospectively collected in our data base.

Results: At discharge from hospital, only 3 patients required small amounts of insulin (mean 21 I.U per day, range 15-30). After 1 year, none of the patients used insulin or oral antidiabetic drugs. The HbA1c level decreased for the total patient population from 8.6% (range 5.8-12.1) preoperatively to 6.0%, 5.7% and 5.6% after 3, 6 and 12 months, respectively. The HbA1c levels at 1 year were significantly lower after BPD-DS and BPD than after RYGB (5.2%, range 4.1-6.4 versus 6.7%, range 5.8-7.8, p<0.01, 95% confidence interval 0.5-2.4).

Conclusion: Metabolic intestinal bypass-surgery for type 2 diabetes in low BMI patients is effective with HbA1c levels at 1 year after operation being significantly lower after BPD-DS or BPD than after RYGB.

17

C-PEPTIDE IS A STRONG PREDICTOR OF REMISSION OF TYPE 2 DIABETES AFTER BPD-DS

Michael Frenken; Kirsten Reiter
Department of Surgery, St. Josef Krankenhaus, Monheim, Germany

Background: High resolution rates of type 2 diabetes have been reported after biliopancreatic diversion with duodenal switch and gastric sleeve resection (BPD-DS). Predictors of failure to induce complete remission are long-standing insulin-requiring diabetes and low C-peptide. Are these 2 factors combined helpful to anticipate outcome in diabetes remission?

Methods: BPD-DS was performed in n=41 patients with type 2 diabetes treated with insulin. Primary endpoint was complete remission of diabetes (HbA1c <6% one year after surgery in the absence of pharmacological therapy). Duration of insulin treatment and level of fasting C-peptide were correlated with remission.

Results: Thirty-two patients had a preoperative C-peptide >1.5 ng/ml. All 32 patients experienced a complete remission of type 2 diabetes, irrespective of duration of insulin treatment (mean duration 6 years, range 0.5-25); mean HbA1c level one year after surgery was 5.2% (range 3.7-5.9). In 9 patients with C-peptide <1.5 ng/ml complete remission occurred in 5 cases, failure was observed in the other 4 cases. These 4 patients were insulin-dependent for 8 to 13 years. There is a high correlation between C-peptide and remission. However, this correlation does not predict failure of remission reliably in every case. One patient was treated with insulin for 17 years and had a fasting C-peptide of only 0.8 ng/ml, but experienced complete remission.

Conclusion: Complete remission of type 2 diabetes after BPD-DS is highly dependent on duration of insulin dependence and on the level of fasting C-peptide. However, even in unfavourable cases failure cannot be predicted with certainty.

18

FOUR YEARS AFTER BPD-DS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS: IS THE CHANCE OF COMPLETE REMISSION DEPENDENT ON PREOPERATIVE DIABETES THERAPY AND DURATION OF INSULIN TREATMENT?

Michael Frenken; Eun Young Cho; Olga Kemmet
Department of Surgery, St. Josef Krankenhaus, Monheim, Germany

Background: Complete resolution of type 2 diabetes mellitus (T2DM) is a common feature after biliopancreatic diversion with duodenal switch and sleeve gastrectomy (BPD-DS) even in long-standing and insulin requiring diabetes. However, the parameters determining the individual chance of remission are imprecisely defined.

Methods: BPD-DS was performed in n=86 patients with T2DM (mean age 50 years, range 26-68, 51 females, BMI 47 kg/m², range 26-71). The patients were retrospectively divided into 4 groups: n=18 patients were treated preoperatively with oral antidiabetic drugs only (group 1), n=32, 24 and 12 patients were treated with insulin for less than 5 years, for 5 to 10 years, and for more than 10 years (group 2, 3 and 4), respectively.

Results: At discharge from hospital all patients of group 1 and 2 were free of insulin usage, 30% and 75% of the patients of group 3 and 4 used up to 48 units insulin per day (mean 24, n=16) to keep blood glucose below 200 mg/dl. After 1 year only 4 patients of group 4 permanently required small amounts of insulin (mean 17 units per day). The rate of complete remission of diabetes (HbA1c <6%, no antidiabetic medication) for the whole study population was 91%.

Conclusion: BPD-DS reliably causes rapid and complete remission of T2DM in all patients on oral antidiabetic drugs and in patients with insulin treatment for less than 5 years. In patients with insulin treatment longer than 5 or 10 years complete remission rates decline to 88 and 66%, respectively.

19

RESOLUTION OF ACCOMPANIED PLURIPATHOLOGY IN DIABETES MELLITUS INSULIN DEPENDENT BMI 25-34 PATIENTS AFTER LAPAROSCOPIC ONE ANASTOMOSIS GASTRIC BYPASS**Manuel Garcia-Caballero***Department of Surgery, University Malaga, Malaga, Spain*

Introduction: Diabetes Mellitus insulin dependent (DMID) are patients with pluripathology including arterial hypertension (HBP), hypercholesterolemia, hypertriglyceridemia, cardiac diseases, angioneurotic oedema, major depressive disorder, joint degenerative disease, vascular disorders, hypersideremia, etc. Furthermore they have advanced age.

Objectives: To analyse morbidity and clinical evolution of accompanied pluripathology of DMID patients operated by One Anastomosis Gastric Bypass (BAGUA).

Patients and Methods: Seventy DMID patients, BMI 26-34, age 47-71 years (mean 64) with pluripathology operated by BAGUA. BAGUA technique excluded 100 cm jejunum distal to Treitz ligament in BMI 25-29 and 150 cm in 30-34. In all patients Peptide C levels were determined. Ten milliliters serum was deep frozen.

Results: Patients presented between 2-6 accompanied diseases that needed 4-23 tablets/day as treatment. 15/17 presented HBP, hypercholesterolemia and hypertriglyceridemia. 6/17 cardiac diseases with 3 coronary stent and hypocoagulation. 2/17 have hypersideremia with hypo-ferritinemia. 4/17 major depressive disorder. 4/17 taken chronic analgesia (two pregabalin during years). There were no perioperative complications or blood transfusion. All the patients leave insulin after operation but 6/17 needed metmorfine 850mg during 1 to 2 months. All the patients abandon their hypercholesterolemia and hypertriglyceridemia treatment since operation. 13/15 with HBP do not receive more treatment since surgery, while 2/15 needed medication during the first month.

Conclusions: Surgery in DMID with pluripathology solves DMID but also control the metabolic syndrome. Weight reduction has a positive effect on joint and heart diseases resulting in not need or reduction of treatment. Major depressive disorder and peripheral vascular disorders take longer to be controlled.

20

EARLY RESOLUTION OF TYPE 2 DIABETES MELLITUS BY LAPAROSCOPIS ILEAL TRANSPOSITION WITH SLEEVE GASTRECTOMY SURGERY IN 23 – 35 BMI PATIENTS**Ramen Goel¹; Madhu Goel²; Pravin Amin³; Sanjith Marik¹***¹Bariatric Surgery, Bombay Hospital, Mumbai, India; ²Bariatric Surgery, Center for Metabolic Surgery, Mumbai, India; ³Medicine, Bombay Hospital, Mumbai, India*

Introduction: Diabetes is considered a life style disease. 56% diabetic patients with BMI > 7 are at high risk of diabetes related complications. Bariatric surgery results in diabetes resolution in over 84% patients. Based on hindgut hypothesis suggesting role of incretins like GLP-1, early trials of ileal interposition surgery have displayed consistent HbA1c levels below 7 in over 80% patients with > 30 kg/m² BMI. In developing countries majority of T2DM patients are not morbidly obese and surgical procedures are to be evaluated for their efficacy in this group. In this study we have assessed the efficacy of ileal transposition with sleeve gastrectomy (SGIT) in 23 – 35 BMI T2DM patients.

Method: After institutional ethical committee approval & Indian Council of Medical Research registration(CTRI/2008/091/00206), selected T2DM patients [HbA1c > 7, C Peptide >1] underwent Lap SGIT by a single surgeon. Data of first five patients with minimum 6 months follow up was analyzed for glycemic control, reduction/ discontinuation of diabetes medication.

Results: The study target (HbA1c < 7) was achieved in 60 % patients within 1 month , and in 100% patients within 6 months. Requirement of medicines reduced significantly within 6 months and their HbA1c levels reduced from 9.65% to 6.22%.

Conclusion: Laparoscopic SGIT represents a new paradigm, for the treatment of T2DM even in non morbidly obese patients.

FIVE-YEAR FOLLOW-UP OF TYPE 2 DIABETIC PATIENTS WHO UNDERWENT BARIATRIC SURGERY

Helen Mary Heneghan¹; Fady Moustarah²; Shai Meron-Eldar¹; Sangeeta Kashyap¹; John Kirwan³; Bipan Chand¹; Stacy Brethauer¹; Tomasz Rogula¹; Matthew Kroh¹; Allan, Laurence Kennedy⁴; Philip Schauer¹

¹Bariatric & Metabolic Institute, Cleveland Clinic, Cleveland, OH, USA; ²Department of Surgery, Laval University, Quebec, QC, Canada; ³Department of Pathobiology, Lerner Research Institute, Cleveland Clinic, Cleveland, OH, USA; ⁴ Department of Endocrinology & Metabolism, Cleveland, Cleveland, OH, USA

Introduction: In addition to weight loss, bariatric surgery has powerful metabolic effects, including resolution of type 2 diabetes mellitus (T2DM). However, the durability of diabetes remission is largely unknown. Our aim was to determine 5-year outcomes of obese diabetic patients who underwent bariatric surgery, and to identify factors associated with durable diabetes remission.

Methods: We identified all T2DM patients who underwent bariatric surgery at our institution, and had 5-year follow-up. Patient's current T2DM status was determined by biochemical analyses and medication review. Remission was defined as fasting glucose <120 off diabetic medications.

Results: Forty-one T2DM patients who underwent bariatric surgery had 5 year data available (59% follow-up rate, 32% male, mean [±SE] age 49.3±1.6 yrs). Mean duration of T2DM was 97.6 months (range 3-468). 29 patients underwent RYGB, 12 had gastric restriction. Results are presented in Table 1. At mean follow-up of 72 months (range 65-83), T2DM remained resolved or improved in 84%. Insulin and oral hypoglycemics were stopped or reduced, respectively, in these patients.

Conclusion: Bariatric surgery can induce a significant and sustainable improvement in T2DM. Lasting remission appears to be related to the duration and severity of diabetes preoperatively, and the extent and durability of weight loss.

Table 1. 5 year outcome			
	Remission	Improvement	Unchanged
T2DM	42%	42%	16%
Hypertension	14%	44%	42%
Dyslipidemia	46%	23%	31%
Duration of T2DM (months)	43.0±14	207±70	236±116
BMI, kg/m ²			
Pre	49.3±2.0	49.4±3.7	44.4±4.6
5yr	36.2±2.1	40.6±3.9	41.0±2.7
HbA1C %			
Pre	7.2±0.5	8.0±0.4	8.6±0.2
5yr	6.1±0.2	7.2±0.6	7.6±0.6
Fasting glucose (mg/dL)			
Pre	122.3±5.4	134.9±20.4	164.7±40.9
5yr	111.3±8.3	122.1±9.3	160.3±66
Blood pressure (mmHg)			
Pre	141/79	130/74	139/72
5yr	135/73	122/75	137/75
Total cholesterol (mg/dL)			
Pre	183±12.3	169.7±14.3	164.5±21.5
5yr	181.3±16.5	166.1±13.0	190.7±25.7

22

TO COMPARE EARLY EFFECTS OF LAPAROSCOPIC SLEEVE GASTRECTOMY (LSG), STANDARD ILEAL INTERPOSITION WITH LSG, DIVERTED ILEAL INTERPOSITION WITH LSG & DUODENO-JEJUNAL BYPASS IN T2DM BMI 22-35 IN A RURAL INDIAN HOSPITAL

Mohamed Ismail¹; Pankaj Garg²

¹Minimally Access Surgery, Moulana Hospital, Perianthalmanna, India; ²Minimally Access Surgery, Fortis Super Speciality Hospital, Panchkula, India

Objective: As defined in the title

Methods: In a prospective trial, 5 T2DM, BMI 22-35 patients were operated (Table-1). All relevant baseline tests were done and evaluated one-month postoperatively. The trial, carried out at a rural hospital, was registered at Indian national registry (CTRI/2010/091/002938).

Results: After 1 month, there was significant improvement in glycemic control (HbA1c and diabetic medications) in all the four procedures. The weight loss was in the range of 2-15% and medication requirement decreased significantly in all the patients (3/5 patients- stopped all medications, 2/5 patients - dosage decreased >50%). Surprisingly, HbA1c also improved (12-30%) significantly in 4/5 patients.

Conclusion: The early results of all the four procedures in non-obese Type-2 DM look promising with marked improvement in glycemic control. Long-term results are awaited.

No	Procedure	Age	Pre-Operative Parameters				1 month post operation		Medications
			Wt.	BMI	HbA1c	Medications	Weight (Wt.) (%wt. loss)	HbA1c (% medications loss)	
1	LSG+DII	52	91	34	9.3	Insulin 100 U	2 (-10%)	6.5 (-30%)	Insulin 38 U
2	LSG+DII	49	77	28	6.3	Insulin 40 U + OHA	68 (-12%)	6.5 (+3%)	No drugs
3	LSG+ SII	42	45	22	8.5	OHA	41 (-9%)	7.5 (-12%)	OHA, decreased dosage
4	LSG	64	89	33	6.6	OHA	87 (-2%)	5.7 (-14%)	No drugs
5	DJB	39	89	30	11.2	OHA	76 (-15%)	8.5 (-24%)	No drugs

LSG- Laparoscopic Sleeve Gastrectomy, DII- Diverted Ileal Interposition, SII- Standard Ileal Interposition, DJB- Duodeno-jejunal Bypass

PS- 3 months follow-up shall be presented during the conference.

23

EFFICACY OF ATORVASTATIN IN CORONARY HEART DISEASE TYPE 2 DIABETES PATIENTS PRESENTED WITH AND WITHOUT CHLAMYDIA PNEUMONIAE INFECTION

Tamar G. Kvantaliani¹; Manana Akhvlediani²; Marina Balavadze³

¹Coronary Heart Disease, Tsinamdzgvrishvili Institute of Cardiology, Tbilisi, Georgia; ²Laboratory of Clinical Biochemistry, Research Institute of Clinical Medicine, Tbilisi, Georgia; ³Functional Diagnostic, Research Institute of Clinical Medicine, Tbilisi, Georgia

Six-month atorvastatin (A) therapy (20 mg/day) was studied in 57 CHD type 2 diabetes patients seropositive (group I) and seronegative (group II) to Chlamydia pneumoniae (Chl.pn.) antibodies, for the prevalence of infection was considerable in diabetic persons. Participants underwent measurements of lipid hydroperoxide (LPO), CRP, fibrinogen, antichlamydial antibodies and carotid intima-media thickness (IMT).

Intergroup analysis before A application revealed significant increase of plasma LPO, CRP and fibrinogen only in seropositive patients on the background of almost identically disturbed lipid metabolism in both groups.

Six-month A therapy showed slightly decreased HDL and triglycerides. Antibody responses and F concentration were also not affected. A proved to be effective in lowering total cholesterol, LDL and reversion of IMT progression in seronegatives, whereas no significant changes of the same parameters were noted in seropositive patients. Essential reduction in group I was noted only in CRP, LPO levels that turned out in substantial inverse association with Chl.pn. antibody index.

Evidently in diabetic patients with CHD Chl.pn. infection causes amplified inflammatory response, activates free radical reactions and considerably reduces the lipid-lowering effect of A. Though decrease of inflammatory markers and plasma LPO activity after A administration suggests that in highly seropositive individuals with type 2 diabetes A therapy might be protective in prevention of oxidative stress and further progression of atherosclerosis.

24

METABOLIC RESULTS OF MODIFIED GASTRIC BY PASS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND BMI < 35 Kg/Mt2

Enrique Lanzarini¹; Attila Csendes¹; Luis Gutierrez¹; Hanns Lembach¹; Juan C. Molina¹; Maher Musleh¹; Karin Papapietro²; Veronica Araya³
¹Department of Surgery, University of Chile Clinical Hospital, Santiago, Chile; ²Department of Nutrition, University of Chile Clinical Hospital, Santiago, Chile; ³Department of Endocrinology, University of Chile Clinical Hospital, Santiago, Chile

Introduction: Surgical management of Type 2 Diabetes (T2DM), also called metabolic surgery, in patients with BMI <35Kg/mt2, is currently under investigation.

Objective: Report metabolic results of modified gastric bypass for the treatment of T2DM in patients with BMI <35 during a 2 year follow-up period.

Methods: Prospective protocol that included T2DM patients with BMI <35Kg/mt2 who underwent modified gastric bypass, with a 2 mt biliary limb and 1 mt alimentary limb, from July 2008 to October 2010.

Results: Forty three patients were included, 21 men and 22 women, with an average age of 51 years and mean BMI of 31.5 Kg/mt2. The median time of progression of type 2 diabetes was 6 years. The preoperative average glycemia was 161 mg / dl, glycosylated hemoglobin 8.1% and C-peptide 3.5 ng/ml. The average postoperative follow-up was 16 months. At 24 months of follow-up glycemia descended to 83 mg/dl, glycosylated hemoglobin to 5.8%, BMI to 24.2 and the beta cell activity increased in 40%. After 2 years of follow-up, 95% of patients met criteria for remission and 5% improved their metabolic conditions. Non of them remain in the same condition or worse.

Conclusions: Modified gastric bypass represents a safe and effective procedure in controlling glycemia and weight, in patients with T2DM and BMI <35. These results remained stable during 24 month follow-up.

25

DOES THE EFFECT OF LAPAROSCOPIC ROUX EN Y GASTRIC BYPASS ON TYPE 2 DIABETES MELLITUS LAST EVEN 5 YEARS AFTER SURGERY?

Jody W. Valk; Leo Hendrickx; **Eno Lavrysen**; Bart Gypen
 Surgery, ZNA Stuivenberg Hospital, Antwerp, Belgium

Bariatric surgery in order to treat morbid obesity leads to dramatic improvement of obesity related comorbidities. Many studies show a high response on type 2 Diabetes Mellitus (T2DM). However little is documented about the lasting effect (>5 years) of the laparoscopic Roux -en-Y gastric bypass (LRYGBP) on T2DM.

We evaluated pre and postoperative data, including duration of diabetes, medication usage, metabolic parameters and clinical outcomes in all patients diagnosed with Type 2 Diabetes undergoing LRYGBP from February 2002 to October 2006.

During this 4.5-year period, 600 patients underwent LRYGBP and 38 (6.3%) had T2DM. Follow up was possible in 34 of 38 patients (89%). There were 30 females (78%) with a mean preoperative age of 52 years (range, 24 – 67 years). After surgery, weight and body mass index decreased from 123 kg and 46.9 Kg/m² to 90.3 kg and 32.9 kg/m² for a mean weight loss of 32.9 kg and mean excess weight loss of 55.6 %. Fasting plasma glucose and glycosylated hemoglobin concentration initially returned to normal levels (<7%) in 84 % or improved in 13 % during the first three years after surgery. In 6 (16%) patients there was again a rise of their glycosylated hemoglobin after the third postoperative year.

LRYGBP resulted in significant weight loss (55.6% of excess body weight) and resolution (76%) of T2DM. Changes in glycemic control after 3 years suggest that the effect of metabolic surgery is not lasting in all patients and continuing glycemic follow up of 'cured' patients is mandatory.

26

EFFECTS OF ROUX-EN-Y GASTRIC BYPASS IN BLOOD GLUCOSE, INSULIN SENSITIVITY AND INSULIN RESISTANCE

Stephan Garcia Andrade Silva¹; **Lucas Pedroso Fernandes Ferreira Leal**²; Deborah Cristina Landi Masquio¹; Clarissa Pedroso Fernandes Ferreira Leal³; Fabio Penteado Nahas³; Jose Afonso Sallet⁴; Ana R. Dâmaso⁵; Danielle Arisa Caranti⁶; João Luiz Moreira Coutinho Azevedo²; Antonio Leal⁶

¹Post Graduate Program of Interdisciplinary Health Sciences/Obesity Study Group - GEO, Federal University of So Paulo UNIFESP, Santos, Brazil; ²Department of Surgery, Federal University of So Paulo - UNIFESP, So Paulo, Brazil; ³Surgery, Medical Clinic and General Surgery CLILEAL, Santos, Brazil; ⁴Director, Sallet Institute of Medicine, Sao Paulo, Brazil; ⁵Department of Biosciences/Obesity Study Group - GEO, Federal University of So Paulo - UNIFESP, Santos, Brazil; ⁶Surgery, Sallet Institute of Medicine, Sao Paulo, Brazil

Introduction: Diabetes remains one of the costliest diseases to the public health system. It has the highest growth rate worldwide of all chronic diseases and is the major cause of blindness, amputations and kidney disease.

Methods: 185 women (38.75±11.35 years) and 33 men (37.78±12.67 years) underwent RYGB and were followed for one year. Anthropometric measurements and biochemical analysis of blood glucose and insulin were collected in three periods: Before surgery, 6 months and 12 months after surgery. Insulin sensitivity was assessed by QUICKI and insulin resistance by HOMA-IR. Statistical analysis was performed using the software STATISTICA7 considering p<0.05. We used ANOVA for repeated measures to compare parametric variables and Friedman test for nonparametric variables.

Results: 31.19% of patients presented elevated blood glucose, 88.99% presented impaired insulin sensitivity and 90.37% of insulin resistance. After surgery, the results of 12 months follow-up showed that only 1.83% of patients had altered blood glucose levels, 1.83% had impaired insulin sensitivity and 4.13% had insulin resistance. At long-term, bariatric surgery caused a significant reduction in bodyweight values (122.04±21.33 to 80.41±15.70kg), BMI (45.71±5.95 to 30.12±4.56kg/m²), glucose (98.92 ± 23.60 to 83.41 ± 7.48 mg/dL), insulin (20.81±10.85 to 5.09±2.25 mU/dl), QUICKI (0.311±0.035 to 0.388±0.027) and HOMA IR (5.20±3.41 to 1.05±0.49).

Conclusion: RYGB was effective within 12 months of follow-up to improve the diagnostic parameters of obesity such as weight and BMI, as well as clinical indicators of diabetes mellitus as fasting glycemia, QUICKI and HOMA-IR. We suggest a longer follow-up to reaffirm these results.

27

THE EFFECT OF DUODENOJEJUNAL BYPASS ON GLYCEMIC CONTROL FOR KOREAN NON-OBESE DIABETIC PATIENTS: A PRELIMINARY ANALYSISYeon Ji Lee¹; Yoonseok Heo²¹Department of Family Medicine, Obesity Center, Inha University Hospital, Incheon, South Korea; ²Department of Surgery, Obesity Center, Inha University Hospital, Incheon, South Korea**Background:** It is assumed that exhaustion of insulin secretory function of β -cell in pancreas is a cause of adult-onset type 2 diabetes mellitus in non-obese Korean population. We investigated the postoperative change of insulin secretory function, diabetes control and metabolic parameters after duodenojejunal bypass surgery.**Methods:** We evaluated 50 volunteers with adult-onset diabetes mellitus, and then, 36 patients were selected for obesity-metabolic surgery. Of those, 18 patients had duodenojejunal bypass from October 2009 to April 2010.**Results:** Four patients were failed for follow-up in 3 months after operation.

Plasma glucose levels were significantly decreased at 60 and 90 minutes during oral glucose tolerance test(OGTT) in 3 months after operation, comparing with pre-operative OGTT test.

Among 14 patients, nine showed improved glycemic control. Especially, four patients showed well-controlled FBG and HbA1c lower than 7.0% without medication, three stopped insulin use, five could decrease the dosage of anti-glycemic medication. Improved glycemic control group had significantly higher serum insulin and c-peptide level at 120 minutes during oral glucose tolerance test preoperatively.

Conclusion: Duodenojejunostomy showed anti-diabetic effect in non-obese Korean diabetic patients in 3 months after operation.

28

REMISSION OF DIABETES AFTER GASTRO-INTESTINAL METABOLIC SURGERY: A MULTI-INSTITUTIONAL INTERNATIONAL STUDYWei-Jei Lee¹; Kyung Yul Hur²; Muffazal Lakadawala³; Kazunori Kasama⁴; Simon KH Wong⁵¹Department of Surgery, Min-Sheng General Hospital, Taiwan, Taoyuan, Taiwan; ²Department of Surgery, Soongchunhyang University Hospital, Korea, Seoul, South Korea; ³Department of Surgery, Saifee Hospital, India, Mumbai, India; ⁴Department of Surgery, Yotsuya Medical Cube, Japan, Tokyo, Japan; ⁵Department of Surgery, Prince of Wales Hospital, Hong Kong, Shatin, Hong Kong**Background:** Gastro-intestinal metabolic surgery has been proposed for the treatment of not well controlled type 2 Diabetes Mellitus (T2DM) patients with a BMI < 35 Kg/m². This study aims to describe recent experience with surgical treatment of T2DM in Asian centers.**Methods:** Patients aged 20 to 70 years, with not well controlled T2DM (HbA1C > 7.0%) and BMI < 35 Kg/m² were included at 5 institutes between 2007 and 2010. The end point is T2DM remission, defined by fasting plasma glucose < 110 mg/dl and HbA1C < 6.0%.**Results:** 200 patients with a mean BMI 28.5 (22-34), age 45.0 (29-67), duration of T2DM 7.9years (0.5-20), C-peptide 2.8ng/ml (0.9-14) and HbA1C of 9.3% (7.0-15) were recruited up to now. Among them, 172(86%) received laparoscopic gastric bypass (LGB), 24(12%) received laparoscopic sleeve gastrectomy (LSG) and 4(2%) received laparoscopic adjustable gastric banding (LAGB). Up to now, 87 patients had been follow-up for at least 12 months. The BMI decreased postoperatively by 19.4% to 23.4. The HbA1C decreased to 6.3%. Partial and complete remission of T2DM was achieved at 77% and 56%. Patients with their BMI > 30 Kg/m² had a better diabetes remission rate than patients with BMI < 30 Kg/m² (81.6% vs. 65.0%; p < 0.05). Increasing diabetes history, C-peptide and type of surgery were also significantly associated with the diabetes remission.**Conclusion:** GI metabolic surgery is an effective treatment for T2DM. BMI > 30, duration of diabetes, C-peptide and type of surgery predict the success of diabetes remission.

29

REMISSION OF TYPE 2 DIABETES MELLITUS IN THE SEVERELY OBESE DIABETIC POPULATION FOLLOWING ROUX EN Y GASTRIC BYPASS IS PREDICTED BY DISPOSITION INDEX, HIGHER BMI, AND LACK OF USAGE OF INSULINRichard A. Perugini¹; You Fu Li²¹Department of Surgery, University of Massachusetts Medical Center, Worcester, MA, USA; ²Department of Surgery, SOAR, University of Massachusetts Medical Center, Worcester, MA, USA**Introduction:** Roux en Y gastric bypass (RYGB) leads to remission in type 2 diabetes mellitus (T2DM) in a majority of patients. The mechanisms involved include early, effects (incretins) and later effects (increase in insulin sensitivity). The factors that predict reversibility of T2DM have not been extensively investigated. We studied factors predictive of remission of T2DM following RYGB in a severely obese population.**Methods:** We studied 101 consecutive severely obese individuals with T2DM undergoing RYGB. T2DM remission was defined as adequate glycemic control without diabetic medication. Demographic factors (age, gender, weight, BMI, EBW), metabolic factors (HOMA-IR, HOMA-B, disposition index, Hgb-A1c), and postoperative weight loss (% EBW loss and delta BMI) at both 6 weeks and 1 year postoperatively were included. Log rank analysis was used to identify independent predictors of T2DM remission. We developed a COX model after covariate selection procedure.**Results:** This population had an age from 26-68 and a BMI from 33-75 kg/m². The preoperative Hgb-A1c was consistent with adequate glycemic control (7.1), and decreased to 6.1 (p=0.0001) postoperatively. Preoperative disposition index (HR=1.019) and preoperative BMI (HR=1.529) were identified as independent predictors for remission of T2DM, while preoperative usage of insulin (HR=0.214) predicted lack of remission.**Conclusions:** T2DM is reversible following RYGB to a variable degree. Disposition index, a measure of residual beta cell function, and BMI predict reversibility. The finding that RYGB is more effective in individuals with higher BMI needs to be corroborated, and should prompt further investigation prior to utilization in the non-severely obese diabetic population.

30

DIFFERENTIAL EFFECTS OF GASTRIC BYPASS AND BANDING ON POSTPRANDIAL GLUCOSE AND INSULIN SECRETION IN DIABETES AND HEALTHY OBESE

Mirjam Anne Lips¹; Marjolein A. Wijngaarden¹; Edo Aarts²; Ignace M.C. Janssen²; Bert Van Ramshorst³; Bart A. Van Wagenveld⁴; Dingeman Swank⁵; Francois Van Dielen⁶; Ko Willems van Dijk⁷; Hanno Pijl¹

¹Department of Endocrinology, Leiden University Medical Centre, Leiden, Netherlands; ²Department of Surgery, Ziekenhuis Rijnstate, Arnhem, Netherlands; ³Department of Surgery, St Antonius Ziekenhuis, Nieuwegein, Netherlands; ⁴Department of Surgery, Sint Lucas Andreas Ziekenhuis, Amsterdam, Netherlands; ⁵Department of Surgery, Groene Hart Ziekenhuis, Gouda, Netherlands; ⁶Department of Surgery, Maxima Medisch Centrum, Eindhoven, Netherlands; ⁷Department of General Internal Medicine and Human Genetics, Leiden University Medical Centre, Leiden, Netherlands

Bariatric surgery alters glucose metabolism and insulin secretion in obese glucose tolerant (NGT) and type 2 diabetes (T2DM) patients within weeks, depending on type of surgery. We aimed to quantify postprandial glucose and insulin levels before and after adjustable-gastric-banding (LAGB) or roux-en-y-gastric bypass (RYGB) in NGT subjects and T2DM patients.

We studied 3 age-matched groups at baseline and 3 weeks after surgery; a NGT-group (n=11; BMI 43,1±3,0 kg/m²) undergoing LAGB, a NGT-group (n=16, BMI 44,2±3,3 kg/m²) undergoing RYGB and a diabetic group (n=15, BMI 43,5±4,2 kg/m²) undergoing RYGB. We performed a meal tolerance test and measured glucose and insulin for 3 hours. A Student's-T-Test was used to compare groups before and after surgery.

In NGT subjects, after LAGB, glucose decreased slightly (p=NS), while insulin levels were approximately 30% lower (90,9 mU/l vs. 64,2 mU/l, p=NS). In contrast, RYGB in NGT subjects increased peak glucose levels from 6,9±1,1 to 8,2±1,6 mmol/l (p<0,05) coinciding with a higher insulin peak (58,7 mU/l vs. 141,6 mU/l, p<0,05), and an increased area under the insulin curve (AUC) (p<0,05). In T2DM patients, RYGB ameliorated glucose metabolism: peak glucose (12,6 vs. 10,9 mmol/l, p<0,05) and AUC glucose (1899 vs. 1479 mmol/L/3h, p<0,05) decreased, peak insulin increased (52,3 vs. 86,3 mU/l, p<0,05), AUC insulin did not change.

These data suggest that in NGT subjects, LAGB enhances insulin sensitivity within 3 weeks. RYGB appears to adversely affect glucose metabolism in these patients, whereas it ameliorates glucose metabolism in T2DM patients. The results support observations in rodents indicating that nutrient entry in the proximal gut activates neuroendocrine systems regulating glucose metabolism. Remarkably, bypass this gut segment ameliorates glucose tolerance in T2DM patients.

Funding Source: Worcester Foundation for Biomedical Research

31

HIPOGLYCEMIC EFFECT DUE TO INTESTINAL BYPASS FISTULA (BPF) IN TYPE 2 DIABETICS. A 25 YEAR REPORT

Elias Morales¹; Fernando Magallanes²

¹General Surgery Department, Mexican Institute of Social Security, El Paso, TX, USA; ²General Surgery Department, Mexican Institute of Social Security, Ciudad Juarez, Chih., Mexico

Introduction: The hypoglycemic reaction due to distal intestinal peptides, PYY and PGL1, are well documented. This reaction is the basis for this surgical procedure.

Surgical Procedure: A jejunum - ileum anastomosis, using 40 cm of jejunum, to 20 cm of terminal ileum, to induce the hypoglycemic effect of the terminal ileum. A second jejunum-jejunum anastomosis of 4 mm of diameter (fistula), located at 10 cm from Trietz ligament, to allow intestinal transit to the rest of small bowel. Using the distal segment of jejunum, to introduce a F8 plastic tube through the second small anastomosis to support the anastomosis and to decompress the anastomosed intestinal segment. A longitudinal anterior gastric invagination, from 5 cm before the gastric incisure to 3 cm before pyloric valve

Results: 136 diabetic patients were treated with this procedure during a 25 year period. Glucemic control was achieved since the early post operative days. A permanent normalization of glucose levels and also normalization of HbA1c levels, from an average of 10.6% (15.8% max/7.6 min) without diet or medication. Normalization of lipids and arterial pressure were achieved also in affected patients. Weight control in the obese patients in a 12 month period. Treated patients have not presented any of the classical diabetic complications at this point in the long time follow up.

Conclusion: This surgical procedure, with good results to control glucemic levels and metabolic syndrome in a permanent way and can be used as a good surgical tool, treat type 2 diabetics.

32

SURGICAL TREATMENT OF TYPE 2 DIABETES: EVALUATION OF PATIENTS WITH BODY MASS INDEX 25 TO 35 KG/M² SUBMITTED TO GASTRIC BYPASS

Alexandre Vontobel Padoin¹; Andresa Colombo Balestro²; Jacqueline Rizzolli²; Letcia Biscaino Alves¹; Rafael J. Ramos¹; **Cláudio Corá Mottin¹**

¹Department of Bariatric Surgery, Pontifícia Universidade Católica do Rio Grande do Sul-RS-Brasil, Porto Alegre, Brazil; ²Department of Endocrinology, Pontifícia Universidade Católica do Rio Grande do Sul-RS-Brasil, Porto Alegre, Brazil

The Roux-en-Y Gastric Bypass Surgery (RYGBP) can improve type 2 diabetes (T2DM) as demonstrated after surgery in severely obese. Recent studies indicate that RYGBP, even in less obese subjects, is the chance for diabetes remission.

Methods: Ten diabetic subjects submitted to RYGBP were evaluated in 12 months of follow up. The inclusion criteria were the absence of pancreatic antibodies, acceptable pancreatic function and BMI of 25 to 35 kg/m².

Objectives: To evaluate the prevalence of MS based on the NCEP-ATPIII. To determine the evolution of loss of excess weight (LEW) and glycemia control.

Results: The patients' mean age was 47.1 years; mean BMI 32.6 kg /m²; the mean of medicines was 2; 40% was using insulin. MS was present in all patients and decrease 90% after RYGBP. Improved glycemic control was achieved in all patients within the first days of surgery without using insulin and reduction medicine. The average of A1C at baseline and 12 months was 9,6% and 6.3%. The average LEW at 6 and 12 months was 99% and 121.3%.

Conclusions: Surgical treatment of T2DM normalized glucose levels with reduction in the use of medicine and discontinuation of insulin. Reversion of MS was observed during follow up. Further studies are needed to support our conclusions.

33

MECHANISMS OF IMPROVEMENT OF GLUCOSE TOLERANCE IN TYPE 2 DIABETES (T2DM) AFTER BARIATRIC SURGERY: ROUX-EN-Y GASTRIC BYPASS VS SLEEVE GASTRECTOMY

Monica Nannipieri¹; Marco Anselmino²; Andrea Mari³; Simona Baldi¹; Daniela Guarino¹; Rosario Bellini⁴; Rossana Berta⁴; Ele Ferrannini¹
¹Department of Internal Medicine, University of Pisa, Pisa, Italy; ²Department of Gastroenterology, Azienda Ospedaliera Universitaria Pisana, Pisa, Italy; ³LADSEB, CNR, Padua, Italy; ⁴Bariatric Division Unit, Santa Chiara Hospital, Pisa, Italy

Background: In obese patients with T2DM, Roux-en-Y-gastric-bypass surgery (RYGB) restores euglycemia early post-surgery, but effects of sleeve gastrectomy (SLV) on T2DM are scarce.

Aim: To investigate extent and mechanisms of recovery of β -cell function and insulin-sensitivity in obese T2DM patients undergoing RYGB or SLV.

Methods: 28 obese T2DM subjects (19 RYGB and 9 SLV) were studied before and 15-d after surgery by comparing the response to a Mixed-Meal-Test (MMT) preceded by a week of low-calorie intake. Insulin-sensitivity was assessed by OGIS-index and β -cell function by modeling analysis of the C-peptide response to MMT. Ghrelin were assessed during MMT.

Results: 15-d post-surgery, BMI decreased to the same extent in RYGB and SLV (43.5 \pm 6.1 vs 40.3 \pm 5.6 kg.m-2, 47.6 \pm 5.2 vs 45.5 \pm 7.5 respectively, p<0.0001 vs baseline). Mean glucose improved in RYGB and SLV (8.2 \pm 1.9 vs 7.0 \pm 1.8 mmol/l, 8.8 \pm 2.1 vs 6.9 \pm 1.5 respectively, p=0.0002 vs baseline) and mean insulin decreased (177 \pm 64 vs 141 \pm 76 pmol/l, 247 \pm 130 vs 184 \pm 79, respectively, p=0.005 vs baseline). β -cell glucose sensitivity improved in RYGB and SLV (28.8 \pm 22.9 vs 47.9 \pm 35.5 pmol.min-1.m-2.mM-1, 33.0 \pm 30.9 vs 48.8 \pm 39.5, respectively, p=0.02 vs baseline). At baseline, insulin-sensitivity was similar in RYGB and SLV (308 \pm 53 vs 289 \pm 39 ml.min-1.m-2); following surgery, insulin-sensitivity improved (359 \pm 53 and 354 \pm 68 ml.min-1.m-2, respectively, p=0.0003 vs baseline). Mean ghrelin decrease in RYGB and SLV (7643 \pm 7871 vs 3630 \pm 2848, 4845 \pm 5712 vs 1687 \pm 782 pg/ml, p=0.02).

Conclusions: 15-d after surgery and under constant calorie intake, glucose tolerance is improved to a similar extent with RYGB and SLV, as a result of similar improvements in β -cell function and insulin-sensitivity.

34

WEIGHT LOSS EFFORTS USING ADJUSTABLE GASTRIC BANDING LEADS TO REMISSION OR IMPROVEMENT OF TYPE 2 DIABETES MELLITUS AND OTHER CO-MORBIDITIES OF OBESITY

Ted E. Okerson¹; Michael Oefelein²; John Dixon³

¹Medical Affairs, Allergan, Irvine, CA, USA; ²Medical Affairs, Allergan, Inc., Irvine, CA, USA; ³Vascular & Hypertension - Obesity Research, Baker IDI Heart & Diabetes Institute, Melbourne, Australia

This study reports the 1 year "remission" and/or improvement in type 2 diabetes mellitus (T2D) after placement of the LAP-BAND AP[®] adjustable gastric band (AGB) in the on-going APEX trail, and the accompanying change in BMI and co-morbidity benefits. These subjects reported daily medical therapy for T2D before AGB and have completed the 1 year post-operative scheduled visit. At baseline, 94/436 subjects (22%) reported T2D requiring daily medical therapy; 48-week data from 64 contained sufficient information for assessment. Complete "remission" (elimination of hypoglycemic medication) of T2D was reported in 22 patients (34%), with improvement (reduction in hypoglycemic medication) in 33 patients (52%), no change in 8 patients (13%) and worsening in 1 patient (2%). Duration of T2D was (in months) 63, 76, 90 and 1 respectively. Remission was more likely to occur in patients treated earlier after the diagnosis of T2D. Mean absolute BMI change/percent change in weight was -7.9/-19%, -8.7/-21%, -7.7/-15% and -2.9/-6% in the four groups respectively. Baseline BMI, reductions in BMI and percent change in weight were not statistically different among the groups. Resolution or improvement also occurred in other pre-existing co-morbidities: hypertension (78%), hyperlipidemia (57%), depression (71%), obstructive sleep apnea (69%) and GERD (93%). These data suggest that a minimally-invasive restrictive gastric banding procedure in obese patients with T2D results in clinically meaningful weight loss, as well as a reduction in T2D medication requirements, with an earlier aggressive weight loss intervention being more likely to facilitate remission of disease. Additional studies should be conducted.

35

LONG TERM FOLLOW-UP IN T2DM REMISSION AFTER BARIATRIC SURGERY: A COMPARATIVE STUDY BETWEEN LAGB, LGBP AND LBDP

Jose Afonso Sallet; Liliane Machado Fernandes; Carlos Eduardo Pizani; Antonio Leal; Lucas Leal; Margaretth Arruda Silva; **Aline Pedrosa Otto Sallet** *Institute of Medicine, Sao Paulo, Brazil*

Background: The surgical treatment of obesity and its effects on diabetes have been notified for 15 years. Therefore, it had motivated many clinical and experimental studies in the last 5 years, aiming to establish surgical techniques to treat T2DM in eutrophic and overweight patients. The proposal of our study is compare the efficacy of three different surgery techniques (LAGB, LGBP and LBDP) in the management of obese T2DM patients.

Methods: During November/98 to April/08, we have performed 3.200 bariatric surgery procedures, including 480 LAGB (15%), 2624 LGBP (82%) and 96 LBDP (3%). The prevalence of T2DM was 21% (n=100), 27% (n=708) and 33% (n=32), respectively. The follow-up of these T2DM patients was preserved for 58% of the patients submitted to LAGB, such as 59% for LGBP and 64% for LBDP group. The glucose homeostasis was studied analyzing HbC1.

Results: The LAGB group showed 19% of unchanged results, 75% improvement, 47% resolution. The LGBP group showed 3% of unchanged results, 97% improvement and 83% resolution. The LBDP group showed 0% unchanged, 100% improvements and 91% resolution on T2DM. Two patients developed nesiodoblastos in LGBP group.

Conclusion: The best results in terms of T2DM improvement were in the LBDP and LGBP groups. LAGB group showed good results, but lower than the others, considering the high incidence of reoperation (17%) due to LAGB complications in the long term follow-up.

Funding Source: Allergan, Inc

36

HIGH CARBOHYDRATE DIET MAY COMPROMISE IMPROVEMENT IN TYPE 2 DIABETES MELLITUS FOLLOWING BARIATRIC SURGERY

Shanker Pasupathy¹; Kwang Wei Tham²; Sonali Ganguly²; Daniel Chun-Hang Wai²

¹*Department of General Surgery, Singapore General Hospital, Singapore, Singapore;* ²*Department of Endocrinology, Singapore General Hospital, Singapore, Singapore*

Background: Bariatric surgery has been shown to improve the control of type 2 diabetes mellitus (T2DM).

Aims of Study: To evaluate the impact of bariatric surgery on T2DM in morbidly obese individuals.

Methods: From August 2008 – July 2010, 52 patients underwent bariatric surgery at the Singapore General Hospital. All patients documented to have T2DM prior to surgery were included in the study.

Results: There were 17 patients with T2DM (9 males). Mean age was 43 years (range 32-60). The duration of diabetes ranged from 2 – 25 years. 8 patients underwent laparoscopic sleeve gastrectomy (LSG), 9 underwent laparoscopic gastric bypass (LGB). Mean pre-operative weight was 118 kg (range 83 – 171) and body mass index (BMI) 42 kg/m² (33 – 70). Mean follow-up was 9 months (2 - 29). Mean absolute weight loss at 6 months was 27% (12 – 34). Patients who underwent LSG had median pre-operative HbA1c of 7.5% (6.4-8.2) and post-operative levels of 5.7% (5.5-5.8). Patients who underwent LGB had median pre-operative HbA1c of 8.8% (6.9-10.1). 7 patients were on subcutaneous insulin injections. Median post-operative HbA1c levels were 6.1% (4.6-8.8). All insulin was discontinued. Only 1 patient in the LGB group was unable to achieve HbA1c of < 7%. Her diet was low in protein and high in carbohydrates, particularly bread, biscuits and rice porridge.

Conclusion: Bariatric surgery provided rapid and effective control of T2DM, allowing all patients to reduce or eliminate diabetic medication completely. High carbohydrate diet post-bariatric surgery may compromise diabetes control.

37

EARLY DIAGNOSIS AND MANAGEMENT OF GASTRIC FISTULA IN LAPAROSCOPIC SLEEVE GASTRECTOMY WITH SUCCESS IN ONE MONTH

Eduardo H. Pirolla¹; Carlos E. Domene²; Paula Volpe²

¹*Sirio Libanes Hospital and IOTHC/MUSP, Sao Paulo, Brazil;* ²*Sirio Libanes Hospital, Sao Paulo, Brazil*

Leakage and fistulization of the stomach have been the major drawback of laparoscopic Sleeve gastrectomy (LSG). Most authors agree that operative treatment is the mainstay of therapy in patients with signs of complications. However, we propose an early diagnosis which is a most important action, with a important blood test, following fasting intravenous antibiotic and local managements to approach fistula develop and others complications. Because the anastomosis cannot be suture again for physiopathologic aspects, others forms of treatment have been applied.

The following case describes a technique with implantation of coated self-expanding stent (CSES). Leakage of the stomach, at angle of Hiss, occurred in one patient thirty days after LSG and resulted in a formation of a local fistula. A CSES were implanted endoscopically with video-radiological assistance in a patient on 32th postoperative day. Enteral nutrition could be started two days later.

This treatment seems be a good option to the management of acute gastric fistula, in specific cases with very early diagnosis, whose patient didn't had any kind of symptoms, remain average 45 days, with control and resolution of this kind of fistula in more thirty days after CSES approach and avoid abdominal infection.

Implantation of CSES was an effective and minimally invasive option for the treatment of gastric anastomosis or suture line about some fistulas after LSG as an alternative to laparoscopic or laparotomy approach to do a suture and/or drainage. A video appear.

38

A MODIFIED SLEEVE GASTRECTOMY FOR THE TREATMENT OF DIABETES MELLITUS TYPE 2 AND METABOLIC SYNDROME IN OBESITY

Eduardo H. Pirolla¹; Ricardo Jureidini²

¹Sirio Libanes Hospital and IOTHC FMUSP, Sao Paulo, Brazil; ²Sirio Libanes Hospital, Sao Paulo, Brazil

Ghrelin is a gastrointestinal peptide hormone (a 28-amino-acid peptide) most produced primarily by X/A cells in the oxyntic glands of the stomach fundus, and cells lining the duodenum cavern. A Modified Sleeve Gastrectomy (MSG) in which we remove a great party of gastric fundus and a body of the stomach, up to the region one inch near the pylorus vein, may contribute to decline circulating Ghrelin levels, better action of residual insulin and control of food intake.

Following prospectively 126 patients with Type 2 Diabetes Mellitus (T2DM) and Metabolic Syndrome (MS), after MSG, in which we performed a resection of the stomach in three stages and up to one inch to the pylorus.

After 30 months of surgery, 110 patients (87,3%) presented normal levels of glycemia (<99 mg/dL), and 6 patients presented levels between 101 and 114 mg/dL, although all of them had their HbA1c an average of 5.1% (normal 4% to 6%). All patients stopped using insulin, and three patients started using a one type of oral hypoglycemics, twice a day. Morbidity index was 2,3% and mortality was 0,7%.

The Modified Sleeve Gastrectomy (MLSG) that we propose here is a safety procedure, with low morbidities, but when occurs, like a gastric fistula (1,5% - 5,7%) of the angle of Hiss, it is very dangerous, with very hard management, new operations and sometimes, long periods of hospital permanence. It seems to promote a control of diabetes type II, and to the treatment of exogenous overweight and morbid obesity.

39

24 HOUR EFFECTIVENESS OF EXENATIDE BID FOR THERAPY OF TYPE 2 DIABETES MELLITUS

Gianluigi Pizzi; Olga Eugenia Disoteco

Diabetologic and Metabolic Disease Unit, AO - Niguarda Ca' Granda Hospital, Milan, Italy

Exenatide is a new therapeutic option for type 2 DM not well controlled. To all outpatients of our metabolic unit in therapy with exenatide we asked them to undergo a continuing glucose monitoring (CGM). 12 of them, after being informed, signed consent to the monitoring, performed it using GCM Medtronic device for 3-4 days. Aim of study was to evaluate exenatide efficacy on post prandial glycaemia and, in particular if this effect is able to get better glycaemic profile over 24 hours for several days.

Method: We evaluated 12 subjects when they reached a stable and optimized HbA1c value (lower 8%) with a concomitant weight reduction to determine if the 24 hours glycaemic profile can confirm these data. All subjects maintained their therapy: Byetta 10 u bid and biguanide as on use at the maximum tolerate dosage. Subjects: 3 F, 9 M, median age 62,5 (range 39-74), median disease length 10 ys (range 2-20), mean HbA1c 7,01 % (SD ± 0,7), median BMI 35 Kg/m² (range 24-43), median dura-tion of exenatide therapy 13 months from 10 till 18 months to CGM.

Results: Glycaemic profile demonstrate that no patient has experimented prolonged period in hypoglycaemia and all subjects, except one, have maintained long period of euglycaemia in range 70-160 mg/dl. In our opinion these data demonstrate that exenatide can be surely used in type 2 DM patients to obtain a good and stable metabolic control during 24 hours and the age or the disease length are not to be considered a contraindication

40

LONG-TERM PREVENTION OF MORTALITY IN MORBID OBESITY THROUGH BARIATRIC SURGERY. A SYSTEMATIC REVIEW AND META-ANALYSIS OF TRIALS PERFORMED WITH GASTRIC BANDING AND GASTRIC BY-PASS

Antonio E. Pontiroli¹; Alberto Morabito²

¹Dipartimento di Medicina, Chirurgia e Odontoiatria, Universit degli Studi di Milano, and Ospedale San Paolo, Milan, Italy; ²Dipartimento di Medicina, Chirurgia e Odontoiatria, Universit degli Studi di Milano, Milan, Italy

Background: Bariatric surgery has been reported to reduce long-term mortality in comparison with control subjects.

Methods: We performed a systematic review and meta-analysis of published clinical trials dealing with cardiovascular (CV), all-cause (non-cardiovascular), and global (sum of CV and all-cause) mortality. Estimates of mortality risk in subjects undergoing surgery were calculated, compared with controls.

Results: Of 44,022 participants from eight trials (14,052 undergoing surgery and 29,970 controls), 3,317 subjects died (400 surgery, 2,917 controls); when kind of death was specified, 321 CV deaths (118 surgery, 203 controls), and 523 all-cause deaths (218 surgery, 305 controls) occurred. Compared with controls, in surgery there was a reduced risk of global (OR 0.55, C.I. 0.49-0.63), of CV (OR 0.58, C.I. 0.46-0.73), and of all-cause mortality (OR 0.70, C.I. 0.59-0.84). Risk reduction was smaller in large than in small studies (OR 0.61 vs 0.21, 0.63 vs 0.16, 0.74 vs 0.35 for global, CV, and all-cause mortality, respectively). The effect of gastric banding and gastric by-pass (3,797 vs 10,255 interventions) was similar for global and all-cause mortality, different for CV mortality (OR 0.71 versus 0.48). At meta-regression analysis, a trend appeared for decreased global mortality with increasing BMI.

Conclusion: This meta-analysis indicates that: 1) bariatric surgery reduces long-term mortality; 2) risk reduction is smaller in large than in small studies; 3) both gastric banding and gastric by-pass reduce mortality, with a greater effect of the latter on CV mortality.

41

EARLY RESULTS OF ROUX-EN-Y GASTRIC BY-PASS ON REGULATION OF DIABETES TYPE 2 IN PATIENTS WITH BMI ABOVE AND BELOW 35 kg/m² - PROSPECTIVE CONTROLLED STUDY

Monika Anna Proczko-Markuszevska; Łukasz Kaska; Tomasz Stefaniak; Justyna Bigda; Zbigniew Śledziński
Department of General, Endocrine and Transplant Surgery, Medical University of Gdansk, Poland, Gdańsk, Poland

Originality: This is the first Polish analysis of the results of RYGB on diabetes type 2 patients with BMI below and above 35 kg/m². Regression of DM2 was observed within a few weeks and even during the hospitalization.

Methods: We present 66 patients with DM2, who underwent RYGB due to morbid obesity and 3 non-obese patients with DM2. In all cases, the preoperatively HbA1c and the highest and lowest blood fasting glucose level were determined. The HbA1c was assessed every 4 weeks after surgery, glucose level was measured 4-6 times a day, and also need for diabetes medication was evaluated.

The criteria for resolution of DM2 included the level of HbA1c <6% and glucose fasting level below 100 mg/ dl.

Analysis: t-Student's tests for paired and unpaired data, chi²- test.

Results: Regression of DM2 was observed in 48 patients (72.7%) during the hospitalization. In 11 patients (16.7%) glycemia and HbA1c were stabilized within next 8 weeks. In 7 (10.6%) there was still need for antidiabetic medication. The average difference between the highest and lowest measurements of blood glucose 4 weeks after RYGB was 68.3 mg/dl +/- 10.4 mg/dl and HbA1c 6.4% +/- 0.8%. In 3 non-obese cases resolution of DM2 was observed during hospitalization, no postoperative complications have been noted. In obese patients postoperative minor complications were related to surgical wound infection.

Conclusion: Our initial experience confirmed safety and efficacy of RYGB in treatment of DM2 in obese and non-obese patients.

42

LAPAROSCOPIC DUODENOJEJUNAL BYPASS WITH SLEEVE GASTRECTOMY- A NOVEL PROCEDURE FOR RESOLUTION OF TYPE II DIABETES MELLITUS IN PATIENTS WITH BMI

Praveen Raj; C. Palanivelu

Department of Minimal Access Bariatric and Metabolic Surgery, Gem Hospital and Research Centre, Coimbatore, India

Background: Type II DM resolution in morbidly obese patients following Metabolic Surgery suggests these may be of benefit even in non-morbidly obese patients. Available literature favors Combined Restrictive/Malabsorptive procedures over the others in control of Diabetes. For a country like India, wherein the diet pattern is more of polished rice, Roux en Y Gastric bypass is too restrictive for this group. Hence Laparoscopic Duodenojejunal bypass with Sleeve gastrectomy (DJB-S) was performed in our series.

Methods: Patients with <32.5BMI, confirmed to be Type IIDM, with HbA1C>7.5 were included. Patients with C-peptide levels < 1 were excluded. Laparoscopic DJB was done in a retro colic fashion with limb lengths 75cm (biliopancreatic limb) and 100cm (Roux limb), anastomosis being done end-end, single layer suturing with a 60 F Sleeve.

Results: A total of 14 patients (8 women, 6men) were prospectively evaluated. The mean age was 36.5yrs. The mean pre-operative BMI, (Fasting Blood Glucose) FBG and HbA1C was 29.9,196.4mg/dl and 8.2%. The postoperative BMI,FBG and HbA1C at the end of 6mts and 1 year was 25.4,110.2,6.3% and 24.2,106.4,6.1% respectively. 12 out of 14 patients had complete remission of Diabetes and 2 had reduced medication use .7 patients had dyslipidemias with complete resolution.

Conclusion: Laparoscopic Duodenojejunal bypass with Sleeve, which combines the principles of Sleeve Gastrectomy and Foregut hypothesis, is an effective procedure for resolution of Diabetes in lower BMI population. With its advantage of presence of a remnant stomach that's amenable to endoscopic surveillance for Carcinoma Stomach, is an ideal procedure for a country like India.

43

IS LAPAROSCOPIC DUODENOJEJUNAL BYPASS WITH SLEEVE AN EFFECTIVE ALTERNATIVE TO ROUX EN Y GASTRIC BYPASS: A RANDOMIZED TRIAL

Praveen Raj; C. Palanivelu

Department of Minimal Access Bariatric and Metabolic Surgery, Gem Hospital and Research Centre, Coimbatore, India

Background: The incidence of Diabesity and that of Carcinoma Stomach in India is one of the highest. Hence we require a procedure that allows postoperative surveillance of the stomach and the best outcomes in terms of weight reduction and diabetes control. Here we compare Laparoscopic Duodenojejunal bypass with Sleeve (DJB-S) against Roux-en Y gastric bypass (RYGB).

Methods: 52 patients were randomized into 2 groups of Laparoscopic DJB-S and RYGB with 26 patients in each. The limb lengths were similar in both the groups and the DJB-S had a 60F Sleeve.

Results: The mean BMI in the RYGB and DJB-S groups was 46.4 and 45.05. The mean BMI at the end of 6 months and 1 year was 35.16, 29.25 in RYGB and 34.51, 28.10 in DJB-S, which was not statistically significant. 14 patients in the RYGB and 19 in the DJB-S had Type2DM. In RYGB 12 had complete resolution and 2 had improvement and 16 patients in the DJB-S had resolution and 3 had improvement. There was 1 patient in the DJB-S group who presented with internal herniation 1 month post-op, was managed surgically.

Conclusion: Laparoscopic DJB-S, which combines the principles of Sleeve Gastrectomy and Foregut Hypothesis, is an effective alternative to gastric bypass in weight reduction and resolution of Diabetes with a remnant stomach for surveillance. Also, with the possibility that the procedure can be made less restrictive by altering the size of the sleeve can be employed to treat Metabolic Syndrome in the lower BMI population. But, a long term follow up is necessary.

44

LAPAROSCOPIC GASTROILEAL BYPASS FOR DIABETES TREATMENT IN NONMORBIDLY OBESE PATIENTS**Joaquin Resa**; Javier Lagos; Monica Valero*Metabolic and Bariatric Laparoscopic Surgery, Montpellier Clinic, Zaragoza., Spain*

Background: Since 2000 year we have performed more than 500 laparoscopic biliopancreatic diversions without gastrectomy (LBDP-G) for morbid obesity treatment with excellent results. In 2008 year we began to treat diabetes in nonmorbidly obese patients through LBDP-G with 92% of diabetes resolution. To simplify the technic and avoid steatorrhea we developed the laparoscopic gastroileal bypass, an operation between biliopancreatic diversion and minigastric bypass.

Methods: Prospective study on oral glucose loads in 20 severe diabetic patients (body mass index [BMI] >30 and <35, HbA1C >7.5%) before and at 1, 3, 6, 12, 18 and 24 months after laparoscopic gastroileal bypass with a horizontal gastric transection and 300 cm gastroenteral anastomosis from ileocecal valve.

Results: Of the 20 patients enrolled, the mean age was 46.7 years, mean BMI was 33.45, mean fasting plasma glucose was 181.8 and mean HbA1C was 8.9. The mean BMI at 1, 3, 6, 12, 18 and 24 months after operation were 30.79, 28.48, 27.44, 26.54, 25.82 and 25.68, respectively. The mean HbA1C at 1, 3, 6, 12, 18 and 24 months after operation were 7.3, 5.86, 5.9, 5.5, 5.7 and 5.6, respectively. Resolution of type 2 diabetes was achieved in 15 (75%) patients at 3 months and 20 (100%) at 12 months after gastroileal bypass. The mean operating time was 30 minutes, without complications and mortality. Single port laparoscopic was accomplished in 5 patients.

Conclusion: Laparoscopic gastroileal bypass seems to be a promising procedure for the control of T2DM and the metabolic syndrome.

45

HIGH LAMBDA EVALUATED WITH RORSCHACH TEST IS HIGHLY DETECTED IN JAPANESE SEVERE OBESE PATIENTS AND A CANDIDATE RESISTANCE FACTOR OF OUTCOMES AFTER BARIATRIC SURGERY**Atsuhito Saiki**¹; Tomokazu Oyama¹; Yoh Miyashita¹; Takashi Oshiro²; Shinichi Okazumi²; Isao Kawamura²; Nobuo Kuroki³; Kohji Shirai⁴*¹Center of Diabetes, Endocrine and Metabolism, Toho University Sakura Medical Center, Sakura, Chiba, Japan; ²Department of Surgery, Toho University Sakura Medical Center, Sakura, Chiba, Japan; ³Psychiatric Medicine Research, Department Toho University Sakura Medical Center, Sakura, Chiba, Japan; ⁴Internal Medicine, Toho University Sakura Medical Center, Sakura, Chiba, Japan*

Objective: Understanding of psychological aspects of severe obese patients is essential for good follow-up after bariatric surgery. High lambda is a personality finding from Rorschach Comprehensive System and is characterized as avoidance of complexity and simplification operations. We hypothesize that high lambda in severe obese patients is a key resistance factor against their behavior modification. The aim of this study is to examine the incidence of high lambda in Japanese severe obese patients and short-term outcomes after bariatric surgery.

Method and Results: To examine the incidence of high lambda, 42 Japanese obese patients (BMI ≥ 30.0 kg/m²) were enrolled. Rorschach test and interview were performed by a psychiatrist and lambda value ≥ 1.51 was regarded as high lambda according to Japanese criteria. In obese patients, lambda value was 1.72 ± 1.75 and was higher than that in control (400 healthy volunteers) (0.96 ± 0.88, P < 0.0001). The incidence of high lambda was 15.0% in control, 21.4% in BMI 30.0-34.9, 35.7% in BMI 35.0-39.9 and 42.9% in BMI 40.0- (p = 0.0035 compared with control). In dropout group, Lambda value (2.14 ± 1.04) was higher than in continuation group (1.16 ± 1.51, P < 0.05) after one-year follow-up of non-surgical treatment. Recently, we performed bariatric surgery (sleeve gastrectomy) on five patients (mean BMI: 48.2 kg/m², duration after surgery: 1-5 months) and the incidence of high lambda was 60%. One high lambda patient already discontinued to come to hospital within 3 months after the surgery.

Discussion: High lambda is highly detected in Japanese severe obese patients and a candidate predicting factor of dropout after bariatric surgery.

46

ROUX-EN-Y GASTRIC BYPASS AS METABOLIC TREATMENT IN A HEART TRANSPLANTATION PATIENT WITH TYPE 2 DIABETES**Alberto Salinas**; Geylor Acosta; Wilfredo Garacia; Mariemma Antor*Bariatric Surgery Service, Hospital de Clinicas Caracas, Caracas, Venezuela*

Background: Type 2 Diabetes is a relative contraindication for organ transplantation, it's has been related to worse survival after heart transplantation. Gastric bypass has demonstrated 85% of remission in diabetes type 2, and has been done after cardiac transplantation.

Case Report: A 55 years old male, type 2 diabetic five years previous to heart transplantation in 2006. Preoperative BMI was 31 kg/m². Treatment for diabetes was Sitagliptina 50mg/d, Repaglinida 2mg with meals and insulin Glargine 40 U pm (preop fasting glycemia 149mg/dl, HbA1c 8.5%), creatinine levels was 3.0mg/dl. Antirejection therapy included Mycophenolate 3000mg/d and Cyclosporine 100mg/d (blood levels 174.9ng/ml). Cardiovascular treatment was Lisinorpil 80mg/d, Carvedilol 50mg/d, Losartan 100 mg/d. Simvastatin (80mg/d) whit Phenophibrate (96 mg/d) for dyslipidemia. Previous tryglicerides was 495mg/dl. He had an incisional hernia after LVAD. In January 2010 he underwent an open proximal vertical gastric bypass with simultaneous repair of the incisional hernia. Was discharged at the fifth post-op day with no complications.

Results: At the 1st post-operative year his weight was 72 kg (BMI 22kg/m²), with 50mg of Sitagliptina for the diabetes (Fasting glycemia 96mg/dl, HbA1c 6.1%) improving renal function (creatinine 1.5mg/dl). Cyclosporine's blood level was 51.7ng/dl, increasing the dose to 150mg/d. Losartan was suspended in his cardiovascular treatment. The lipid test was normal with 40mg/d of Simvastatin and the same dose of Phenophibrates.

Conclusion: In this case GBP showed to be a good alternative for the treatment of DT2 and other comorbidities in cardiac transplantation patient.

47

SLEEVE GASTRECTOMY AND ILEAL INTERPOSITION IN THE TREATMENT OF TYPE 2 DIABETES - EXPERIENCE OF 11 CASES

Alcides Branco; **Joao Antonio Schemberk, Jr.**
GI Surgery, Hospital Vita Batel, Curitiba, Brazil

The current clinical treatments for type 2 diabetes, controlling blood glucose levels, but with the over the years that the blood glucose levels worsen. The UKPDS also showed that there is a progressive deterioration of pancreatic beta cell function, regardless of the treatment, and 9 years after treatment only 25% of diabetic patients continue to respond to monotherapy, the association the multiple resources to improve the control glycemic.

The goal of creating a surgical treatment is to try to promote healing of type 2 diabetes, as all current treatments are only for control of glucose levels rather than cure.

This retrospective study by BRANCO, SCHEMBERK et al where we selected all patients who were using high doses of insulin and some oral medication associations, were conducted during 2008 to 2009. With 11 patients as follows:

Sex M (10) and F (1)

BMI ranged between 24,7 - 40,0

BMI postoperative period ranged between 20,1 -29,4

Currently five patients are without medication with normal blood glucose levels, and six patients stopped using insulin and are alone, with improvement of clinical conditions.

We think it is a current proposal for the treatment of type 2 diabetes, with excellent results in relation to quality of life that can provide this group of patients.

48

CLOSE MONITORING AND RAPID MEDICATION TITRATION IS NECESSARY FOR T2DM SUBJECTS AFTER RYGB

Dara P. Schuster; Magdalena Teodorescu; Kathy Foreman; Dean J. Mikami; Bradley J. Needleman
Department of Surgery, The Ohio State University, Columbus, OH, USA

Background: Roux-en-Y gastric bypass (RYGB) has demonstrated up to a 90% reduction in type 2 diabetes (T2DM)-related mortality. When T2DM resolution occurs post-operatively and how best to titrate medications to prevent hypoglycemia after RYGB is unclear. Therefore, the objectives of this study included 1) to temporally define glucose normalization 2) to reduce risks of hypoglycemia while maintaining glucose control.

Methods: A prospective study assessing resolution of T2DM post-RYGB. Monthly telephone interaction tracked weight loss, glucose and medication use, baseline and six-month readings of weight, glucose, insulin, HbA1c were collected.

Results: Baseline characteristics: 23 female/3 male, age 52±9 years, T2DM duration 7.8±6 years, weight 131±32 kg, HOMA-IR 8.3±2.1, HbA1c 7.1±1.1%, 10 on insulin and 15 on at least 2 oral hypoglycemic drugs.

Months post-RYGB	0	1	2	3	4	5	6
	(n=26)	(n=26)	(n=21)	(n=13)	(n=9)	(n=5)	(n=5)
*Weight loss (kg)		12±1	18±1	24±2	25±1	29±2	28±2
*FBG (mg/dl)	127±35	124±5	120±6	115±8	110±6	118±9	98±4
*2 hour postprandial (mg/dl)		123±5	118±7	120±9	121±13	123±11	102±8

*mean±SE

At six-months HOMA-IR 1.4±0.9, HbA1c 6.1±0.1%, one subject remained on insulin, one on metformin. There was no association between use of insulin/oral medications and improved glucose and weight loss.

Summary: We observed: improvement of 28.4 mg/dl in FBG, 1% reduction in HbA1c and 6.9 points improvement in HOMA-IR at 6 month follow-up.

Conclusion: Significant improvement in glucose levels and insulin resistance occur soon after RYGB. Patients should be monitored closely, with ongoing medication titration to avoid hypo- and hyperglycemia during the first months post-RYGB.

IS DUMPING SYNDROME A REAL CONCERN AFTER GASTRIC BYPASS?

Magdalena Teodorescu; Bradley J. Needleman; Ambar Banerjee; Kathy Foreman; Dean J. Mikami; **Dara P. Schuster**
Department of Surgery, The Ohio State University, Columbus, OH, USA

Background: Dumping syndrome is an expected/desired part of the behavior modification caused by Roux-en-Y gastric bypass (RYGB) that can deter consuming energy-dense food. Dumping occurs in 25-50% of RYGB patients. In this study, we assessed the occurrence of dumping after high glucose load.

Methods: In this prospective study to assess resolution of type 2 diabetes mellitus (DM), subjects completed an oral glucose tolerance test (OGTT). During an OGTT, the subjects ingest 75 grams of Glucola®.

Results: Six patients completed an OGTT. None of them experienced dumping as defined by the Sigstad scoring system, despite the ingestion of a high glucose load. Prior to OGTT, only one subject reported any dumping episodes.

Subjects	1	2	3	4	5	6
HbA1c(%) baseline	6.4	6.3	7.6	10.4	6.4	6.5
Mean 2hPP BG (mg/dl) one mo prior to OGTT	91.3	89.6	100.7	113.6	82	86
Sigstad's score	0	2	1	0	0	0
Postsurgical date of OGTT (mo)	3	6	6	3	4	2

Summary: In our study population, dumping was not seen in response to high glucose load, even in the early post-operative period. Therefore, glucose, when ingested alone, may not stimulate dumping.

Conclusion: The occurrence of dumping is highly variable after RYGB and difficult to predict pre-operatively. The risk of dumping causes significant apprehension for patients, even to the point of declining surgery. Dumping has not been found to improve weight loss. Therefore, additional research into the triggers for dumping is needed to better inform/educate prospective patients.

24-HOUR GLYCEMIC EXCURSIONS FOLLOWING ROUX-EN-Y GASTRIC BYPASS (RYGB) IN A NON-MORBIDLY OBESE DIABETIC PATIENT: A LONGITUDINAL 12-MONTH STUDY

Alpana P. Shukla¹; Soo Min Ahn¹; Naina Sinha²; Marlus Moreira³; Gladys Strain⁴; Maureen Morrison³; Alfons Pomp⁴; David Brillont²; Francesco Rubino⁵

¹Metabolic Surgery/Diabetes Surgery Center, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY, USA; ²Department of Endocrinology, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY, USA; ³Metabolic Surgery/Diabetes Surgery, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, USA; ⁴Department of Bariatric Surgery, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY USA; ⁵Department of Surgery, WCMC, New York, NY, USA

Background: It is not clear if dramatic reduction of A1c levels after RYGB results from persistent normoglycemia or wide daily glycemic excursions including frequent asymptomatic hypoglycemia. We sought to investigate glycemic excursions using 24h glucose monitoring (CGM) after RYGB in a non-morbidly obese diabetic patient.

Methods: A 44 years old female patient with BMI 32kg/m², uncontrolled type 2 diabetes, hypertension and dyslipidemia underwent RYGB. Several measures of glycemia including CGM were obtained pre-operatively at 2 weeks, 3, 6 and 12-months after surgery.

Results: Pre-operatively, despite intensive insulin therapy (>100 U/day) and Exenatide, a 7-day CGM measurement revealed hyperglycemia to occur for an average of 62.5% of the study period, while there were frequent episodes of glycemia <70mg/dl (5% of total time). As early as 2 weeks after surgery, glycemic excursions were between 70-180mg/dl for 99.6% of the time with no hypoglycemia. From month 3 post-operatively the patient was off all anti-diabetic medication and glycemic excursions remained between above limits with no evidence of hypoglycemia. At 12 months, glucose levels were normal (85-118 mg/dl) with no episodes of hypoglycemia. Her HbA1C declined from 9.1% preoperatively to 5.6% at 12 months. At one year, the patient lost a total of 55lbs and BMI decreased to 24kg/m². Blood pressure and lipid profile normalized without medication.

Conclusion: In this moderately obese Type 2 diabetic patient RYGB has resulted in complete remission of diabetes at 12 months without hypoglycemia as assessed by CGM.

Funding Source: Covidien Surgical Devices

51

ONE-YEAR IMPLANTATION OF AN ENDOSCOPIC DUODENAL-JEJUNAL BYPASS LINER INDUCES 46% EXCESS OF WEIGHT LOSS AND SUBSTANTIAL IMPROVEMENT IN TYPE 2 DIABETES AND CORONARY HEART DISEASE (CHD) RISK FACTORS

Alex Escalona¹; Fernando Pimentel¹; Allan Sharp¹; **Milenko Slako**¹; Pablo Becerra¹; Danae Turiel¹; Claudia Bambs¹; Manoel Galvao²; Almino Ramos²; Lee Kaplan³; Keith Gersin⁴; Luis Ibanez¹

¹Department of Digestive Surgery, Pontificia Universidad Catolica de Chile, Santiago, Chile; ²Gastro Obeso Center, Sao Paulo, Brazil;

³Department of Gastroenterology, Massachusetts General Hospital, Boston, MA, USA; ⁴Department of Surgery, Carolinas Medical Center, Charlotte, NC, USA

Background: The duodenal-jejunal bypass liner (DJBL, GI Dynamics, Inc., Lexington, MA) is an endoscopic implant that mimics the intestinal bypass component of the Gastric bypass. Previously reported studies have shown promising improvements in type 2 diabetes (T2D) and weight loss for up to 6 months. This report describes weight loss and CHD risk factors changes in subjects with obesity who were implanted with the DJBL for one year.

Methods: The DJBL was implanted endoscopically in 43 of 46 subjects (weight, 110.8±18.7 kg; BMI, 44.1±5.7 kg/m²; age, 35.0±10 years, 76.7% women). Three subjects could not be implanted due to unfavorable anatomy. Mean implant delivery time was 23±11 minutes. There were 16 early endoscopic removals due to device movement (9), liner obstruction (3), abdominal pain (2), acute cholecystitis (1) and patient request (1). Weight and cardiometabolic data were analyzed on the 24 subjects who completed the protocol to one year.

Results: Observed weight loss at one year was 22.3±10.5 kg, or 20.0±8.8% of total body weight (p<0.001). Improvements on CHD risk factors includes decreases in waist circumference of 20.6±8.1 cm (p<0.0001), systolic blood pressure of 8.6±15 mmHg (p<0.01), LDL cholesterol of 25.9±24.5 mg/dL (p<0.0001), triglycerides of 45.1±65.1 mg/dL (p=0.007) and no change in HDL cholesterol 0.6±7.3 (p=0.7). HbA1c decreased from 7.9±2 to 6.5±1.6 (p=0.05) in the 6 subjects with T2D.

Conclusions: The DJBL has a durable effect on weight loss, type 2 diabetes and CHD risk factors for one year, suggesting that this new device may be a candidate for the primary therapy of T2D and obesity.

52

ROUX-EN-Y GASTRIC BYPASS IN PATIENTS WITH TYPE 2 DIABETES AND BMI <35 AND POOR METABOLIC CONTROL

Milenko Slako¹; Pablo Becerra¹; Napoleon Salgado¹; Josefa Cisternas¹; Gustavo Perez¹; Alejandro Raddatz¹; Fernando Crovari¹; Ricardo Funke¹; Sergio Gusmán¹; Camilo Boza¹; Danae Turiel²; Alex Escalona²

¹Department of Digestive Surgery, Faculty of Medicine, Pontificia Universidad Catolica de Chile, Santiago, Chile; ²Department of Digestive Surgery, Pontificia Universidad Catolica de Chile, Santiago, Chile

Introduction: Roux-en-Y Gastric Bypass (RYGBP) results in early and long-term improvement of type 2 diabetes (DM2) in morbidly obese patients. The aim of this study was to evaluate the impact of RYGBP on glucose homeostasis in patients with DM2 and body mass index (BMI)< 35 Kg/m².

Methods: This retrospective analysis included all patients who underwent RYGBP with preoperative BMI 30 to 35, DM2 and poor metabolic control (HbA1c >7%) in our institution. We analyzed their epidemiologic features, pharmacologic treatment for DM2, serum fasting glucose and HbA1c levels at first postoperative year.

Results: From 2002 to 2009, 42 patients met the inclusion criteria, 24 female (57%). The mean age and BMI were 48±8.9 years and 33,5±1,3 kg/m², respectively. Before surgery, 31 patients (73%) were under oral treatment, and 8 (18%) were insulin treatment. Mean preoperative HbA1c was 8,3%. Six patients (14%) developed gastrojejunostomy stenosis at follow up. BMI at 3, 6 and 12 months were 27.7, 26.6 and 26.1 Kg/m² respectively (p=0,001). Serum Fasting glucose at 3, 6 and 12 months were 106.3, 91.6 and 89.4 mg/dl (p=0,002). Mean HbA1c at 3, 6 and 12 months were 6.3, 6.0 and 6.1(p=0,0001). One year after RYGBP 24 patients (57%) were free of medications.

Conclusion: RYGBP surgery improves metabolic control in DM2 patients with low BMI. These results suggest that RYGBP is safe and may be considered an alternative of control of DM2 in obese patients with low BMI and poor metabolic control.

Funding Source: GI Dynamics Inc.

53

SERUM APOLIPOPROTEIN H, NEW MARKER OF DIABETIC NEFROPATHY?

David Stejskal

Department of Laboratory Medicine & Institute of Medical Chemistry and Biochemistry, Central Moravian Hospital County, Prostějov, Czech Republic

Background: Apolipoprotein H (beta2 glykoprotein I, 48 kDa) is a plasma glycoprotein synthesized in the liver. Precise functions are unknown but it is speculated about urine ApoH as a marker of kidney diseases. No valid data on ApoH serum method for laboratory diagnosis of nephropathy exist.

Aim: Development and validation of the new ELISA test for serum ApoH measurements and its testing in individuals with diabetic nephropathy.

Methods: Serum samples were used from 43 patients of nephrologic out patient centre (27 with diabetic nephropathy, 16 with normal kidney functions). ELISA was developed, validated and performed for ApoH serum, cystatin C, urea, creatinine, were measured in sera and albumin/creatinin index, alpha 1 microglobulin and GGT in urines.

Results: ELISA test for serum ApoH DKK-1 measurement had optimal analytic characters. Serum ApoH serum values were significant higher in individuals with diabetic nephropathy (195 vs.326.6 ug/l, P<0.01) and test had high diagnostic efficacy (ROC 0.95, sensitivity 90, specificity 100%, LR+ 15). Differences were significant after adjustment for age, sex and urine or serum kidney markers. Results were verified with frequency chart and with serum ApoH were 93% of individuals correctly classified.

Conclusions: ELISA test for serum ApoH was developed. Serum ApoH is promising marker for laboratory diagnosis of diabetic nephropathy.

54

EFFECT OF ONE-MONTH TREATMENT EXTREMELY OBESE PATIENTS WITH VERY LOW CALORIE DIET (VLCD) ON ANTHROPOMETRIC PARAMETERS, CARDIOMETABOLIC RISK AND LEPTIN LEVELEdita J. Stokic¹; Dragana Tomic-Nagic¹; Esma R. Isenovic²¹Department of Endocrinology, Clinical Center of Vojvodina, Novi Sad, Serbia; ²Institute Vinca, Laboratory for Molecular Genetics and Radiobiology, University of Belgrade, Serbia**Introduction:** Obesity is a disease characterized by body fat accumulation. Numerous studies suggest that weight loss of 5% to 10% can reduce obesity-related disorders. The aim of obesity treatment is not only weight reduction, but also reduction of body fat.**Methods:** Treatment with VLCD (400 kCal/day), was carried out in 30 extremely obese patients (age, 38.87± 10.96 years; BMI, 44.01 ± 4.86 kg/m²) in hospital conditions. Body weight (BW), waist, body composition, leptin, lipids, fibrinogen, glucose, fasting and postprandial insulin were determined before and after VLCD. IR was measured by homeostatic model assessment (HOMA) index.**Results:** There was significant reduction in BW by 9.8 % (120±/ 17 kg vs. 108. ±/ 14 kg, p< 0.001) and significant reduction in fat mass and waist (119±/14 cm vs. 110 ±/ 15 cm, p< 0.01). Significant improvements of lipids were observed for total (p<0.001) and LDL cholesterol (3.50 ± 1.0 vs. 2.60 ± 1.0 mM/l, p<0.001), triglycerides (1.85 ± 1.37 vs. 1.25 ± 0.70 mM/l, p<0, 01) while HDL-cholesterol was significantly decreased (p<0.001). Leptin levels decreased significantly by 52.60% and leptin level expressed per kilogram of fat was significantly lower after weight loss. Fasting and postprandial insulin and insulin sensitivity improved significantly after weight loss.**Conclusion:** VLCD produces clinically significant weight loss, with improvements in IR and cardiovascular diseases risk factors in extremely obese persons. This treatment option is effective in promoting significant short-term weight loss, with concomitant improvement in obesity-related conditions. VLCD is generally safe when used under proper medical supervision in severely obese patients.

55

CAN WE PICK THE NON-OBESE DIABETICS WHO WOULD BENEFIT FROM METABOLIC SURGERY?Richard S. Stubbs¹; Jonathan Foo²; John Wilson²; Jeremy Krebs³; Mark Hayes²¹The Wakefield Clinic, Wakefield Hospital, Wellington, New Zealand; ²Wakefield Biomedical Research Unit, University of Otago, Wellington, Wellington, New Zealand; ³Department of Diabetes and Endocrinology, Wellington Hospital, Wellington, New Zealand**Background:** Bariatric surgery can achieve resolution of T2DM in over 80% of instances when performed in severely obese individuals. However, resolution rates are not so high when these operations are performed in non-obese diabetics. It seems those with T2DM may represent a variety of phenotypes, not all of which have the potential to be resolved by surgery.

In an effort to understand the factors contributing to the resolution of T2DM after gastric bypass, we conducted two studies. In the first, in 130 severely obese diabetics, we analysed those pre-operative factors which predicted resolution of T2DM following gastric bypass. In the second, we measured insulin resistance using HOMA in a group of overweight individuals (25>BMI<30) with T2DM and also in a group of 86 severely obese individuals with T2DM, who have subsequently undergone gastric bypass.

Results: In the first study, five preoperative variables were found to have independent predictive value for resolution of T2DM. These included BMI, HbA1c, fasting glucose, hypertension and requirement for insulin. In the second, mean HOMA was 4.8 vs 10.2 for non-obese and severely obese diabetics respectively with 35% vs 72% having a HOMA of ≥5.0. Mean C-peptide was 962 vs 1487 for non-obese and severely obese respectively with 35% vs 83% having a fasting C-peptide ≥1000.**Conclusions:** These studies have important implications for which non-obese individuals with T2DM, may expect to resolve their diabetes by metabolic surgery. They may therefore be used to guide the selection of non-obese subjects being offered metabolic surgery in future studies.

56

PATIENTS WITH DIABETES AND PRE-DIABETES HAVE SMALLER HIGH DENSITY LIPOPROTEIN CHOLESTEROL (HDL-c) IMPROVEMENTS POST BARIATRIC SURGERY COMPARED TO PATIENTS WITH NORMAL GLOCOSE TOLERANCEDaniel Chun-Hang Wai¹; Shanker Pasupathy²; Sonali Ganguly¹; Kwang Wei Tham¹¹Department of Endocrinology, Singapore General Hospital, Singapore, Singapore; ²Department of General Surgery, Singapore General Hospital, Singapore, Singapore**Background:** HDL-c is negatively correlated with cardiovascular risk. Patients with diabetes and pre-diabetes or abnormal glucose tolerance (AGT) have low HDL-c. Few studies have compared the change of HDL-c post bariatric surgery between patients with normal glucose tolerance (NGT) and AGT.**Aims of Study:** To compare the change of HDL-c post bariatric surgery between patients with NGT and AGT.**Methods:** HDL-c levels at 0, 3 and 6 months were transformed using the multivariate repeated measures model, with glucose tolerance being the between-subject factor.**Results:** 46 patients (61% females) underwent laparoscopic bariatric surgery from September 2008 to November 2010. 78% had sleeve gastrectomy, 20% gastric bypass, and 2% bilio-pancreatic diversion. The mean age was 39 years (+/-10.6) with a mean BMI of 43.6kg/m² (+/-9.8). 54% had NGT versus 46% with AGT. Only 1 patient (4%) in the NGT group was on a fibrate pre-op but none in the AGT group. Average weight loss at 6 months was 25.5kg and 22.2kg for NGT and AGT respectively. HDL-c rose significantly in both groups (mean HDL-c for NGT were 1.06, 1.49 and 1.68 mmol/L at 0, 3 and 6 months; mean HDL-c for AGT were 0.89, 0.92 and 1.08 mmol/L; within-subject p=0.006). Thus HDL-c increased 58% in the NGT but only 21% in the AGT. HDL-c in the NGT was significantly higher than in the AGT group throughout the 6 months (between-subject p=0.009).**Conclusion:** Although bariatric surgery improved HDL-c in both group of patients, those with AGT had less significant improvements.**Funding Source:** The Executive Yuan National Science Council in Taiwan(grant NSC 97-2625-M-39-3), Department of Health Clinical Trial and Research Center for Excellence (grant DOH99-TD-B-111-4 and DOH99-TD-C-111-5)and China Medical University Hospital (grant 1MS1).

57

CARDIO-VASCULAR RISK REDUCTION AFTER GBP FOR TYPE 2 DM IN PATIENTS WITH BMI < 35KG/M2**J.S. Todkar, S. S. Shah***Surgery, Ruby Hall Clinic, Pune, Maharashtra, India*

Background: Metabolic syndrome (MS) is known to increase coronary heart disease (CHD) risk in diabetics. Improvement in MS and glycemic control can reduce this risk. United Kingdom Prospective Diabetes Study (UKPDS) risk engine predicts the absolute risk of CHD in this population. This study aims to evaluate absolute CHD risk in Type 2 Diabetic patients with Body mass index between 22 and 34.99Kg/M2 before and after gastric bypass.

Methods: Sixteen Type 2 diabetic patients with BMI less than 35Kg/M2 and C-Peptide more than 1ng/ml were prospectively evaluated using UKPDS risk engine preoperatively & at 9 months after GBP. For analysis paired T test was used.

Results: The mean age and HbA1C was 44±22yrs and 11 ± 3.5 % respectively. The calculated mean Pre and Post-operative CHD risk and the Pre and Post-operative fatal CHD risk was 15.58 and 5.033 and 10.553 and 2.687 respectively. Pre & Post-operative stroke risk and Pre & Post-operative fatal stroke risk was 4 and 2.687 and 0.633 and 0.3 respectively. Statistically significant difference was found between pre and post operative CHD & fatal CHD risk.

Conclusion: GBP does reduce the risk of CHD in type 2 diabetic patients with BMI < 35Kg/M2. Further studies with a larger sample & long term results are needed.

58

CARDIOVASCULAR RISK REDUCTION AFTER LSG (LAPAROSCOPIC SLEEVE GASTRECTOMY) USING FRAMINGHAM SCORE**J. S. Todkar, S. S. Shah***Surgery, Ruby Hall Clinic, Pune, Maharashtra, India*

Background: Morbid obesity, hypertension, dyslipidemia are known to increase coronary heart disease (CHD) risk. Improvement in the above can reduce this risk. FRAMINGHAM RISK SCORE predicts absolute risk of CHD in this population. This study aims to evaluate changes in absolute CHD risk before and after laparoscopic sleeve gastrectomy(LSG).

Methods: Total 87 obese hypertensive patients with dyslipidemia underwent LSG at laparo-obeso center from 2004 till 2008. This is the retrospective study of the prospectively evaluated 32 patients using FRAMINGHAM RISK SCORE preoperatively & at 36 months after LSG. For analysis paired T test was used.

Results: The mean age was 44±20 yrs .N=32. The mean preop systolic BP(136.4 mm of Hg), total cholesterol(182.8 mg%),HDL (43.1 mg%), triglycerides (164.1 mg%), CHD risk (14.19), Fatal CHD risk (8.98), stroke risk (6.71) and fatal stroke risk (1.37) was compared to mean postop systolic BP(127.6), total cholesterol (178), HDL (44.7), triglycerides (122.9),CHD risk (11.11), Fatal CHD risk (6.95), stroke risk (6.69) and fatal stroke risk (1.31). Statistically significant difference was found between pre and post operative systolic BP(p<0.001), triglycerides(p=0.01), CHD(p=0.008) & fatal CHD (p=0.005) risk. Difference between pre and post operative total cholesterol, HDL, stroke risk and fatal stroke risk was not statistically significant.

Conclusion: LSG reduces the risk of CHD in morbidly obese patients with hypertension and dyslipidemia. Further studies with a larger sample & long term results are needed.

59

PREDICTING REMISSION WITH ILEAL INTERPOSITION - EFFICIENT UTILISATION OF NATIONAL RESOURCES**Surendra Ugale¹; Neeraj Gupta¹; Vishwas Naik¹; K. D. Modi²; Sunil Kumar Kota²***¹Advanced Laparoscopic & Metabolic Surgery Center, Kirloskar Hospital, Hyderabad, India; ²Endocrinology, Medwin Hospital, Hyderabad, India*

Aim: Laparoscopic Ileal Interposition with sleeve gastrectomy offers good metabolic improvement and weight reduction without significant malabsorption.

India with more than 40 million diabetics can contain rising healthcare costs, if resources are focused on select group of patients, with impending complications of nephropathy, retinopathy or cardiac disease, by using factors predicting successful outcomes.

Methods: Procedure performed in 43 patients (M:F=26:17) from January 2008 with mean age of 47.53± 8.82 years (range 29-64 years), mean duration of diabetes 9.75± 8.82 years (range- 1 to 32 years) and mean preoperative BMI 32.05 ± 7.5 kg/mt2. All patients had poorly controlled type 2 diabetes (mean HbA1C- 9.57 ± 2 %). Thirty (70%) patients had hypertension, 19 (44%) had dyslipidemia and 19 (44%) had significant microalbuminuria.

Results: Mean follow up was 11.3 ± 9 months. Postoperatively glycemic parameters (FBS, PLBS, HbA1C) improved in all patients (p<0.05) at all intervals. Eighteen patients (45%) had remission in diabetes. Twenty seven patients (90%) had remission in hypertension. All patients had weight loss between 15%-30% (p<0.05). Metabolic improvement was clearly more in patients with BMI > 27 kg/mt2, duration of diabetes ≤ 10 years and stimulated C-peptide > 4 ng/ml.

Conclusions: The 'neuroendocrine brake' procedure appears to be safe and an effective option for remission of type 2 diabetes and hypertension (major risk factor for cardiovascular disease and micro vascular complications such as retinopathy and nephropathy); predictors enabling focused utilization of scarce resources, to prevent major complications and avoid the large financial drain on the country's economy

60

BPD WITH GASTRIC PRESERVATION IN DIABETES II**Manuel E. Valdez Muelle***General Surgery, Clinica El Golf, Lima, Peru*

Introduction: Diabetes is a health problem in the world, BPD with gastric preservation control diabetes in our patients without restriction, restriction could be useful in obesity patients, but is not in non obese patients.

Methods: We make a revision of all our 20 diabetic patients sometimes a BPD with gastric preservation between 2005 to 2010, we ask for the use of insulin, oral anti diabetic drugs or diet.

Results: 100 % of the patients avoid the use of any medication for diabetes without any diet restriction.

61

LAPAROSCOPIC SLEEVE GASTRECTOMY AS A SINGLE-STAGE PROCEDURE FOR THE TREATMENT OF MORBID OBESITY: QUALITY OF LIFE, RESOLUTION OF COMORBIDITIES, FOOD TOLERANCE AND 6-YEAR RESULTS FOR WEIGHT LOSSMathieu D'Hondt¹, **Filip Vanrykel**¹; Sofie Vanneste¹; Hans Pottel²; Dirk Devriendt¹; Frank Van Rooy¹; Franky Vansteenkiste¹¹Digestive Surgery, Groeninge Hospital, Kortrijk, Belgium; ²Faculty of Medicine, Catholic University Leuven (KULAK), Kortrijk, Belgium

Background: This study evaluates long term weight loss, effect on comorbidities, quality of life (QoL) and food tolerance following laparoscopic sleeve gastrectomy (LSG).

Methods: Between January 2003 and July 2008, 102 patients underwent LSG. A retrospective review of a prospectively collected database was performed. Demographics, complications, percent excess weight loss (%EWL) and effect on comorbidities were determined. QoL was measured with SF-36 and BAROS questionnaires. The food tolerance score (FTS) was compared to non-obese subjects.

Results: Eighty-three patients (81.4%) were eligible for follow-up. Mean initial BMI was 39.3. No major complications occurred. At median follow-up of 49 months (range 17-80) mean %EWL was 72.3% (+/-29.3). Twenty-three patients reached 6 years follow-up, mean %EWL was 55.9(+25.6). After one year 100% (7/7) of patients with sleep apnea withdrew from CPAP-mask. Antidiabetic medication was reduced or discontinued in 50.0% (5/10) of diabetic patients. The resolution rate of dyslipidemia 12 months after surgery was 69.4%. Hypertension normalized in 81,8%. A good to excellent BAROS-score was found in 90.4%. When comparing patients with >50 %EWL with patients <50 %EWL, SF-36 scores were statistically different only for 'physical functioning' and 'general health perception'. Mean FTS was 23.8 and 95.2% of patients described food tolerance as acceptable to excellent.

Conclusion: LSG is a safe and effective bariatric procedure although a tendency of weight regain is noticed after 5 years. LSG results in excellent reduction of comorbidity comparable to that of other bariatric procedures and in good to excellent health-related QoL. In 95.2% of patients food tolerance is acceptable to excellent.

62

ROBOTIC LAPAROSCOPIC SLEEVE GASTRECTOMY IS A FEASIBLE AND SAFE APPROACH FOR THE TREATMENT OF MORBID OBESITY AND ITS ACCOMPANYING DM**Ramon Vilallonga**; José Manuel Fort; Oscar Gonzalez; Manel Armengol*Endocrine, Bariatric and Metabolic Unit, Robotic Division, University Hospital Vall d'Hebron, Barcelona, Spain*

Novel techniques such as laparoscopic sleeve gastrectomy (LSG) are now used for the treatment of morbid obesity (MO) and related diseases such as diabetes mellitus (DM). There is now enough experience with LSG in our group and we had the possibility to begin robotic sleeve gastrectomy for the treatment of MO and DM.

Method: Eighteen consecutive patients underwent LSG with the use of the Da Vinci surgical system by the same surgical team, four of them were affected with DM. Surgical techniques followed the principles of standard LSG. We completed a sleeve gastrectomy at 2 or 5 cm from the pylorus with a 36F boggie inside the stomach and performing stappling through a standard 12 mm trocar. A complete robotic prolene® suture for reinforcement.

Results: Twenty patients (2 men and 18 women) with a mean age of 44.4 years (17-63) and a mean body mass index (BMI) of 48.0 kg/m² were operated by Robot. 4 patients were affected of DM and using insulin at time of operation. Mean total operative time was 104.1±15.3 min. Peri-operative morbidity and mortality was zero. Mean time for discharge was 4.16 days. All patients after a mean follow-up of 5 months have cured their DM.

Conclusions: Robotic laparoscopic sleeve gastrectomy is a feasible and safe approach for the treatment of MO and its accompanying DM. In experienced laparoscopic hands it is still an efficient surgical technique for the treatment of MO and DM. No added operating time for the procedure has been reported.

63

IMPROVEMENT AND REMISSION IN TYPE 2 DIABETES MELLITUS AFTER LAPAROSCOPIC VERTICAL SLEEVE GASTRECTOMY IN OBESE PATIENTS

Diva Villao¹; Juan Eduardo Contreras¹; Jorge Bravo¹; Julio Nuñez¹; Gustavo Czwiklitzer¹; Juan Pablo Camacho¹; Roberto Arpi¹; Ismael Court²; JAMES Hamilton²
¹Surgery Department, Hospital Del Salvador - Clinica Santa Maria, Santiago De Chile, Chile; ²Surgery Department, Clinica Santa Maria, Santiago De Chile, Chile

Background: The results regarding remission or improvement of type 2 diabetes mellitus (DM2) after Laparoscopic vertical sleeve gastrectomy (VSG) have been encouraging and even comparable to those observed in other techniques.

Methods: An uncontrolled prospective study of patients undergoing VSG from Nov 2005 to Dec 2010 by the same team, under the same standards of surgical technique, preoperative evaluation and postoperative management. We evaluated the results of DM2 in terms of resolution, improvement or indifference and compare the lost weight between diabetic and non diabetic patients.

Results: 577 patient underwent to VSG, 10,4% have T2DM. Preoperative weight: 108.2 ± 22.34 kg, BMI: 39,72 ± 6,37 kg/m², FBG: 144.1 ± 69mg / dl and HbA1c: 7.4 ± 1.7%. At follow-up at 1, 6 and 12 months an excess weight loss of diabetic patients 31 ± 15%; 56 ± 19 and 64 ± 16% respectively and non diabetic patients 33±15%; 75±25% (p<0.001); 87±29% (<p0.001).

The evolution of the average FBG at 1, 6 and 12 months were: 97.1 ± 27.2mg/dl; 98.3 ± 14.8 mg / dl and 102.8 ± 20.7 mg / dl respectively, and HbA1c: 6.9 ± 2%, 5.8 ± 0.7%, 5.7 ± 0.6% (p <0.01) respectively. At follow-up year 60% had remission and 21.4% improvement in DM2.

Conclusion: The VSG is an effective technique for control of DM2 in obese patients, revealing a significant metabolic control demonstrated in both clinical and laboratory parameters, maintaining the same year follow up. Further studies are needed to determine the difference in weight loss.

Funding Source: Fundació Dr. Vilallonga

64

GASTRIC BYPASS AND TYPE 2 DIABETES MELLITUS (DM2). WOULD THERE BE A FAVORABLE RELATION?

Gregorio Villarreal; Luis Guillermo Menchaca
 Surgery, ISSSTE, Monterrey, Mexico

Introduction: DM2 has become into a world-wide epidemic; considered grave due to its complications and mortality. Its gravity transcends due to its incidence is increased and the early age of beginning in the population. In this research we want to show the results of our DM2 patients having a BMI less than 35 kg/m², who got a gastric bypass.

Method: It's a prospective, longitudinal clinical research, in which since June 2005, along with our hospital's Ethics and Research committees' authorization, summoned DM2 patients who didn't achieve their control and having a BMI less than 35 for getting a gastric bypass in order to help their diabetes treatment. Until November 2009, 15 patients got operated, 10 women and 5 men, age range from 36 to 57 y-old, having a BMI between 22 and 33 kg/m².

Analysis: Glycemic levels were evaluated, glycosylated hemoglobin, serum lipids, also the treatment used by patients to control their diabetes. The student's T test was used for related samples, evaluating before-and-after variables, using the patient's preoperative state as its own control.

Results: Making an evaluation on November 2010, 86.7% had glycosylated hemoglobin less than 7%. 73.3% were without treatment for their comorbidities. When evaluating the glycemia, lipids, glycosylated hemoglobin and the antidiabetes treatment, the improvement is statistically significant with p<0.001.

Conclusions: Knowing that researches to clarify the mechanism of action are needed, our research's diabetic patients having a BMI less than 35 achieved control or improvement after getting a gastric bypass.

65

INDICATIONS FOR BARIATRIC SURGERY IN THE BMI<35 KG/M² POPULATION TREATED AT ASMBS BARIATRIC SURGERY CENTERS OF EXCELLENCE (BSCOE'S) AS REPORTED IN THE BARIATRIC OUTCOMES LONGITUDINAL DATABASE

Deborah A. Winegar¹; Eric J. DeMaria¹; Bintu Sherif¹; Caroline M. Apovian²

¹Research, Surgical Review Corporation, Raleigh, NC, USA; ²Department of Medicine, Boston Medical Center, Boston, MA, USA

Background: Bariatric surgery in patients with BMI <35 kg/m² is controversial as many fear otherwise healthy patients are electing to undergo risky invasive procedures for less serious comorbidities as well as cosmesis. The current study was undertaken to examine the frequency of risk factors for cardiovascular disease (CVDRF) in patients undergoing surgery at ASMBS BSCOE's to determine if Roux-en-Y gastric bypass (RYGB) is being performed in low BMI patients to treat CVDRF.

Methods: Among the 145,751 research-consented patients with a primary bariatric surgery entered into BOLD, 483 were identified as RYGB patients with BMI >30 and <35 kg/m². Patient demographics and selected comorbidities of this cohort were compared to the overall BOLD population.

Results: The low BMI population was older, more often female and more often Caucasian than the overall BOLD population (Table). Low BMI patients also had a higher prevalence of comorbidities identified as CVDRF (diabetes, hypertension, dyslipidemia and liver disease). Only 17.8% were not afflicted by any of these CVDRF's.

Conclusion: BOLD data confirm that the presence of CVDRF is widespread in low BMI patients undergoing RYGB and is thought to be a primary indication for surgery in practice at ASMBS BSCOE's.

	Low BMI Population (N=483)	Overall BOLD Population (N=145,751)
Mean age, years (SD)	50.4 (10.6)	45.7 (11.8)
Percent Female	84.7	78.5
Percent non-Caucasian	19.5	23.8
Mean BMI, kg/m ² (SD)	33.9 (1.0)	46.7 (8.0)
% Diabetes	48.4%	27.2%
% Hypertension	66.5%	53.6%
% Dyslipidemia	51.6%	30.3%
% Liver Disease	7.7%	5.9%
None of the 4 comorbidities	17.8%	33.9%

66

INITIAL RESULT OF A PROSPECTIVE CASE-CONTROL STUDY TO EVALUATE THE EFFICACY OF LAPAROSCOPIC PLACEMENT OF GASTRIC CONTRACTION MODULATOR (TANTALUS II®) VERSUS INSULIN TREATMENT IN SUB-OPTIMALLY CONTROLLED OBESE TYPE 2 DIABETIC PATIENTS

Simon KH Wong¹; Alice PS Kong²; Vanessa WS Ng²; Rita Osaki²; Lindy LY Chan²; Candice CH Lam¹; Enders KW Ng¹; Juliana CN Chan²

¹Department of Surgery, The Chinese University of Hong Kong, Hong Kong, China; ²Department of Medicine and Therapeutic Pharmacology, The Chinese University of Hong Kong, Hong Kong, China

Aim: The aim of the current study is to evaluate the efficacy of TANTALUS system, a meal-initiated implantable gastric contractility modulator (GCM) in suboptimally controlled obese type 2 diabetes (T2DM) patients and compare its effect against conventional insulin therapy in a Chinese cohort.

Method: Moderately obese (BMI 25-35kg/m²) patients with T2DM who were suboptimally controlled (HbA1c >7.5%) despite maximal dose of oral anti-diabetic agents were included. Patients either received laparoscopic implantation of TANTALUS or insulin therapy are compared for their body weight, waist circumference (WC), glycemic control (HbA1C) before and after treatment.

Results: Seven patients were recruited, with 4 patients received GCM therapy and 3 patients received insulin injection therapy. At baseline, their mean body weight and BMI were 90.1kg (SD 9.8) & 31.6 kg/m² (SD 1.7) respectively and mean HbA1c was 9.4% (SD 0.8%). At 3 months after treatment, both groups have significant reduction of mean HbA1c, from 9.3% to 7.9% in the GCM group and from 9.5% to 8.3% in the insulin group (p=0.028). In the GCM group there was associated weight loss (mean 88.4kg to 85.5kg, p=0.068) and reduction of WC (mean 100.5cm to 97.8cm, p=0.059) whereas body weight (92.5kg to 92.5kg, p=1.0) and WC (111.0 cm to 111.3cm p=0.317) were similar in the insulin group.

Conclusion: Our initial results suggest that GCM implantation may potential be a safe and alternative treatment option to insulin therapy in improving glycemic control for obese T2DM patients. More patients and longer follow-up is required to confirm this finding.

COST EFFECTIVENESS AND PUBLIC HEALTH IMPLICATIONS TRACK

67

TYPE 2 DIABETES MELLITUS FOLLOWING BARIATRIC SURGERY: LONG-TERM REMISSION, RELAPSE AND EFFECTIVENESS VERSUS NONSURGICAL TREATMENT. A MULTISITE STUDY WITH 4,353 SUBJECTS

Guilherme M. Campos¹; David Arterburn²; Andy Bogart²; Karen J. Coleman³; Sebastien Haneuse⁴; David McCulloch²; Patrick O'Connor⁵; Nancy Sherwood⁶; Stephen Sidney⁷; Mary Kay Theis²; Joe Selby⁷

¹Department of Surgery, University of Wisconsin School of Medicine and Public Health, Madison, WI, USA; ²Group Health Center for Health Studies, Group Health Center Research Institute, Seattle, USA; ³Research & Evaluation, Southern California Permanente Medical Group, Pasadena, USA; ⁴Department of Biostatistics, Harvard School of Public Health, Boston, USA; ⁵HealthPartners Research Foundation, HealthPartners Research Foundation, Bloomington, USA; ⁶HealthPartners Research Foundation, HealthPartners Research Foundation, Minneapolis, USA; ⁷Division of Research, Kaiser Permanente Northern California, Oakland, USA

Aims: Our aim was to examine long-term T2DM remission and relapse patterns among severely obese adults who did and did not undergo Bariatric Surgery (BS).

Methods: We conducted a retrospective cohort study of adults with uncontrolled or medication-controlled T2DM who underwent BS in three integrated health care systems from 1995-2008. A second comparison cohort included all adults with severe obesity and T2DM from 2005-2008 (BMI data available). Outcomes were remission and relapse of T2DM, defined using pharmacy and laboratory data. We used propensity approach to identify a final sample for comparative effectiveness analyses, and multivariable-adjusted Cox proportional hazards framework to investigate the impact of BS vs. usual care on T2DM remission.

Results: We identified 4,353 adults with T2DM who had BS from 1995-2008, 96.4% were Roux-en-Y gastric bypass, 1.8% was banding, and 1.8% others. Overall, 80.0% experienced T2DM remission within five years after BS. Among those who remitted, 36.7% redevelop T2DM within five years. The median duration of T2DM remission was 7.5 years. Significant predictors of remission and relapse were procedure type, poor preoperative glycemic control, insulin use, and longer duration of T2DM. The comparative effectiveness sample comprised 1,395 BS subjects and 62,167 non-surgical subjects. The bariatric subjects experienced T2DM remission at a significantly higher rate [Hazard Ratio: 18.7; 95% Confidence Interval: 17.1 to 20.4].

Conclusions: BS is associated with durable remission of T2DM in most severely obese adults, however about one-third may experience a relapse within five years. BS appears far superior to usual medical care for T2DM remission.

Funding Source: This project was funded under Contract No. 2925331 from the Agency for Healthcare Research and Quality, US Department of Health and Human Services as part of the Developing Evidence to Inform Decisions about Effectiveness (DEcIDE) program. The authors of this report are responsible for its content. Statements in the report should not be construed as endorsement by the Agency for Healthcare Research and Quality or the US Department of Health and Human Services

68

BYPASSING GASTRIC BYPASS BY INSTRUCTING PATIENTS TO "BYPASS" INGESTING WHITE FOODS AND FRUIT: A SIMPLE NON-INVASIVE METHOD TO REVERSE TYPE 2 DIABETES

Steven R. Gundry

Center for Restorative Medicine, The International Heart and Lung Institute, Palm Springs, CA, USA

Bariatric Surgery (BS) leads to control of Type 2 Diabetes (DM). The procedure and follow-up results in expense to payers and pts while requiring considerable changes to dietary habits. As a less invasive/costly alternative, we asked whether dietary instructions to bypass (curtail or eliminate) certain food groups would result in comparable reversal/control of DM as that achieved by BS, at a BS institution. Patients who met criteria for BS (BMI 35 and above, with DM and other risk factors), and who were contemplating BS, were entered into the surgeon designed "Diet Evolution" Program with instructions to eliminate or curtail white and beige foods (breads, grains, potatoes, milk, sugar) and all fruits. They were allowed access to leafy and cruciferous vegetables, olive and canola oils, and 6 oz protein sources, and one/half cup of raw nuts per day. Pts were weighed monthly and laboratory values checked every three months. Wts, labs and food diaries checked compliance.

45 pts, ages 18 to 85, have been followed for 1-8 years, (mean 4). Weight loss the first year was 45+/-15 lbs. BMI fell from 38 to 27. HbA1c fell from 7.6 to 5.5; insulin fell from 26 to 8. 40/45 pts stopped all DM meds and insulin. There were no complications.

BS imposes dietary restrictions to costly and risky invasive procedures. In contrast, dietary advice to "bypass" certain foods results in reversal of DM, substantial weight loss, good compliance, while minimizing costs. For reversal of DM, bypassing food groups is superior to bypassing stomachs.

69

THE "VIRTUAL ENDOCRINOLOGIST": USING HEALTH INFORMATION TECHNOLOGY TO OPTIMIZE DIABETES MANAGEMENT IN PRIMARY CARE

Ronald Irwin Harris¹; J.B. Jones²; Christa Bruce²; Walter F. Stewart²

¹Endocrinology, Geisinger Clinic, Wilkes-Barre, PA, USA; ²Center for Health Research, Geisinger Health System, Danville, PA, USA

Effective management of T2D requires familiarity with details of treatment guidelines, but primary care providers (PCP) rarely have this specialized knowledge. We describe the development and use of "eDiabetes", a web-based tool designed to bring a "virtual endocrinologist" into the exam room as a means to optimize diabetes management.

eDiabetes relies on three components: 1) conversion of guidelines to a codified and actionable form, 2) patient-reported (including treatment preferences) and Electronic Health Record (EHR) data, 3) a guideline-based "rules engine" that processes all data. Two patient-specific applications were developed for use in primary care: a behavioral health questionnaire and a tool to educate and elicit patient preferences for reducing macro- and micro-vascular disease risks. Data are processed against decision logic that determines the appropriate recommendation, which is presented to the PCP via a web-based display.

Key data necessary to create a rule set for HbA1c management were determined to be current treatment, LFT, GFR, HbA1c, and Fasting Blood Glucose. From these data, 383 possible "scenarios" (i.e., a combination of key data) were determined and corresponding treatment recommendations were mapped to each scenario from the guidelines. eDiabetes is being tested in a randomized trial evaluating provider use, patient knowledge, and quality of care (e.g., treatment intensification).

The "virtual endocrinologist" assists the PCP in delivering optimal treatment by collecting needed data, synthesizing data into actionable advice, educating patients on individual-specific treatment options, eliciting preferences, and sharing relevant information with the PCP to facilitate the development of an optimal and individualized treatment plan.

Funding Source: Roche Diagnostics Operations and Merck & Co., Inc.

70

COST-OF-ILLNESS ANALYSIS OF TYPE 2 DIABETES MELLITUS IN IRAN

Mehdi Javanbakht¹; Hamid Reza Baradaran²; Atefeh Mashayekhi¹; Erfan Kharazmi³; Hadi Rezaei⁴

¹Health Economics, Tehran University of Medical Sciences, Tehran, Iran; ²Center for Non-Communicable Diseases Control, Iran Ministry of Health, Tehran University of Medical Sciences, Tehran, Iran; ³School of Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran; ⁴School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Objective: The objective of this study is to provide a detailed economic burden of type2 diabetes and its complications in Iran 2009.

Methods: This is a cost-of-illness study focusing on quantifying direct health care costs by bottom-up approach. Data on inpatient hospital services, outpatient clinic visits, physician services, drugs, laboratory test, education and non-medical cost were collected from national registries. The human capital approach was used to calculate indirect costs separately in male and female and among different age groups.

Results: The total national cost of Type2 diabetes in 2009 is estimated at 3.95 billion [US\$] including 2.33 billion direct (medical and non-medical) cost and indirect cost of 1.62 billion. Average direct and indirect cost per capita was 843.1\$ and 588.4\$ respectively. Complications (57%) and drugs (23.8%) were main components of direct cost. The largest components of medical expenditures attributed to diabetes' complications are cardiovascular disease (46.5% of total complications cost), nephropathy (22.9%), blindness (10.7%) and peripheral vascular disease (7%). Indirect costs include temporarily disability (\$382.9million), permanent disability (\$79.6million) and reduced productivity due to premature mortality (\$730.4million).

Conclusions: Type2 diabetes is a costly disease in the Iran healthcare system and consumes more than 9.8% of total health expenditure. In addition to these quantified costs, diabetes imposes high intangible costs on society in terms of reduced quality of life. While Diabetes is increasingly prevalent in the Middle East, the population remains largely unaware of the devastating effect of the disease. Preventive intervention, screening, and treatment strategies may effectively decrease this burden.

Funding Source: This study was part of M.J. Ph.D candidate (health economics) thesis and was supported financially by a grant from the Institute of Endocrinology and Metabolism.

71

PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES OF SOME MEDICINAL PLANTS IN CENTRAL AFRICAN ANTIDIABETIC PROPERTIES

Jean-Noël Koane

Department of Chemistry, University of Bangui, Bangui, Central African Republic

For thirty years, diabetes is a real public health problem worldwide. It results in abnormally high blood sugar measured in the blood several months apart, at a concentration greater than 1.4 gr. per liter at fasting and it affects all age groups.

It is a chronic metabolic disease that occurs when the pancreas does not secrete insulin, insulin-dependent (type I) usually affects young individuals age 30 or when the pancreas does not produce enough insulin secretion and that it is in deficit; form of diabetes found in adults and obese: diabetes non-insulin-dependent (type II). Besides these two forms of diabetes are primitive, there are diabetes secondary to other diseases, diabetes and gestational diabetes Mady.

Indeed, given the dissatisfaction found in modern medicine, traditional herbal tracks seem to reinforce potential interest, including the process of development, from plant to phytomedicine through appropriate scientific methods, could offer a credible alternative, for communities.

72

THE EFFECT OF ICT IN DISSEMINATION OF HEALTH INFORMATION AMONG NIGERIA TEENAGERS**King Obinna Odor***Department of Public Health, University of Ibadan, Ibadan, Nigeria*

Health information dissemination is an activity that ensures behaviour change among most risk population relating to risk practices that promote ill health. This activity is adopted in formal and non-formal settings. Facilities and personnel are employed to provide health information for behaviour change, which aims at preparing teenagers to contribute socio-economically to the society they live. However, evidence-based studies in Nigeria involving the use of information and communication technology (ICT) have been limited to the dissemination of arts and dramas with limited attention paid to health information. This study therefore, determined the effect of ICT in dissemination of health information among Nigeria teenagers.

A total of 202 participants in four youth-friendly centres were used. Six null hypotheses were formulated and tested. Four instruments namely: DVD machine, Projector, Displayer Screen and DVD (MP3disc) were used for the study at each of the centres.

The results revealed there was significant behaviour change on teenagers' attitude and behaviour. It also showed there was significant behaviour on teenagers' knowledge in health information. ($P < .05$). There was significant result on attitude of teenagers to health information and education ($P < .05$). However, there was no significant gender difference on teenagers knowledge and development in health information ($P > .05$). There was also no significant gender difference on teenagers' attitude to health information and education ($P > .05$).

Government at all levels should support the establishment of youth-friendly centres with ICT facilities, in order to improve teenagers' behaviours especially in the face of risky practices. They should be encouraged to adopt this strategy.

73

POTENTIAL CARDIOVASCULAR RISK FACTOR IN ASIAN INDIAN WOMEN: FOCUS ON MENSTRUATION**Gumpeny R. Sridhar**¹; Venkata Putcha²; Gumpeny Nagamani³; Gumpeny Lakshmi¹¹*Endocrinology, Endocrine and Diabetes Centre, Visakhapatnam, India;* ²*Statistics, AccoStats Solutions Ltd, Luton, United Kingdom;*³*Department of Obstetrics and Gynecology, Andhra Medical College, Visakhapatnam, India*

Asian Indians develop diabetes mellitus (DM) earlier at lower weights. Considering lifestyle measures are difficult, surgery would be both effective and welcome. In our Centre (n:20,000 DM), over time (1994-2004) more young women tended to present. With diabetes They also experience greater stress, an etiologic factor. Also menstrual disturbances presage cardiovascular risk. Here we assess menstruation in adult women with type 2 diabetes mellitus and correlate with the fasting plasma glucose (FPG). Among 851 consecutive women 516 had normal cycles, 45 menorrhagea, 114 oligomenorrhoea, 38 underwent hysterectomy 98 reached menopause and 40 were pregnant. The mean age (yrs) in each group respectively was 33.45 yrs, 33.2, 34.66, 31.39, 38.65, 37.39 and 26.63. Applying Poisson regression risk rate, sedentary women with normal menstruation, amenorrhoea and menopause, had higher FPG. Body mass index: lean subjects (<20 kg/m²) had higher glucose levels in those with (a) normal cycles (b) oligomenorrhoea and (c) menopausal. A similar pattern occurred in the overweight and obese (viz those with menorrhagea and oligomenorrhoea).

In summary, menstrual irregularity, as a surrogate for cardiovascular

74

ANTI-DIABETIC MEDICATIONS REDUCE HEPATOCELLULAR CARCINOMA RISK IN DIABETIC PATIENTS: A POPULATION-BASED COHORT STUDY**Shih-Wei Lai**; Pei-Chun Chen; Chih-Hsin Muo; Kuan-Fu Liao; **Fung Chang Sung***Public Health, China Medical University and Hospital, Taichung, Taiwan*

Objectives: To investigate the risk of hepatocellular carcinoma (HCC) in patients with diabetes mellitus (DM) and whether DM medications alter the HCC risk.

Methods: Using claims data of the universal insurance of Taiwan, 19,349 adults with DM newly diagnosed in 2000-2005 were identified. We also selected 77,396 people without DM from same index years, frequency matched with sex and age. We measured the incidences of HCC until the end of 2008 and hazard ratios (HR) associated with co-morbidities. Uses of anti-diabetic drugs were compared to investigate the role of medications associated with the HCC risk.

Results: The HCC incidence was 2.03-fold higher in DM cohort than in non-DM cohort (21.0 vs. 10.4 per 10,000 person-years), with an adjusted HR of 1.73 (95% confidence interval (CI) = 1.47-2.03). Men, cirrhosis, HBV and HCV were significant factors predicting HCC independently. The HR increased to 72.4 (95% CI = 42.9-122) in patients with DM, cirrhosis and HVC infection in the stratified analysis. The HCC risk reduction was greater for diabetics taking biguanides than taking thiazolidinediones (51% vs. 44% reduction).

Conclusions: Co-morbidity of cirrhosis and/or hepatitis appears to associate with the extremely increased risk of HCC for patients with DM. The adequate remedy with biguanides or thiazolidinediones is associated with more than 40% HCC risk reduction.

75

REDUCTION OF METABOLIC RISK FACTORS WITH USE OF DIETARY INTERVENTION**Michael Uzmann**¹; Sampath Parthasarathy²; Larissa Brophy²; Xueting Jiang²; Dara P. Schuster²¹*Department of Internal Medicine, The Ohio State University, Columbus, OH, USA;* ²*Department of Surgery, The Ohio State University, Columbus, OH, USA***Background:** Sesame oil has been shown to affect atherosclerosis and genetic factors when fed to atherosclerosis-prone mice with reductions in lesion area, oxidative stress, and inflammatory markers. We hypothesized that the consumption of sesame oil would be tolerable and safe while exerting positive effects on established markers of inflammation in healthy subjects.**Methods:** Healthy volunteers between the ages 18-50 were recruited. After obtaining baseline blood and anthropomorphic measurements, subjects were randomized into two groups: group 1 to consume 2 tablespoons of sesame oil daily and group 2 to consume 2 tablespoons of control oil of similar fatty acid composition daily. Over the 12 week study subjects underwent repeat blood draws, body weight and blood pressure measurements, and food frequency assessments while compliance was monitored by measurement of unused sesame oil.**Results:** Eight out of the original 12 participants completed the 12 week study and both oils were well tolerated without adverse event. Amongst subjects completing the study, weight and blood pressure remained stable throughout while lipids remained consistent in all but two individuals, one in each group. Decrease in serum inflammatory marker v-CAM1 levels occurred in four out of five (80%) of those persons receiving sesame oil arm and zero out of three (0%) receiving control oil.**Conclusion:** Consumption of sesame oil, an inexpensive and readily available product, was tolerable during a 12 week study and shows significant potential to improve atherosclerotic risk factors in low risk subjects. Future studies should strive to assess additional benefits in higher risk individuals.**MECHANISMS OF ACTION TRACK**

76

MC4RS IN AUTONOMIC NEURONS OF THE BRAINSTEM MEDIATE EFFECTS OF GASTRIC BYPASS ON DIABETES BUT NOT ENERGY EXPENDITURE OR BODY WEIGHTJuliet Fong; **Vincent Aguirre***Divisions of Hypothalamic Research and Medicine, UT Southwestern, Dallas, TX, USA*

Roux-en-Y gastric bypass (GB) is now widely used as a therapy for obesity. Clinically, GB exerts significant beneficial effects to improve several parameters of dysregulated glucose homeostasis associated with obesity. Despite the expanding use of GB as a treatment for obesity and diabetes, the mechanisms underlying the complex beneficial effects of GB remain to be identified. Thus, we have established a GB protocol in mice to take advantage of available genetic models as means to identify potential cellular and molecular mechanisms. GB and sham-operations were performed on obese WT, MC4R null, and Phox-MC4R mice. After surgery, body weight was followed serially, and energy balance and glucose homeostasis were assessed. GB reduced body weight by 35% in obese WT mice. The WT mice displayed increased energy expenditure (EE) following GB. GB also decreased fasting glucose and insulin, glucose-stimulated insulin secretion, and improved the glucose and insulin tolerances of obese WT mice. Notably, GB failed to increase EE, induce weight loss, or improve glucose homeostasis in MC4R null mice.

Recent data suggests that distinct anatomic pathways play important but divergent roles in mediating the effects of melanocortins on regulating feeding, EE, and glucose homeostasis. To identify candidate neuronal populations mediating these effects, we used our MC4R null mice harboring a loxP-modified null MC4R allele that can be reactivated in a Cre-dependent manner. We assessed the responses to GB of mice with re-expression of MC4Rs in autonomic (parasympathetic) preganglionic neurons including those in the dorsal motor nucleus of the vagus. In mice with re-expression of MC4-Rs in parasympathetic preganglionic neurons, GB did not induce weight loss or increase EE. However despite ongoing obesity in these mice, fasting glucose, fasting insulin, and glucose and insulin tolerance responses were normalized. GB also improves lipid metabolism and partitioning as evidenced by decreased plasma/liver triglyceride as well as respiratory quotient in Phox-MC4R mice. We conclude that the effects of GB require MC4Rs to increase EE, induce weight loss and improve diabetes in mice. In addition, MC4Rs expressed in autonomic neurons of the brainstem including those of the dorsal motor nucleus of the vagus contribute to the effects of GB to improve glucose homeostasis. Moreover, the GB-induced improvements in diabetes are independent of changes in EE and body weight. Our data support the model that there is a functional divergence of the effects of GB on diabetes from its effects on EE and body weight.

77

DUODENO-JEJUNAL BYPASS (DJB) PREVENTS PROGRESSIVE DECLINE IN INSULIN LEVELS IN ZUCKER DIABETIC FATTY (ZDF) RATS BY A WEIGHT-INDEPENDENT MECHANISMSoo Min Ahn¹; Rajesh Patel²; Marlus Moreira³; Noghma Wynne²; Alpana P. Shukla¹; Francesco Rubino⁴¹Metabolic Surgery/Diabetes Surgery Center, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY, USA; ²Metabolic Surgery, Weill Cornell Medical College, New York, NY, USA; ³Metabolic Surgery/Diabetes Surgery, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY, USA; ⁴Department of Surgery, WCMC, New York, NY, USA**Background:** Type 2 diabetes is characterized by progressive reduction in insulin secretion. We sought to investigate whether gastrointestinal bypass surgery can prevent progressive decline in insulin secretion in a rat model of severe type 2 diabetes.**Methods:** We measured plasma insulin levels in ZDF rats from age 8 to age 12 weeks to investigate the natural course of insulin secretion over time. DJB was performed in two sets of experiments (12- and 18-wks old rats). In each experiment sham paired-fed (PF) and ad libitum-fed (AL) groups were included to control for calorie intake and weight changes. Body weight (BW), food intake (FI) were measured daily. Oral glucose tolerance test (OGTT), plasma insulin and C-peptide levels were measured every 2wks for a total study duration of 16wks.**Results:** Control ZDF rats showed progressive reduction of plasma insulin over time (-83.4±6.4%; p<0.01), confirming the progressive nature of insulin deficiency in this model. There were no differences in BW and FI between operated animals. However, while DJB preserved preoperative levels of plasma insulin in both 12wks and 18 wks old rats, sham-PF groups and sham-AL groups experienced a substantial reduction in insulin levels over time (-82.4±9.4% and -91.6±7.8% p<0.01), similar to un-operated controls. Fasting C-peptide levels were significantly higher in DJB rats compared with sham-operated controls throughout the postoperative period.**Conclusion:** Gastrointestinal bypass surgery preserves plasma insulin levels and prevents the natural deterioration of pancreatic insulin secretion in ZDF rats. This effect appears to be weight-independent and its mechanism deserves further investigation.

78

THE EFFECT OF DUODENO-JEJUNAL BYPASS (DJB) ON GLUCOSE TOLERANCE IN ZUCKER DIABETIC RATS (ZDF): A TIME-COURSE STUDYSoo Min Ahn¹; Rajesh Patel²; Alpana P. Shukla¹; Marlus Moreira³; Noghma Wynne²; Francesco Rubino⁴¹Metabolic Surgery/Diabetes Surgery Center, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY, USA; ²Metabolic Surgery, Weill Cornell Medical College, New York, NY, USA; ³Metabolic Surgery/Diabetes Surgery, Weill Cornell Medical College/NewYork Presbyterian Hospital, New York, NY, USA; ⁴Department of Surgery, WCMC, New York, NY, USA**Background:** DJB has been shown to improve diabetes in rodents and in short-term clinical studies. We sought to characterize the effect of DJB on various measures of glycemic control in a time-course study.**Methods:** ZDF rats aged 12 to 18 weeks randomly underwent DJB, sham-operation + pair-feeding (PF) and sham operation + ad-libitum feeding (AL). Body weight (BW) and food intake (FI) were measured daily. Longitudinal sequential tests of fasting glycemia and oral glucose tolerance (GT) were performed at several time points for up to 16 weeks after surgery.**Results:** There were no differences in BW among groups throughout the study period. DJB animals showed better GT than PF and AL groups at 2 weeks postoperatively (AUC glucose: -1413.9±2287.2 vs. 3715.0±303.8 vs. 7417.5±2040.4 in DJB, PF and AL respectively; p=0.01). However, 4 weeks after surgery GT worsened in DJB rats and became similar to preoperative levels and controls. Further follow-up showed that DJB rats maintain GT tolerance similar to baseline whereas GT tolerance further deteriorates in controls (AUC: 3503.5±1984.0 vs. 5938.7±736.2 vs. 10463.7±2371.6 in DJB, PF and AL respectively at 16wks postoperatively; p=0.001). Fasting glycemia in DJB was significantly lower than in controls only at 2 weeks after surgery. Over time, FG worsened in all groups, including in DJB rats.**Conclusion:** DJB results in early improvement of glycemia in ZDF rats, an effect which appear to be weight-independent. This time-course study, however, shows an attenuation of the anti-diabetic effect over time in this animal model.

79

EFFECT OF ROUX-EN-Y GASTRIC BYPASS ON INSULIN SENSITIVITY AND β-CELL FUNCTION IN TYPE 2 DIABETIC AND NON-DIABETIC PATIENTSStefania Camastra¹; Marco Anselmino²; Amalia Gastaldelli³; Brenno Astiarraga⁴; Elza Muscelli⁴; Simona Baldi⁴; Rossana Berta²; Rosario Bellini²; Demetrio Ciociaro³; Ferruccio Santini³; Andrea Mari⁵; Ele Ferrannini⁴¹Department of Internal Medicine, University of Pisa, Pisa, Italy; ²Bariatric Division Unit, Santa Chiara Hospital, Pisa, Italy; ³Institute of Clinical Physiology, CNR, Pisa, Italy; ⁴Internal Medicine, University of Pisa, Pisa, Italy; ⁵Department of Endocrinology, University of Pisa, Pisa, Italy; ⁶LADSEB, CNR, Padua, Italy**Introduction:** We tested the effects of Roux-en-Y gastric-bypass (RYGB) on insulin sensitivity and β-cell function in morbidly obese subjects with (T2D) or without type 2 diabetes (OB).**Methods:** In 11 OB (BMI=53±2 kg/m²) and 11 T2D (BMI=51±2 kg/m²), we performed a euglycaemic clamp (to measure insulin resistance (IR)) and a mixed meal test (to measure β-cell glucose sensitivity [β-GS]) at baseline and 1-year after RYGB (OB-post, BMI=36±2 kg/m²; T2D-post, 33±2 kg/m²).**Results:** Baseline: Compared 7 normal-weight subjects (Ct, BMI=23±1 kg/m²), OB and T2D showed IR (26±3 vs 23±4 vs 58±6 μmol.min⁻¹.kgFFM⁻¹, p=0.001) and insulin hypersecretion (147[69] vs 107[70] vs 54 [28] pmol.min⁻¹.m⁻², p<0.04). β-GS was normal in OB (122[41] pmol.min⁻¹.m⁻².mM⁻¹), but impaired in T2D vs Ct (33[33] vs 96[60] pmol.min⁻¹.m⁻².mM⁻¹, p=0.001). Postsurgery: plasma glucose was normalized in T2D (from 8.6±0.8 to 5.3±0.2 mM, p=0.005 vs baseline and p=ns vs Ct), IR was improved in both OB and T2D (to 41±3 and 45±4 μmol.min⁻¹.kgFFM⁻², respectively, p=0.0001 vs baseline) but not normalized (p=0.01 vs Ct). Insulin hypersecretion was normalized in Both OB and T2D (57[28] and 71[32] pmol.min⁻¹.m⁻², p<0.02 vs baseline and p=ns vs Ct). In OB, β-GS decreased slightly (to 91[19] pmol.min⁻¹.m⁻².mM⁻¹, p=0.01), but was still within the normal range (p=ns vs Ct); in T2D β-GS doubled (to 62 [54] pmol.min⁻¹.m⁻².mM⁻¹, p=0.007) but did not normalize (p=0.002 vs Ct).**Conclusion:** Following a 30% weight loss, RYGB improves IR both in T2D and OB proportionally to weight loss. In T2D, β-cell function improves significantly but incompletely despite normalization of glycemic control.

80

EFFECT OF ORAL ADMINISTRATION OF PALM OIL AND GLUTAMINE ON GLP1 AND GLUCOSE LEVELS IN TYPE 2 DIABETIC PATIENTS UNDERGOING WITHOUT GASTRECTOMY

Eduardo Crema; Roseli Aparecida da Silva Gomes; Fernanda Borges Dijigow; Raissa Porta; Luci Mara DA Silva; Juverson Alves Terra Júnior; Alex Augusto Silva
Department of Digestive Surgery, University Hospital, Federal University of Tringulo Mineiro (UFTM), Uberaba, Brazil

Glutamine is one of the most effective stimuli of GLP-1 when compared to other amino acids. To evaluate glucose and incretin levels after oral administration of palm oil and glutamine.

Methods: twenty patients with DM2 undergoing ileal interposition without gastrectomy were studied after a mean period of 19.66 months (12-30). After collection of fasting (4 h) blood samples, 9.1 g palm oil was administered orally and new blood samples were collected after 1 and 2 h. Serum levels of glucose, GLP-1, PYY, insulin, glucagon, and ghrelin were measured at baseline and 1 and 2 h after palm oil administration. At another time, 30 g glutamine was used as the other stimulus.

Results: Mean fasting glycemia was 130,71 (60,2 – 281,6) at baseline and 121,6 (43,6 – 248,6) and 112,94 (45,5 - 212) 1 and 2 h after the ingestion of palm oil, respectively, corresponding to a reduction of 6,96% and 13,59%. Regarding glutamine stimulation, glycemia levels were 197,51 at baseline and 181,73% after 1 h, corresponding to a significant reduction of 7,98%. Palm oil has been used as an ileal brake for the control and treatment of obesity, but there are no reports on its use for the control of type 2 diabetes.

Conclusions: the present study showed that the two stimuli contributed to a significant reduction of glycemia at the time points studied. The results suggest that the separate or combined administration of glutamine and palm oil may help control type 2 diabetes.

81

EFFECT OF DUODENOJEJUNAL BYPASS ASSOCIATED WITH ILEAL INTERPOSITION WITHOUT GASTRIC RESECTION ON GLUCOSE METABOLISM IN TYPE 2 DIABETIC PATIENTS

Eduardo Crema; Roseli Aparecida da Silva Gomes; Fernanda Borges Dijigow; Raissa Porta; Ellen Beatriz Pereira Nunes; Beatriz Hallal Jorge; Tharsus Dias Takeuti; Juverson Alves Terra Júnior; Alex Augusto Silva
Department of Digestive Surgery, University Hospital, Federal University of Tringulo Mineiro (UFTM), Uberaba, Brazil

Inhibition of the secretion of triggers of insulin resistance is attributed to duodenojejunal bypass of nutrient transit and production of hormones that improve insulin action (GLP1). Objective: Patients with DM2 BMI: 26 to 35 kg/m² were submitted to the mixed technique (hindgut + foregut). Methods: Twenty patients since the diagnosis of DM2 ranging in age from 18 to 60 years and receiving insulin therapy were submitted to laparoscopic surgery consisting of the interposition of an ileal segment of 100 cm and exclusion of a 100-cm duodenojejunal segment without gastrectomy. Results: Mean age was 51.6 years (31-60). The mean duration of diabetes was 12.3 years (5-17). After a mean period of 19.66 months (12-30), weight loss of 8.14% was observed after surgery (71.27 kg) compared to the preoperative period (77.59 kg). The mean BMI was 29.56 and 27.28 kg/m² before and after surgery, respectively. Fasting glycemia was 218.08 mg/dl (127.1 - 371.8) before and 121.6 mg/dl (52.5 - 154) after surgery. Mean preoperative glycosylated hemoglobin 10.02 (7.2 - 15.6) was reduced to 7.15 (5.78 - 9.1). All 8 insulin-dependent patients who required a mean dose of 47.07 U/day (150-30) before surgery required 23.13 U/day (49-8) after surgery, corresponding to a reduction of 49.14%. Five of the 12 cases who did not require insulin were using oral hypoglycemics, and 7 did not require any medication for glycemic control. Conclusion: The surgery proposed was effective in the control of glycemia and should be recommended for diabetic patients with a BMI <35 kg/m².

PLASMA INSULIN AND GLUCOSE TIME COURSES FOLLOWING BILIARY PANCREATIC DIVERSION: EVALUATION OF TWO DIFFERENT WAYS OF GLUCOSE LOADING

Giuseppe Curro¹; Marcello Previti²; Tommaso Centorrino³; Vanessa Low¹; Cinzia Musolino¹; Domenico Cucinotta²; Giuseppe Navarra¹
¹Department of Human Pathology, University of Messina, Messina, Italy; ²Department of Internal Medicine, University of Messina, Messina, Italy; ³Department of Surgical Sciences, University of Messina, Messina, Italy

Aims: We performed Biliopancreatic diversion according to Resa technique except for the creation of a temporary gastrostomy as a model to investigate the mechanism of surgical control of type 2 diabetes. The short-term insulinemic and glycemic modifications after glucose loading both through the gastrostomy and through the new alimentary limb were studied.

Methods: Five morbidly obese patients affected by type 2 diabetes, undergoing BPD were studied. A 75-g Trans-Gastrostomy Glucose Tolerance Test (TGGTT) was administered on the 5th day postoperatively and a standard 75-g Oral Glucose Tolerance Test (OGTT) was performed on the 7th day, with blood sampling for measuring plasma glucose and insulin at 0, 30, 60, 90, 120, 180 minutes.

Results: Significant difference in plasma glucose and insulin levels during TGGTT and OGTT were seen between the two alimentary paths soon after BPD (Figure 1-2). All five diabetic patients were shown, at the same time, to have still diabetes or an impaired glucose tolerance test when tested through the bilio-pancreatic limb but were normal when tested through the alimentary channel.

Conclusions: Our data support the hypothesis that the exclusion of the duodenum/proximal jejunum from the transit of nutrients prevents secretion of a signal promoting insulin resistance and type 2 diabetes.

Figure 1. Time courses of plasma glucose after TGGTT on the 5th and OGTT on the 7th day after BPD. Data are expressed as means \pm SE

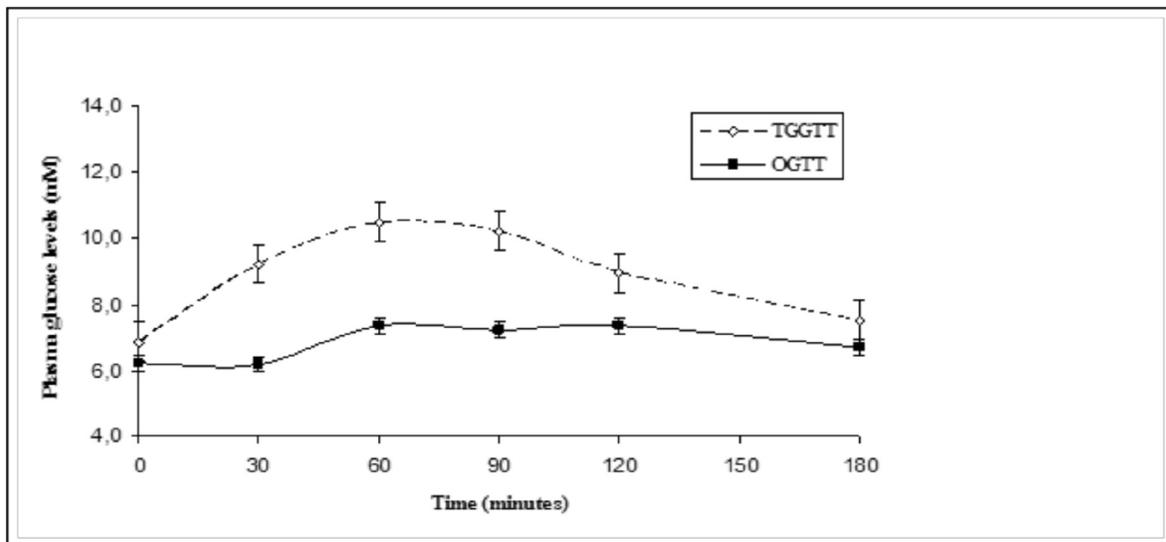
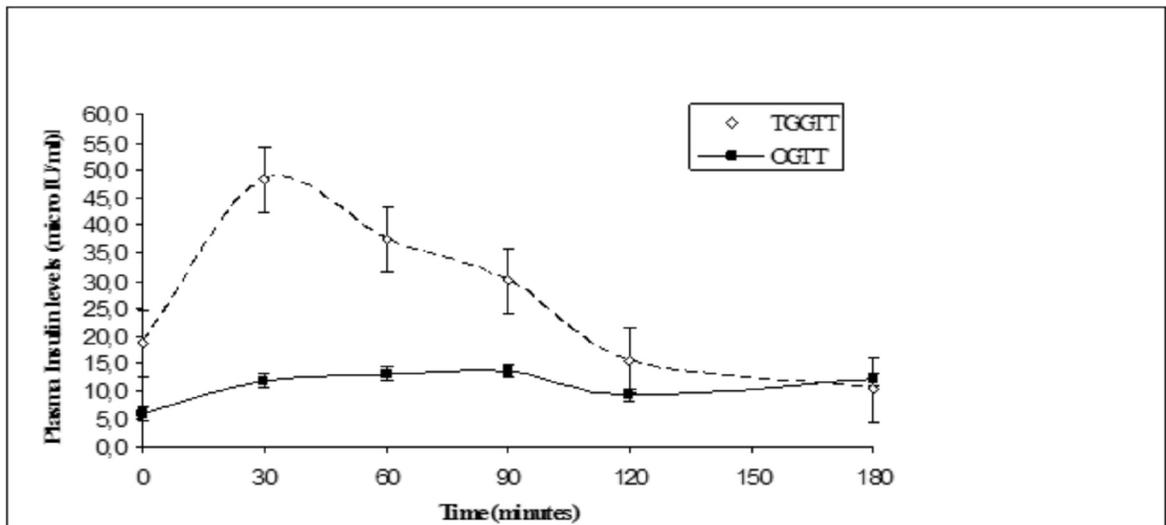


Figure 2. Time courses of plasma insulin after TGGTT on the 5th and OGTT on the 7th day after BPD. Data are expressed as means \pm SE



83

ENDOBarrier™ GASTROINTESTINAL LINER TREATMENT RAPIDLY IMPROVES DIABETES PARAMETERS PARALLELED BY INCREASED POSTPRANDIAL GLP-1 AND PYY LEVELS IN OBESE TYPE 2 DIABETIC PATIENTS

C. de Jonge¹; F.J. Verdam¹; S.S. Rensen¹; R.P. Vincent²; S.R. Bloom²; M.A. Ghatei²; W.A. Buurman¹; C.W. Le Roux²; N.D. Bouvy¹; J.W.M. Greve³
¹Department of Surgery, Maastricht University Medical Centre, Maastricht, Netherlands; ²Investigative Medicine, Hammersmith Hospital, Imperial College London, London, United Kingdom; ³Department of Surgery, Atrium Medical Centre Parkstad, Heerlen, Netherlands

Excluding the proximal intestine from nutrients by malabsorptive bariatric surgical techniques improves Type 2 Diabetes (T2DM) within days. Herein, the gut peptides Glucagon-like peptide-1 (GLP-1) and Peptide YY (PYY) are thought to play a central role. Here, the effects of the EndoBarrier™ Gastrointestinal Liner (EBL), a new minimally invasive duodenaljejunal bypass sleeve, on diabetes parameters and GLP-1 and PYY were investigated.

17 obese T2DM patients received the EBL and a low calorie diet for 24 weeks. Patients were studied prior to, 1 and 24 weeks after implantation, and 1 week after explantation. Blood was sampled before and 10, 20, 30, 60, 90 and 120 minutes after a 500 kcal test meal. HbA1c, glucose, insulin, GLP-1, and PYY levels were measured.

Already at one week after implantation, fasting and AUC glucose levels were improved (11.4±0.5 vs. 8.9±0.4 and 1,999±88 vs. 1,535±53, both p<0.01). Interestingly, AUC PYY and AUC GLP-1 levels both increased (2,584±144 vs. 4,112±441 and 4,440±242 vs. 6,448±527, both p<0.01). Thereafter glucose parameters remained low whereas the levels of PYY and GLP-1 returned to normal. At 24 weeks, patients showed a mean loss of excess weight of 25.3±3.0% while HbA1c had improved significantly from 8.4±0.2 to 7.0±0.2. Furthermore, anti-diabetic medication of the majority of patients was lowered.

In conclusion, EBL treatment resulted in a rapid and long lasting improvement of diabetes. The changes in gut peptides shortly after implantation and the early improvement are in line with the so-called hindgut hypothesis whereas other unrevealed factors may underlie the sustained effect.

Funding Source: GI Dynamics

84

INSULIN RESISTANCE AND BETA-CELL FUNCTION IN OBESE PATIENTS WITH TYPE 2 DIABETES BEFORE AND AFTER SLEEVE GASTRECTOMY: AMELIORATING GLUCOSE TOLERANCE BY REDUCTION OF INSULIN RESISTANCE AT 3 MONTHS OF FOLLOW-UP

Hans Eickhoff¹; Edgar Rosa¹; Sofia Pais¹; Ana Guimaraes¹; Teresa Louro²; Raquel Seica²
¹Obesity Center, Hospital Santiago, Setubal, Portugal; ²Institute of Physiology, University of Coimbra, Coimbra, Portugal

Aims: Sleeve gastrectomy is a novel technique for the treatment of morbid obesity. Its effects on the metabolic syndrome and comorbidities like type 2 diabetes (T2D) are not yet fully understood. We determined insulin resistance and beta-cell function to assess the hypothesis that sleeve gastrectomy favors the improvement of the metabolic state in type 2 diabetes.

Methods: From June 2007 to July 2010, sleeve gastrectomy as sole treatment for severe or morbid obesity was performed in 23 patients with T2D or impaired fasting glucose (IFG). Fasting glycemia and serum insulin levels were determined before and 3 months after surgery.

Results: Ten patients suffered from T2D (fasting glucose ≥ 126 mg/dl) and 13 patients presented with IFG (100 mg/dl – 125 mg/dl), mostly associated with high fasting insulin levels. Three diabetic patients had an impaired beta-cell function (< 40 % of expected value). In 16 patients (69.6 %), insulin resistance (IR) was more than twofold increased (modified HOMA-IR). No post-operative complications occurred. During follow-up, fasting glucose returned to normal values in 18 of 21 patients (2 patients lost to follow-up) and IR improved in all patients that presented with increased pre-operative values. Two diabetic patients with impaired pre-operative beta-cell function improved function and achieved fasting glucose levels < 126 mg/dl.

Conclusion: In obese patients with T2D submitted to sleeve gastrectomy, early improvement of the metabolic state is mainly due to reduced insulin resistance at 3 months' follow-up. Recovery of beta-cell function might contribute to ameliorate type 2 diabetes in some patients.

85

INTESTINAL GLUCONEOGENESIS IS NOT A MAJOR MECHANISM FOR RESOLUTION OF TYPE 2 DIABETES IN THE MORBIDLY OBESE FOLLOWING GASTRIC BYPASS SURGERY

Jonathan Foo¹; Mark Hayes¹; Vinko Basic¹; Richard S. Stubbs²
¹Wakefield Biomedical Research Unit, University of Otago, Wellington, New Zealand; ²The Wakefield Clinic, Wakefield Hospital, Wellington, New Zealand

Background: Intestinal gluconeogenesis is a proposed mechanism for glycaemic improvements post Roux-en Y gastric bypass (RYGB). In rodents, intestinal gluconeogenesis alters portal glucose concentrations post RYGB which then modulates hepatic glucose uptake and reduce hepatic gluconeogenesis. This hypothesis was evaluated in humans comparing portal and peripheral glucose before and after RYGB.

Method: On Day 0 and Day 6 post RYGB paired portal and peripheral samples were obtained in 28 patients (8 T2DM and 20 non-diabetics). 4 patients (2 T2DM and 2 non-diabetic patients) had daily sampling.

Results: Pre-procedure, no significant difference (paired student t-test) was noted between portal and peripheral glucose in T2DM patients (11.6mM portal vs 11.4mM peripheral, p=0.46) or in non-diabetic patients (6.6mM portal vs 6.45mM peripheral, p=0.63). By 6 days post RYGB, all T2DM patients had resolution of diabetes despite portal and peripheral differences in glucose remaining non-significant (6.5mM portal vs 6.5mM peripheral, p=0.76). A small but significant difference was seen in non-diabetic patients at day 6 (4.2mM portal vs 4.0mM peripheral p<0.0001). Daily sampling showed a small but significant difference between fasted portal and peripheral plasma glucose from pre-procedure to day 6 (0.18mM difference, 95% CI 0.10 - 0.26mM, p=0.005 ANOVA). Portal-peripheral glucose difference was not significantly different between days (p=0.47).

Conclusion: A small portal-peripheral glucose gradient exists in the fasted state. This gradient was not significant in T2DM patients and is unaltered following RYGB. Intestinal gluconeogenesis is unlikely to be responsible for early improvements in glycaemic control following RYGB in morbidly obese diabetics.

86

EARLY IMPROVEMENTS IN INSULIN RESISTANCE FOLLOWING GASTRIC BYPASS SURGERY: IS CALORIC RESTRICTION THE MAJOR FACTOR?Jonathan Foo¹; Donia Macartney-Coxon²; Jeremy Krebs³; Mark Hayes¹; Richard S. Stubbs²¹Wakefield Biomedical Research Unit, University of Otago, Wellington, Wellington, New Zealand; ²The Wakefield Clinic, Wakefield Hospital, Wellington 6242, New Zealand; ³Diabetes and Endocrinology, Wellington Hospital, Wellington, New Zealand**Background:** The rapid improvement in insulin resistance post Roux-en Y gastric bypass (RYGB) may involve mechanisms apart from caloric restriction or improved peripheral glucose uptake. Effects of a very low calorie diet (VLCD) were compared to an RYGB.**Methods:** Eight morbidly obese non-diabetic patients underwent a six day VLCD (456kcal/day) and changes in insulin resistance were assessed. A RYGB was performed one week later and changes were compared. Insulin resistance was measured by short intravenous insulin tolerance test (IVITT) and homeostasis model assessment (HOMA-IR). 24 matched patients underwent a RYGB with equivalent caloric restriction for comparison.**Results:** VLCD resulted in a significant fall in HOMA-IR from 6.8±4.9 to 4.3±2.9 (p<0.05). Following RYGB, HOMA-IR had a further reduction to 1.5±0.4. Patients were age, weight, BMI, HOMA-IR matched. Matched patients (RYGB-only) had a significant reduction in HOMA-IR (6.8±4.9 to 1.5±0.9, p<0.01) equivalent to final HOMA-IR following VLCD and RYGB (p=0.587). IVITT at day 6 of a VLCD showed no significant change, but IVITT demonstrated worsened insulin-induced glucose uptake at day 6 post RYGB (p<0.05).**Conclusion:** Patients undergoing RYGB have an early reduction in HOMA-IR partly from caloric restriction. IVITT demonstrated worsening insulin induced glucose uptake following RYGB, which may reflect worsening peripheral resistance. This suggests early post-operative changes in glycaemic control is related to HOMA-IR and hepatic insulin resistance rather than peripheral insulin resistance. Post RYGB improvements in HOMA-IR may be multi-factorial. This supports the hypothesis that mechanisms apart from caloric restriction are involved in the early improvement in HOMA-IR post RYGB.

87

IMMUNE EFFECTS OF GLP-1 - EXPLANATION FOR SOME OF THE POST OPERATIVE BENEFITS OF GASTRIC BYPASS?

Donal O'Shea; Andrew E. Hogan

Department of Endocrinology, St Vincents University Hospital, Dublin 4, Ireland

Background: A number of obesity related co-morbidities improve more following gastric bypass (RYGB) surgery than gastric banding. These include type 2 diabetes mellitus (T2DM), psoriasis and asthma. Invariant natural killer T (iNKT) cells are key innate immune cells implicated in the pathogenesis of psoriasis and asthma. We observed an improvement in psoriasis in patients with T2DM treated with analogues of GLP 1. We proposed that some of the benefits seen following RYGB surgery are mediated by an effect of GLP-1 on iNKT cells.**Methods:** We examined iNKT cells for the presence of the GLP-1 receptor and for regulation by GLP-1. We measured circulating iNKT cell numbers in obese subjects before and after RYGB surgery. We assessed changes in circulating iNKT cell numbers in subjects with T2DM, starting GLP-1 therapy.**Results:** The GLP-1 receptor is expressed on the surface and in the cytoplasm of iNKT cells. GLP-1 inhibits activated iNKT cells in vitro in a dose dependant fashion. iNKT cell numbers are significantly reduced in obese subjects compared to lean subjects, and increase significantly following RYGB surgery.**Conclusion:** GLP-1 is an immune modulator that acts directly through iNKT cells. RYGB surgery and GLP-1 therapy increase iNKT cell numbers in the circulation. The immune effects of GLP-1 may be responsible for the improvement seen in iNKT mediated conditions such as psoriasis, colitis and multiple sclerosis that have been reported post RYGB.

88

IMMEDIATE REDUCTION OF GLUCOSE AND INSULIN LEVELS AND IMPROVEMENT OF INSULIN RESISTANCE AMONG NON-DIABETIC MORBIDLY OBESE PEOPLE UNDERGOING GASTRIC SLEEVE OPERATION FOR WEIGHT REDUCTIONLior Lebou¹; Mordechai Shimonov¹; Julio Wainstein²; Pinhas Shachter¹; Dov Gavish³; Eyal Leibovitz⁴¹Department of Surgery A, Wolfson Medical Center, Holon, Israel; ²Diabetes Unit, Wolfson Medical Center, Holon, Israel; ³Department of Medicine A, Wolfson Medical Center, Holon, Israel; ⁴Department of Medicine, Wolfson Medical Center, Holon, Israel**Aim:** To study the immediate effects of gastric sleeve operation on glucose and insulin levels and insulin resistance among non-diabetic morbidly obese individuals.**Methods:** Morbidly obese individuals (BMI>40 kg/m²) without known diabetes mellitus were included. All individuals had their fasting plasma glucose (FPG) and fasting insulin (FI) level assessed one day prior to surgery and 3 days following surgery, as well as oral glucose tolerance (OGTT) with 100 g of glucose.**Results:** Included were 8 individuals (4 males), mean age of 34.4±13.4 years with a mean BMI of 44.3±6.5 kg/m². One day prior to surgery, FPG levels were 97.7±15.1 mg/dL and FI levels were 16.9±8.4 IU. Three days following surgery, these levels were reduced significantly (87.0±19.2 mg/dL for FPG, and 5.0±3.3 IU for FI, p<0.01 for both changes). HOMA-IR improved significantly following surgery (from 4.3±2.9 to 1.2±0.9, p<0.01) and HOMA-B% was reduced from 176±50% to 84±53% (p<0.01). Glucose levels 2 hours following OGTT also improved significantly (from 133.6±30.7 to 117.3±26.4, P<0.05), and 3 individuals that were found to have FPG and OGTT levels indicative of diabetes mellitus one day prior to surgery reverted to non-diabetes levels following surgery.**Conclusion:** Gastric sleeve operation is associated with significant improvement of metabolic profile and insulin resistance immediately following the procedure.

89

GASTROSTOMY TUBE PLACEMENT IN THE GASTRIC REMNANT AT THE TIME OF GASTRIC BYPASS: A RAT MODEL FOR SELECTIVE GUT STIMULATION

Shai Meron-Eldar¹; Helen Mary Heneghan¹; Olivia Dan¹; Kibwe Weaver¹; Sangeeta Kashyap¹; John Kirwan²; Philip Schauer¹; Stacy Brethauer¹
¹Bariatric & Metabolic Institute, Cleveland Clinic, Cleveland, OH, USA; ²Department of Pathobiology, Lerner Research Institute, Cleveland Clinic, Cleveland, OH, USA

Roux-en-Y gastric bypass (RYGB) surgery achieves high remission rates of type 2 diabetes mellitus in obese diabetic patients. It has been hypothesized that the changes in bowel nutrient exposure after RYGB results in altered release of gut hormones and improved glucose homeostasis. The aim of this study was to assess the feasibility and report our technique and initial experience with a model enabling selective gut stimulation in a gastric bypass rat model. We performed RYGB surgery with simultaneous placement of a gastric tube in the excluded gastric remnant of six obese Sprague-Dawley rats. Gastrostomy tubes were successfully inserted in all animals with no tube-related complications. The tubes remained patent throughout the study. Each rat was tested for oral glucose tolerance pre-operatively. On postoperative days 14 and 28, glucose tolerance was re-evaluated via oral and G-tube routes. Area under the curve (AUC) after oral glucose gavage decreased significantly after gastric bypass ($p < 0.001$). Gastric remnant glucose gavage after RYGB essentially reversed the effects of surgery on glucose metabolism, and resulted in a glucose response AUC that significantly exceeded AUC for the oral route preoperatively and postoperatively ($p < 0.001$). We conclude that placing a gastrostomy tube into the gastric remnant at the time of RYGB in a rat model is technically feasible. Our initial findings support the role of duodenal exclusion in improving glucose metabolism after RYGB. This innovative metabolic procedure provides access for selective gut stimulation and a new tool to better define the mechanisms of type 2 diabetes improvement after RYGB surgery.

90

GASTRIC INHIBITORY PEPTIDE (GIP) CONTROLS ADIPOSE INSULIN SENSITIVITY VIA ACTIVATION OF CREB AND p110b PI3 KINASE

Sameer Mohammad¹; Lavoisier S. Ramos²; Francesco Rubino³; Timothy McGraw¹
¹Department of Biochemistry, Weill Medical College of Cornell University, New York, NY, USA; ²Department of Pharmacology, Weill Medical College of Cornell University, New York, NY, USA; ³Department of Surgery, WCMC, New York, NY, USA

GIP, an incretin secreted in response to food intake, increases glucose-dependent insulin secretion. Here we demonstrate in adipocytes that GIP increases insulin-dependent translocation of the GLUT4 glucose transporter to the plasma membrane and exclusion of FoxO1 transcription factor from the nucleus. The effect of GIP on adipocyte insulin sensitivity requires both activation of the cAMP/protein kinase A/CREB signaling module and activation of p110b phosphoinositol-3' kinase. These data establish that GIP, in addition to its previous described role in lipid metabolism, has a general effect on insulin action in adipocytes, and they define a novel signal transduction pathway modulating insulin action in adipocytes. Other hormones that activate adenylate cyclase and induce formation of cAMP do not replicate the effect of GIP on insulin sensitivity. This unique characteristic of GIP is because it can activate PI3 Kinase p110b in addition to cAMP/PKA pathway and therefore, modulates insulin sensitivity of adipocyte. By setting the tone of insulin response of adipocytes, GIP would affect whole body metabolism. This insulin sensitizing activity points to a more central role for GIP in coordinating intestinal nutrient sensing to control peripheral tissue metabolism, an emerging central feature of inter-organ communication in the control of metabolism.

91

WEIGHT LOSS AFTER GASTRIC BYPASS SURGERY MODULATES DNA METHYLATION OF PGC-1 AND PDK4 PROMOTERS

Erik Naslund¹; Jie Yan²; Romain Barres²; Anna Krook²; Juleen Zierath²
¹Dept of Clinical Sciences, Danderyd Hospital, Karolinska Institutet, Stockholm, Sweden; ²Physiology and Pharmacology, Karolinska Institutet, Stockholm, Sweden

Aim: Obesity is associated with reduced insulin sensitivity and extensive changes in skeletal muscle. Bariatric surgery has been shown to improve glucose control. DNA methylation can act as a reversible switch of gene expression that can lock genes in an active or repressed state. We determined whether DNA methylation of select proteins is altered in obesity and after gastric bypass (GBP) surgery. Methods: DNA methylation levels of the Peroxisome Proliferator-Activated Receptor γ Coactivator-1- α (PGC-1 α) and Pyruvate Dehydrogenase Kinase, isozyme 4 (PDK4) promoters was investigated in skeletal muscle and whole blood from eight non-diabetic obese people (41.8 \pm 3.7 years) before (BMI 42.1 \pm 1.5 kg/m²) and six months after GBP surgery (BMI 31.2 \pm 1.6 kg/m²). Data were compared against sixteen age-matched non-obese women.

Results: Plasma concentrations of glucose and insulin were reduced 6 months after weight loss surgery (5.6 \pm 0.3 vs 4.8 \pm 0.2 mmol/L and 99.9 \pm 19.8 vs 56.6 \pm 8.4 pmol/L, glucose and insulin, respectively). Weight loss induced hypomethylation of the PGC-1 α promoter and hypermethylation of the PDK4 promoter as examined by bisulfite DNA methylation analysis. These changes in DNA methylation levels were inversely correlated with mRNA expression of PGC-1 α and PDK4. BMI, C-reactive protein and leptin levels were correlated with PGC-1 α and PDK4 methylation.

Conclusion: Our results provide evidence that obesity and GBP surgery-induced weight loss have a dynamic effect on the level of DNA methylation in the promoter regions of key genes involved in lipid and glucose oxidation in skeletal muscle. Changes in DNA methylation may contribute to metabolic reprogramming and glucose homeostasis.

Funding Source: European Foundation for the Study of Diabetes

92

LAPAROSCOPIC SLEEVE GASTRECTOMY WITH DUODENOJEJUNAL BYPASS FOR THE TREATMENT OF TYPE 2 DIABETES IN NON-OBESE PATIENTS. TECHNIQUE AND PRELIMINARY RESULTS

Salvador Navarrete; Jose Leyba; Salvador Navarrete Llopis
Servicio de Cirugia II, Hospital Universitario de Caracas, Caracas, Venezuela

Background: Medical treatment of type 2 diabetes has suboptimal clinical results at long term. Although the surgical option is a well established alternative for obese patients, the procedures in nonobese are currently being developed.

Methods: A 12 month prospective trial with ten diabetic non obese patients who underwent laparoscopic sleeve gastrectomy with duodenojejunal bypass is presented. Changes in fasting blood glucose, HbA1c, weight, and BMI were determined.

Results: There was a significant reduction in fasting glycemia and HbA1c at one year postoperative ($p < 0.004$). One patient had an intraabdominal bleeding and a wound infection treated with blood transfusion and antibiotic therapy respectively. The BMI decreased 12.1% and in any case it was reduced to less than 20 kg/m²

Conclusions: Laparoscopic sleeve gastrectomy with duodenojejunal bypass is a promising procedure for the treatment of non obese patients with type 2 diabetes. Studies with large number of patients and longer follow up are necessary to make definitive conclusions.

Funding Source: Swedish Medical Research Council, European Union, Karolinska Institutet, Swedish County Council

93

SLEEVE GASTRECTOMY AND BII DUODENOJEJUNOSTOMY (SG-BIIDJ) INTENDED FOR THE TREATMENT IN NON OBESE TYPE 2 DIABETES MELLITUS PATIENTS. 1 STEP: TECHNICAL FEASIBILITY IN A PORCINE MODEL

German Rosero; Luis J. Espana; Fernando Casabon
Surgery, Hospital Universitario Departamental de Nario, San Juan de Pasto, Colombia

The most effective treatment for T2DM in obese patients with BMI >35 is bariatric surgery. The experience with surgical treatment in patients with BMI <35 is encouraging, obtaining resolution rates of 85.3% with several surgical techniques. Our objective was to evaluate the technical feasibility of a laparoscopic procedure combining sleeve gastrectomy (SG) plus a duodenal-jejunal BII anastomosis in a porcine model. The theoretical advantages with this procedure comprise: 1. Decreasing in Ghreline levels and weight and caloric offer control. 2. Duodenal exclusion. 3. Early distal intestine stimulation with the duodenojejunosomy and faster gastric emptying with SG.

Methods: After approval of the ethics committee, we used 5 pigs (weight 15 - 20 Kg). The procedure begins with devascularization of the gastric greater curvature up to 3-cm distal to the pylorus. The duodenum was sectioned with stapler preserving its vasculature. A gastric tube was created. An end to side hand-sewn duodeno-jejunum anastomosis was made 100 cm. distal to Treitz ligament (video provided).

Results: Surgical average time was of 60.8 + - 14. 6 minutes. The sanguineous losses were minimal. A pig died in the immediate post-operative cause of malignant hyperthermia, the other 4 survived without complications. SG-BIIDJ was well tolerated in the 12 weeks follow-up

Conclusion: The SG-BIIDJ is technically feasible in a porcine model and could be of potential use in the surgical treatment of non-obese T2DM patients, being an easy and reproducible surgical procedure. Our intention is to use this procedure in the surgical treatment of T2DM patients with BMI <35.

PRESENTING AUTHORS INDEX

A

Aguirre, Vincent 29
Ahn Soo Min 30
Akhvlediani, Manana 1
Altieri, Pablo I. 1
Arruda, Sérgio 1, 2

B

Basu, Debasis 2
Biron, Simon 2
Blackstone, Robin 3
Branco, Alcides 3
Busetto, Luca 3

C

Camastra, Stefania 30
Campos, Guilherme M. 26
Chouillard, Elie K. 4
Conjeevaram, Srinivasulu 4
Cotta-Pereira, Ricardo 5
Crema, Eduardo 31
Curro, Giuseppe 32

D

de Jonge, C. 33
de Moura, Eduardo Guimaraes Hourneaux 5
Dixon, John 5

E

Eickhoff, Hans 33

F

Foo, Jonathan 33, 34
Frenken, Michael 6

G

Garcia-Caballero, Manuel 7
Goel, Ramen 7
Gundry, Steven R. 26

H

Harris, Ronald Irwin 27
Heneghan, Helen Mary 8
Hogan, Andrew E. 34

I

Ismail, Mohamed 9

J

Javanbakht, Mehdi 27

K

Koane, Jean-Noël 27
Kvantaliani, Tamar G. 9

L

Lanzarini, Enrique 10
Lavrysen, Eno 10
Leal, Lucas Pedroso Fernandes Ferreira 10
Lebou, Lior 34
Lee, Yeon Ji 11
Lee, Wei-Jei 11
Li, You Fu 11
Lips, Mirjam Anne 12

M

Meron-Eldar, Shai 35
Mohammad, Sameer 35
Morales, Elias 12
Mottin, Cláudio Corá 13

N

Nannipieri, Monica 13
Naslund, Erik 35
Navarrete, Salvador 36

O

Odor, King Obinna 28
Okerson, Ted E. 13

P

Pasupathy, Shanker 14
Pedrosa, Otto Aline 14
Pirolla, Eduardo H. 14, 15
Pizzi, Gianluigi 15
Pontiroli, Antonio E. 15
Proczko-Markuszczyńska, Monika Anna 16

R

Raj, Praveen 16
Resa, Joaquin 17
Rosero, German 36

S

Saiki, Atsuhito 17
Salinas, Alberto 17
Schemberk Jr., Joao Antonio 18
Schuster, Dara P. 18, 19
Shukla, Alpna P. 19
Slako, Milenko 20
Sridhar, Gumpeny R. 28
Stejskal, David 20
Stokic, Edita J. 21
Stubbs, Richard S. 21
Sung, Fung Chang 28

T

Tham, Kwang Wei 21
Todkar, J.S. 22

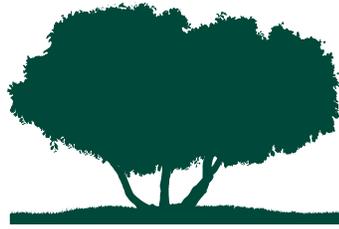
U

Ugale, Surendra 22
Uzmann, Michael 29



2ND WORLD CONGRESS ON INTERVENTIONAL THERAPIES FOR TYPE 2 DIABETES

VISIONARY LEVEL SUPPORTER

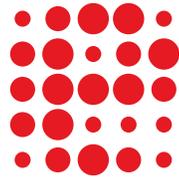


مؤسسة قطر
Qatar Foundation

لإطلاق قدرات الإنسان.
Unlocking human potential.

CORPORATE SPONSORS

PLATINUM LEVEL



**Ethicon
Endo-Surgery**

PART OF THE Johnson & Johnson FAMILY OF COMPANIES

GOLD LEVEL



ALLERGAN



COVIDIEN

SILVER LEVEL



Medtronic

BRONZE LEVEL

AstraZeneca



Bristol-Myers Squibb



MERCK

Be well

OLYMPUS

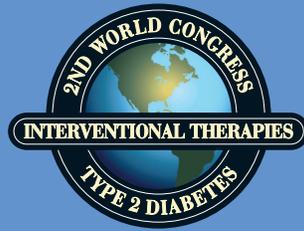
sanofi aventis

Because health matters

STORZ
KARL STORZ – ENDOSKOPE

WE WOULD ALSO LIKE TO THANK





2ND WORLD CONGRESS ON
INTERVENTIONAL THERAPIES FOR TYPE 2 DIABETES

www.wcidt.org

Giovanni Lorenzini Medical Foundation
6535 Fannin, MS A-601
Suite A754
Houston, TX 77030
Tel: +1 713 797 0401 • Fax: +1 713 796 8853