

**International Federation for the Surgery of Obesity and metabolic disorders. XIV World Congress.** Paris, France - August 26-29, 2009

**O-062** Laparoscopic Duodeno-Jejunal Bypass (LDJB) as a Surgical Treatment for Type 2 Diabetes Mellitus in Non Obese Patients

**Presenter:** M. Berry (Clinica Las Condes, Santiago, Chile)

**Background:** All bariatric surgical techniques resolve diabetes (T2DM), among days to weeks after surgery. Based on Dr. Rubino's research on animals, LDJB has been proposed as an alternative of treatment for T2DM in non obese patients. In this work we are trying to confirm LDJB as a new treatment for a subset of T2DM in non obese patients. **Methods:** 11 T2DM patients underwent a LDJB. Surgical technique: transaction of the duodenum 2 cm. distal to the pylorus, duodeno-jejunal anastomosis, biliopancreatic limb of 150 cm, alimentary limb 100 cm. Barium swallow on the second postoperative day. All patients are taking metformin upon discharge for at least 6 month after surgery. **Results:** 10 Male, 1 Female patient. Mean age: 45 yo(34-54). Mean years of T2DM 5(1-10), 2 patients were insulin users, Mean Preop BMI 28,7(26,8-31), Postop BMI: 6 month 27,5(27-27,9), Pre-op Fasting Blood Glucose 165(128-251), Post-op Fasting Blood Glucose: 1 month 113,9(95,5-130). 3 months:129(101-165). 6 months: 108,5(97-120). Pre-op HbA1c: 8,3(6,9-9,3), Post-op HbA1c: 1 month: 6,6(5,9-7,5), 3 month: 6,86(6,1-8,4), 6 month: 6,65(6,2-7,1). No patient on insulin postop. OR time: 150 min. Morbidity: 1 duodeno-jejunal anastomotic leak resolved, gastroparesis in 2 cases. No mortality. **Conclusion:** These early results are encouraging, showing improvement or remission of T2DM. Longer follow-up is needed.

**O-063** Sleeve Gastrectomy versus Gastric Bypass for the Treatment of Non-Morbid Obese Diabetic Patients: a Randomized Trial

**Presenter:** W. J. Lee (Min-Sheng General Hospital, Taoyuan, Taiwan)

**Background:** Bariatric Surgery leads to a dramatic improvement in morbid obesity associated type 2 Diabetes Mellitus (T2DM) but the mechanism remains speculative. This study compared the laparoscopic sleeve gastrectomy (LSG) and mini-gastric bypass (LMGB) in the treatment of T2DM, and to test the "fore-gut" hypothesis. **Methods:** Patients aged 30 to 60 years, with poorly controlled T2DM (HbA1C >7.5%) and BMI between 35 and 25 were included and randomized to LSG and LMGB. The end point is T2DM resolution, defined by fasting plasma glucose < 126 mg/dl and HbA1C < 6.5%. **Results:** 40 patients with a mean BMI 29 (24-34), age 45 (34-58) and HbA1C of 10.0% (8.0-15) were randomized to either LSG (n=20) or LMGB (n=20). All procedures were successfully carried out with no deaths or major complication in either group. Minor complication occurred in 4 patients (10%). There was no difference in basic

and peri-operative clinical parameters between the two groups. Minimum follow-up was 12 months (from 14 to 28 months). After surgery, both groups experienced a rapid decrease in fasting plasma glucose and insulin at 1st week. Body weight rapidly decreased up to 6 months and stabilized to 12 months in both groups. However, T2DM resolution rate was significantly better in LMGB than LSG (90% vs 50%,  $p < 0.05$ ). The T2DM resolution rates in LSG for those with preoperative C-peptide  $< 3$ , 3-6 and  $> 6$  ng/ml were 1/7(14.3%), 7/11(63.6%) and 2/2(100%);  $p < 0.05$ , separately. **Conclusion:** Although both are effective for T2DM with BMI  $< 35$ , LMGB is more effective than LSG. C-peptide  $> 3$  ng/ml is the most important predictor for a successful treatment for LSG. Duodenum exclusion does play a role in surgical treatment of low BMI T2DM patients.

**P-087** One Anastomosis Gastric Bypass (BAGUA) as Procedure for Metabolic Surgery: Evolution of a Patient During the First Postoperative Year

**Presenter:** M. Garcia-Caballero (University Malaga, Spain)

**Introduction:** The effect of bariatric surgery on healing the comorbidities of morbid obese patients, prompt us to think that they could also solve type II diabetes and other comorbidities in non obese patients that presented the above mentioned diseases. Diabetes Mellitus type II due to its high frequency, the impact of chronic complications and factor of cardiovascular risk would be the most important indication. **Objectives:** To review the indication and first year evolution of a patient 34 BMI with Diabetes Mellitus type II of difficult control (until 600 IU insulin/day) operated by metabolic surgery with BAGUA. **Material and Methods:** Male patient 34 years old with family history of DM type II diagnosed in 2004 of type II DM after hyperglucemic coma. Glicemia 370 mg/dl, Hb glicosilade 13,2%, Ferritine 1144 ng/ml. Glucosuria 1000 mg/dl y microalbuminuria 16.6 mg/dl. Polidipsia and poliuria (4 l/day). Fatty liver with increased enzyme levels. Two try of suicide and anxiety in treatment. Was treated by oral anti-glicemic drugs and insulin between 180 and 600 IU/day. Send to us by endocrinologists for surgery that we performed 01-02-08 by BAGUA excluding 150 cm jejunum distal to Treitz ligament. **Results:** Glicemia was 125 mg/dl since the first postoperative day. During the first 4 months he do not need any anti-diabetic treatment. Since June 2008 Avaglim 8 mg/4 mg. The liver levels were normalized. He loosed 25 kg in spite of no alimentary restriction. He do not need more psichological treatment. He have an intense work and sportive life that he could not have before the operation. **Conclusions:** Metabolic surgery by BAGUA excluding 150 cm jejunum for type II DM of difficult control with conservative treatment, have demonstrated in this case to avoid the necessity of use insulin and solved all other metabolic and psychological problems of the patient. However although during 4 months the patient do not need any treatment, after that he need use oral anti-diabetic drugs.

**V-054** Duodenal Exclusion Associated to Sleeve Gastrectomy with Roux An Y for the Treatment of non Obese Type 2 Diabetic Subjects-Preliminary Results

**Presenter:** D. Nasser (Maringa Obesity Surgery Center, Maringa, Brazil)

**Background:** The world Diabetes type 2 prevalence is getting higher, with epidemic characteristics in many countries, especially in developing ones. Brazil has the tenth diabetic population in the world. In 2004 Rubino M.D., published a study done in non obese diabetic rats showing that the Duodenal Exclusion can directly improve the glucose metabolism, suggesting that the surgery can also lead to an glicemic control in non obese diabetic type 2 patients. The Weight loss of the Sleeve Gastrectomy is lower and also improve the glucose metabolism. So the association of both surgical techniques can improve the glucose metabolism without a great weight loss. The long term medical treatment for the type 2 diabetes has also risks for the patient as severe hypoglycemia, weight gain and an inadequate disease treatment. The objective of that study is to demonstrate the benefits of the duodenal exclusion with sleeve gastrectomy, to improve the clinical condition of the patient, suspend the insulin or hypoglycemic drugs, and stop the secondary lesion of the diabetes. **Methods:** This study was approved by the Ethical Committee of State University of Maringá. The subjects will be submitted to general anesthesia and videolaparoscopy approach. The inclusion criteria are; BMI < 30 Kg/m<sup>2</sup>, limit age of 65 years old, diagnose of type 2 diabetes, C peptide > 1, Glicade hemoglobin > 7.5% and sign the consentment term. **Result:** We will present the preliminary results of the first year post operative, with reduction of glicemic tests since the first day and with interruption of the insulin needs. We will show a surgical video with the more important steps of the videolaparoscopic duodenal exclusion and sleeve gastrectomy. **Conclusion:** Weight loss is not the reason why duodenal exclusion with sleeve gastrectomy controls diabetes. Instead, bypassing the foregut and reducing food intake produce the profound long- term alterations in glucose metabolism and insulin action.

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[Surg Endosc.](#) 2009 Jun;23(6):1313-20. Epub 2008 Oct 2.

**Laparoscopic ileal interposition associated to a diverted sleeve gastrectomy is an effective operation for the treatment of type 2 diabetes mellitus patients with BMI 21-29.**

[DePaula AL](#), [Macedo AL](#), [Mota BR](#), [Schraibman V](#).

**BACKGROUND:** The objective of this study is to evaluate the clinical results of the laparoscopic interposition of a segment of ileum into the proximal duodenum associated to a sleeve gastrectomy (II-DSG) in order to treat patients with type 2 diabetes mellitus (T2DM) and body mass index (BMI) 21-29 kg/m<sup>2</sup>. **PATIENTS AND METHODS:** The laparoscopic

procedure was performed in 69 patients, 22 female and 47 male. Mean age was 51 years (range 41-63 years). Mean BMI was 25.7 (21.8-29.2) kg/m<sup>2</sup>. All patients had the diagnosis of T2DM for at least 3 years and evidence of stable treatment with oral hypoglycemic agents and or insulin for at least 12 months. Insulin therapy was used by 44% of the patients. Mean duration of T2DM was 11 years (range 3-18 years). Dyslipidemia was diagnosed in 72.5% and hypertension in 66.7%. Nephropathy was characterized in 29% of the patients, retinopathy in 26.1%, and neuropathy in 24.6%. RESULTS: Overall, 95.7% of the patients achieved adequate glycemic control (Hb(A1c) < 7%) without antidiabetic medication. Hb(A1c) below 6% was achieved by 65.2%. Mean postoperative follow-up was 21.7 months (range 7-42 months). Mean postoperative BMI was 21.8 kg/m<sup>2</sup>. There was no conversion to open surgery. Median hospital stay was 3.4 days (range 2-58 days). Major postoperative complications were diagnosed in 7.3%. There was no mortality. Fasting glycemia decreased from a mean of 218 to 102 mg/dl, postprandial glycemia from 305 to 141 mg/dl, and homeostasis model assessment of insulin resistance (Homa-IR) from 5.2 to 0.77. All associated comorbidities and complications related to T2DM had significant improvement or control. Arterial hypertension was controlled in 91.3%. Macroalbuminuria was no longer observed. Microalbuminuria resolved in 87.5% of patients. Hypercholesterolemia was normalized in 95% and hypertriglyceridemia in 92% of patients. CONCLUSIONS: Laparoscopic II-DSG was an effective operation in controlling T2DM in a nonobese (BM < 30 kg/m<sup>2</sup>) population. Associated diseases and related complications were also improved. A longer follow-up period is needed.

[Surg Endosc.](#) 2009 Aug;23(8):1724-32. Epub 2008 Oct 2.

#### **Hormonal evaluation following laparoscopic treatment of type 2 diabetes mellitus patients with BMI 20-34.**

[DePaula AL](#), [Macedo AL](#), [Schraibman V](#), [Mota BR](#), [Vencio S](#).

BACKGROUND: A group of patients with type 2 diabetes mellitus (T2DM) and body mass index (BMI) 20-34 kg/m<sup>2</sup> were submitted to laparoscopic interposition of a segment of ileum into the proximal jejunum or into the proximal duodenum associated to a sleeve gastrectomy. The objective of this study is to evaluate the hormonal changes in the pre- and postoperative period. MATERIALS AND METHODS: Hormonal evaluation was done in 58 patients operated between April 2005 and July 2006. Mean age was 51.4 years (40-66 years). Mean BMI was 28.2 (20-34.8) kg/m<sup>2</sup>. All patients had had the diagnosis of T2DM for at least 3 years. Mean duration of T2DM was 9.6 years (3-22 years). Two techniques were performed, consisting of different combinations of ileal interposition (II) associated to a sleeve gastrectomy (SG). The following hormones were assayed in the pre- and postoperative period (mean 16 months) at the

baseline and following specific food stimulation (30, 60, 120 min): glucagon-like protein 1 (GLP-1), glucose-dependent insulintropic peptide (GIP), insulin, glucagon, C-peptide, amylin, cholecystokinin (CCK), pancreatic polypeptide (PPP), somatostatin, peptide YY (PYY), ghrelin, adiponectin, resistin, leptin, and interleukin-6 (IL-6). RESULTS: Thirty patients had II associated to sleeve gastrectomy (II-SG) and 28 had II with diverted sleeve gastrectomy (II-DSG). GLP1 exhibited an important rise following the two operations, especially after II-DSG ( $p < 0.001$ ). GIP also exhibited an important rise, with both II-SG and II-DSG being equally effective ( $p < 0.001$ ). Insulin and amylin showed a significant rise at 30 min. Glucagon decreased slightly. CCK measurements were very low after II-DSG. PPP was also slightly altered by the II-DSG. PYY showed an important increase with both operations ( $p < 0.001$ ). Ghrelin showed a significant decrease following the two operations ( $p < 0.001$ ). Somatostatin and IL-6 were not affected ( $p = 0.632$ ). Both leptin and resistin blood levels decreased. Adiponectin showed a slight increase. Mean postoperative follow-up was 19.2 months. Both II-SG and II-DSG were effective in achieving adequate glycemic control (91.2%). CONCLUSIONS: There was a significant hormonal change following laparoscopic ileal interposition. These alterations may explain the promising good results associated to these operations for the treatment of T2DM in the nonmorbidly obese population.

[Surg Endosc](#). 2008 Mar;22(3):706-16.

### **Laparoscopic treatment of type 2 diabetes mellitus for patients with a body mass index less than 35.**

[DePaula AL](#), [Macedo AL](#), [Rassi N](#), [Machado CA](#), [Schraibman V](#), [Silva LQ](#), [Halpern A](#).

BACKGROUND: Type 2 diabetes mellitus (T2DM) is a common disease with numerous complications. Bariatric surgery is an efficient procedure for controlling T2DM in morbidly obese patients. In T2DM, the incretin effect is either greatly impaired or absent. This study aimed to evaluate the preliminary results from interposing a segment of ileum into the proximal jejunum associated with a sleeve or diverted sleeve gastrectomy to control T2DM in patients with a body mass index (BMI) less than 35 kg/m<sup>2</sup>. METHODS: For this study, 39 patients (16 women and 23 men) underwent two laparoscopic procedures comprising different combinations of ileal interposition into the proximal jejunum via a sleeve or diverted sleeve gastrectomy. The mean age of these patients was 50.3 years (range, 36-66 years). The mean BMI was 30.1 kg/m<sup>2</sup> (range, 23.4-34.9 kg/m<sup>2</sup>). All the patients had a diagnosis of T2DM that had persisted for at least 3 years and evidence of stable treatment with oral hypoglycemic agents or insulin for at least 12 months. The mean duration of T2DM was 9.3 years (range, 3-22 years). RESULTS: The mean operative time was 185 min, and the median hospital stay was 4.3 days. Four major

complications occurred in the short term (30-days), and the mortality rate was 2.6%. The mean postoperative follow-up period was 7 months (range, 4-16 months), and the mean percentage of weight loss was 22%. The mean postoperative BMI was 24.9 kg/m<sup>2</sup> (range, 18.9-31.7 kg/m<sup>2</sup>). An adequate glycemic control was achieved for 86.9% of the patients, and 13.1% had important improvement. The patients whose glycemia was not normalized were using a single oral hypoglycemic agent. No patient needed insulin therapy postoperatively. All the patients except experienced normalization of their cholesterol levels. Targeted triglycerides levels were achieved by 71% of the patients, and hypertension was controlled for 95.8%. **CONCLUSIONS:** The laparoscopic ileal interposition via either a sleeve gastrectomy or diverted sleeve gastrectomy seems to be a promising procedure for the control of T2DM and the metabolic syndrome. A longer follow-up period is needed.

[Zentralbl Chir.](#) 2009 Feb;134(1):24-31. Epub 2009 Feb 25. [Article in German]

#### **[Operative techniques and outcomes in metabolic surgery: sleeve gastrectomy]**

[Hüttl TP](#), [Obeidat FW](#), [Parhofer KG](#), [Zügel N](#), [Hüttl PE](#), [Jauch KW](#), [Lang RA](#).

Laparoscopic sleeve gastrectomy (LSG) was initially introduced for super-obese patients in a two-step concept in order to reduce the perioperative risk. Many years before a very similar technique - the Magenstrasse and Mill (M & M) operation - was developed by Johnston in Leeds / UK as a "more physiological" bariatric procedure with acceptable weight loss, while preserving gastric emptying mechanisms and thus minimising possible side-effects such as vomiting, dumping and diarrhoea, which are common complications of gastric bypass procedures. The following manuscript analyses the current literature and our own preliminary results and parallels publications of the M & M procedure. Until now numerous modifications (e. g., bougie size and residual volume, stapler technique, use of buttress material) have been reported. However, reported morbidity and mortality rates were equal to those of gastric banding and gastric bypass (RYGB). In conclusion, laparoscopic sleeve gastrectomy (LSG) has now proven to be as effective as the RYGB for weight loss over a three-year period. Control of hunger and feeling of fullness are reported to be superior compared to gastric banding. Laparoscopic sleeve gastrectomy is no longer an experimental procedure. It should be accepted as one of the effective standard procedures for surgical treatment of morbid obesity.

[Obes Surg.](#) 2009 Aug;19(8):1077-83. Epub 2009 May 12.

#### **Surgery for nonobese type 2 diabetic patients: an interventional study with duodenal-jejunal exclusion.**

[Geloneze B](#), [Geloneze SR](#), [Fiori C](#), [Stabe C](#), [Tambascia MA](#), [Astiarraga BD](#), [Pareja JC](#).

**BACKGROUND:** A 24-week interventional prospective trial was performed to compare the benefits of open duodenal-jejunal exclusion surgery (GJB) with a matched control group on standard medical care. **METHODS:** One-hundred eighty patients were screened for the surgical approach. Twelve patients accepted to be operated and presented the full eligibility criteria for surgery that includes overweight BMI (25-29.9 kg/m<sup>2</sup>), T2DM diagnosis for less than 15 years, insulin-treated patients, no history of major complications, preserved beta-cell function, and absence of autoimmunity. A matched control group (CG) of patients whom refused surgical treatment was placed to receive standard care. Patients had age of 50 (5) years, time of diagnosis 9 years (range, 3 to 15 years), time of insulin usage 6 months (range, 3 to 48 months), fasting glucose (FG), 9.8 (2.5) mg/dL, and glycated hemoglobin (A1C) 8.90 (2.12)%. **RESULTS:** At 24 weeks after surgery, patients experienced greater reductions on FG (14% vs. 7% on CG), A1C (from 8.78 to 7.84 in GJB- $p<0.01$  and 8.93 to 8.71 in CG;  $p<0.05$  between groups) and reductions on average daily insulin requirement (93% vs. 29%,  $p<0.01$ ). Ten patients stopped insulin usage in GJB but they remain taking oral medications. No differences were observed in both groups regarding BMI, body distribution and composition, blood pressure, and lipids. **CONCLUSIONS:** In conclusion, duodenal-jejunal exclusion was an effective treatment for nonobese T2DM subjects. GJB was superior to standard care in achieving better glycemic control along with reduction in insulin requirements.

[Surgery.](#) [Epub ahead of print]

**Laparoscopic sleeve gastrectomy for diabetes treatment in nonmorbidly obese patients: Efficacy and change of insulin secretion.**

[Lee WJ](#), [Ser KH](#), [Chong K](#), [Lee YC](#), [Chen SC](#), [Tsou JJ](#), [Chen JC](#), [Chen CM](#).

**BACKGROUND:** Sleeve gastrectomy is a new bariatric surgery, and many reports have showed that patients who have undergone sleeve gastrectomy have experienced rapid resolution of type 2 diabetes. The mechanisms accounting for the beneficial effects of sleeve gastrectomy on glucose homeostasis are not well understood and remain speculative. This trial assessed prospectively the effect of sleeve gastrectomy on type 2 diabetes and the serial changes of insulin secretion to oral glucose loads. **METHODS:** Prospective study on the response of insulin secretion to oral glucose loads in 20 severe diabetic patients (body mass index [BMI]  $>25$  and  $<35$ , HbA1C  $>7.5\%$ ) before and at 1, 4, 12, 26, and 52 weeks after sleeve gastrectomy. The insulin secretion was measured by insulinogenic index and area under the curve (AUC) during a standard oral glucose tolerance test (OGTT). Remission of type 2 diabetes was defined as

fasting glucose level <126 mg/dL and HbA1C <6.5% without any glycemc therapy.

**RESULTS:** Of the 20 patients enrolled, the mean age was 46.3 +/- 8.0 years, mean BMI was 31.0 +/- 2.9 kg/m(2), and mean HbA1C was 10.1 +/- 2.2. The mean BMI and excess body weight loss at 1, 4, 12, 26, and 52 weeks after operation were 28.9 (22.1%), 27.4 (43.0%), 25.7 (55.1%), 24.9 (71.9%), and 24.6 (69.1%), respectively. The mean HbA1C at 1, 4, 12, 26, and 52 weeks after operation were 9.2, 8.4, 7.7, 7.3, and 7.1, respectively. Resolution of type 2 diabetes was achieved in 2 (20%) patients at 4 weeks, 6 (30%) at 12 weeks, 8 (40%) at 26 weeks, and 10 (50%) at 52 weeks after sleeve gastrectomy. Before operation, the mean fasting plasma glucose and insulin levels were 240.1 + 80.9 mg/dL and 16.8 +/- 15.4 uIU/mL, respectively. The OGTT test showed a blunted insulin secretion pattern with an AUC of 3,135 uIU.min/mL. At 1 week after operation, the fasting plasma glucose and insulin levels significantly decreased to 158 +/- 52 mg/dL and 5.6 +/- 3.2 uIU/mL, respectively. The AUC decreased to 2,988.7 uIU.min/mL. The AUC at 4, 12, 26, and 52 weeks after operation was 2,211, 1,584, 3,621, and 3,351 uIU.min/mL, respectively. The diabetes resolution rates for those with pre-operative C-peptide <3, 3-6, and >6 ng/mL were 1/7 (14.3%), 7/11 (63.6%), and 2/2 (100%), respectively (P < .05).

**CONCLUSION:** Laparoscopic gastric sleeve gastrectomy resulted in remission of poorly controlled nonmorbidly obese T2DM patients up to 50% at 1 year after operation. The effect is related more to the decreasing of insulin resistance because of calorie restriction and weight loss rather than to the increasing of insulin secretion. C-peptide >3 ng/mL is the most important predictor for a successful treatment.

[Surg Obes Relat Dis.](#) 2006 May-Jun;2(3):401-4, discussion 404.

#### **Laparoscopic Roux-en-Y gastric bypass for BMI < 35 kg/m(2): a tailored approach.**

[Cohen R, Pinheiro JS, Correa JL, Schiavon CA.](#) Comment in: [Surg Obes Relat Dis.](#) 2006 Sep-Oct;2(5):579-80.

**BACKGROUND:** Patients with a body mass index (BMI) < 35 kg/m(2) who are obese, have uncontrolled co-morbidities, and have tried to lose weight with no success do not meet the "traditional" criteria for obesity surgery, and no other treatment is being offered to them.

**METHODS:** A total of 37 obese patients (30 women and 7 men) had been undergoing clinical treatment with no resolution or improvement of their life-threatening co-morbidities. The mean BMI was 32.5 kg/m(2). Their age ranged from 28 to 45 years. All patients had type 2 diabetes mellitus, hypertension, and lipid disorder. Gastroesophageal reflux disease was present in 7 patients and sleep apnea in 3. These patients underwent the same preoperative evaluation as other patients for gastric bypass. The patients were required to have approval from their primary care physician. All patients provided written informed consent. Laparoscopic Roux-en-Y gastric

bypass was performed. After extensive explanation and documentation, the Brazilian insurance companies approved the procedure in 3 cases, and international (non-American) insurance companies approved the procedure in 4 cases. RESULTS: The follow-up range was 6-48 months. The mean excess weight loss was 81%. Thirty-six patients had total remission of their co-morbidities. One patient still had mild hypertension, but with a reduction in the number of antihypertensive drugs used. No surgery-related complications occurred. CONCLUSION: Obese patients with a BMI of  $<35 \text{ kg/m}^2$  and severe co-morbidities can benefit from laparoscopic Roux-en-Y gastric bypass. This treatment option should be offered to this group of patients.

[Obes Surg.](#) 2009 Mar;19(3):307-12. Epub 2008 Nov 6.

**Laparoscopic duodenal-jejunal exclusion in the treatment of type 2 diabetes mellitus in patients with BMI $<30 \text{ kg/m}^2$  (LBMI).**

[Ramos AC](#), [Galvão Neto MP](#), [de Souza YM](#), [Galvão M](#), [Santamaría R](#), [Zambrano TA](#).

BACKGROUND: The association between medical and dietetic-behavioral treatments of type 2 diabetes mellitus (T2DM) has demonstrated to have variable results. The surgical treatment of T2DM is justifiable after the observation of a successful glycemic control in patients submitted to Roux-en-Y gastric bypass and biliopancreatic diversion. Experiments have shown an important role of the proximal intestine in glycemia decrease and diabetes control. METHODS: Twenty diabetic patients underwent laparoscopic duodenal-jejunal exclusion. The variables studied were body mass index (BMI), fasting glycemia, glycosylated hemoglobin (HbA1c), and C-peptide, in the preoperative period and after 3 and 6 months. RESULTS: There was a BMI decrease up to the third month and a weight stabilization between the third and sixth months. There was a significant reduction in fasting glycemia (43.8%) and HbA1c (22.8%) up to the sixth month ( $p<0.001$ ). C-peptide did not show any significant alteration until the third month, although there was a considerable increase (25%) between the third and the sixth months ( $p<0.001$ ). Only two patients were on oral medication after the sixth month. CONCLUSIONS: Preliminary results have shown an important effect of the laparoscopic duodenal-jejunal exclusion in the treatment of T2DM. Studies with longer follow-up and a larger number of patients are necessary to better define the role of this new and promising procedure.

[Obes Surg.](#) 2007 Feb;17(2):185-92.

**Long-term control of type 2 diabetes mellitus and the other major components of the metabolic syndrome after biliopancreatic diversion in patients with BMI  $< 35 \text{ kg/m}^2$ .**

[Scopinaro N](#), [Papadia F](#), [Marinari G](#), [Camerini G](#), [Adami G](#). Comment in: [Obes Surg. 2007 Feb;17\(2\):193-4.](#)

**BACKGROUND:** Bariatric operations are the most powerful means of curing type 2 diabetes mellitus (T2D) and the other major components of the metabolic syndrome. Despite the very frequent occurrence of metabolic disturbances in patients with BMI from 30 to 35, there is a general reluctance to operate on these patients, as their disease is considered less severe. **METHODS:** 7 T2D obese patients with mean BMI < 35 underwent BPD between 1976 and 1996 at the Azienda Ospedaliera Universitaria San Martino of Genoa, Italy. Mean age was 49 years, mean body weight 91 kg, and mean waist circumference 115 (M) and 98 (F) cm. The mean follow-up was 13 (10-18) years. All 7 patients had abnormally high values of serum triglyceride, serum cholesterol, and arterial pressure. **RESULTS:** In all patients, serum glucose was normalized at 1,2, and 3 years. In 5 patients, a slight increase of serum glucose above 125 mg/dl was observed at or around 5 years, the values being maintained at all subsequent times, with no one value higher than 160 mg ever being recorded. The other 2 patients showed full resolution of diabetes at all follow-up times. Both serum cholesterol and triglyceride values fell to normal 1 year after BPD, and remained within the normal range in all 7 patients during the entire follow-up observation. Arterial pressure normalized in 6 cases and was improved in 1 case. No patient had excessive weight loss at any postoperative time. **CONCLUSIONS:** T2D patients with BMI < 35 have very severe metabolic disturbances. Surgical therapy for these patients is warranted, and it should be performed as soon as possible, before the rapid evolution of the pattern leads them to a point where even the most effective metabolic surgery operation could be insufficient to yield complete and permanent control of their diabetes.

[J Gastrointest Surg.](#) 2008 May;12(5):945-52. Epub 2007 Oct 16.

**Effect of laparoscopic mini-gastric bypass for type 2 diabetes mellitus: comparison of BMI>35 and <35 kg/m<sup>2</sup>.**

[Lee WJ](#), [Wang W](#), [Lee YC](#), [Huang MT](#), [Ser KH](#), [Chen JC](#).

**BACKGROUND:** Laparoscopic gastric bypass resulted in significant weight loss and resolution of type 2 diabetes mellitus (T2DM). The current indication for bariatric surgery is mainly applied for patients with body mass index (BMI)>35 kg/m<sup>2</sup> with comorbidity status. However, little is known concerning T2DM patients with BMI<35 kg/m<sup>2</sup>. Recent studies have suggested that T2DM patients with BMI<35 kg/m<sup>2</sup> might benefit from gastric bypass surgery. **METHODS:** From Jan 2002 to Dec 2006, 820 patients who underwent laparoscopic mini-gastric bypass were enrolled in a surgically supervised weight loss program. We identified 201 (24.5%) patients who had impaired fasting glucose or T2DM. All the clinical data were

prospectively collected and stored. Patients with BMI<35 kg/m<sup>2</sup> were compared with those of BMI>35 kg/m<sup>2</sup>. Successful treatment of T2DM was defined by HbA1C<7.0%, LDL<100 mg/dl, and triglyceride<150 mg/dl. RESULTS: Among the 201 patients, 44 (21.9%) had BMI<35 kg/m<sup>2</sup>, and 114 (56.7%) had BMI between 35 and 45, 43 (21.4%) had BMI>45 kg/m<sup>2</sup>. Patients with BMI<35 kg/m<sup>2</sup> are significantly older, female predominant, had lower liver enzyme and C-peptide levels than those with BMI>35 kg/m<sup>2</sup>. The mean total weight loss for the population was 32.1, 33.4, 31.9, and 32.8% (at 1, 2, 3, 5 years after surgery), and percentage to change in BMI was 31.9, 34.2, 32.2, and 29.5% at 1, 2, 3, and 5 years. One year after surgery, fasting plasma glucose returned to normal in 89.5% of BMI<35 kg/m<sup>2</sup> T2DM and 98.5% of BMI>35 kg/m<sup>2</sup> patients (p=0.087). The treatment goal of T2DM (HbA1C<7.0%, LDL<100 mg/dl and triglyceride<150 mg/dl) was met in 76.5% of BMI<35 kg/m<sup>2</sup> and 92.4% of BMI>35 kg/m<sup>2</sup> (p=0.059). CONCLUSION: Laparoscopic gastric bypass resulted in significant and sustained weight loss with successful treatment of T2DM up to 87.1%. Despite a slightly lower response rate of T2DM treatment, patients with BMI <35 still had an acceptable DM resolution, and this treatment option can be offered to this group of patients.