

Early results of laparoscopic **biliopancreatic diversion with duodenal switch**:
a case series of 40 consecutive patients.

Obes Surg 2000 Dec;10(6):514-23; discussion 524 (ISSN: 0960-8923)

Ren CJ; Patterson E; Gagner M [[Find other articles with these Authors](#)]
Department of Surgery, The Mount Sinai Medical Center, New York, NY, USA.

BACKGROUND: **Biliopancreatic diversion with duodenal switch** (BPD-DS) is an operation which provides one of the greatest maintained weight losses of any bariatric procedure. We looked at the safety and efficacy of laparoscopic BPD-DS for morbid obesity. **METHODS:** A 150-200 ml sleeve gastrectomy was created and anastomosed to the distal 250 cm of divided ileum. The median length of the common channel was 100 cm. All patients were prospectively followed up to 12 months. **RESULTS:** 40 consecutive patients underwent laparoscopic BPD-DS as a primary procedure for morbid obesity. Median patient body mass index (BMI) was 60 kg/m² (range 42-85 kg/m²). Mean age was 43 +/- 1 years (+/- SEM), with 12 males and 28 females. One patient was converted to open laparotomy (2.5%). Median operative time was 210 +/- 9 minutes (range 110-360 minutes) with a significant correlation between BMI and operative time (p = 0.04). Median length of stay was 4 days (range 3-210 days). There was one 30-day mortality (2.5%). Major morbidities occurred in 6 patients (15%), including 1 anastomotic leak (2.5%), 1 venous thrombosis (2.5%), 4 staple-line hemorrhages (10%) and 1 subphrenic abscess (2.5%). Median follow-up at 6 months (range 1-12 months) resulted in 46% +/- 2% excess weight loss (EWL) and at 9 months 58% +/- 3% EWL. **CONCLUSION:** Laparoscopic BPD-DS is a complex, yet feasible, procedure resulting in effective weight loss with an acceptable morbidity. A BMI >65 was associated with increased morbidity and mortality. A long-term study is needed to confirm efficacy and proper patient selection.

Biliopancreatic diversion with duodenal switch.

World J Surg 1998 Sep;22(9):947-54 (ISSN: 0364-2313)

Marceau P; Hould FS; Simard S; Lebel S; Bourque RA; Potvin M; Biron S [[Find other articles with these Authors](#)]

Department of Surgery, Laval Hospital, Laval University, Quebec, Canada.

In 1990 Scopinaro's technique of **biliopancreatic diversion** with distal gastrectomy (DG) and gastroileostomy was modified. A sleeve gastrectomy with **duodenal switch** (DS) was used instead of the distal gastrectomy; and the length of the common channel was made 100 cm instead of 50 cm. A questionnaire and a prescription for blood work were sent to 252 patients who underwent DG a mean 8.3 years ago (range 6-13 years) and 465 patients who underwent DS 4.1 years ago (range 1.7-6.0 years). The questionnaire response rate was 93%, and laboratory work was completed for 65% of both groups. The mean weight loss after DG was 37 +/- 21 kg and after DS 46 +/- 20 kg. There were fewer side effects after DS: The number of daily stools was lower ($p < 0.0002$), as was the prevalence of diarrhea ($p < 0.01$), vomiting ($p < 0.001$), and bone pain ($p < 0.001$). Greater benefits related to several aspects of life were reported after DS than DG ($p < 0.0001$). The mean serum levels of ferritin, calcium, and vitamin A were higher ($p < 0.001$), and parathyroid hormone was lower. The yearly revision rate for excessive malabsorption was 1.7% per year after DG and 0.1% per year after DS. The two procedures were equally efficient for treating co-morbid conditions such as diabetes, hypertension, and hypercholesterolemia. **Biliopancreatic diversion** with sleeve gastrectomy/**duodenal switch** and a 100-cm common limb was shown to produce greater weight loss with fewer side effects.

Preliminary results of the **duodenal switch**.

Obes Surg 1997 Dec;7(6):500-4 (ISSN: 0960-8923)

Baltasar A; del Rio J; Escriva C; Arlandis F; Martinez R; Serra C [[Find other articles with these Authors](#)]

The Surgical Service, Virgen de los Lirios Hospital, Alcoy, Alicante, Spain.

BACKGROUND: The **duodenal switch** (DS), as a modification of the bilio-pancreatic **diversion** (BPD), is a 'complex' hybrid operation. **METHODS:** Sixty patients were operated on during the last 3 years. **RESULTS:** Two patients died early (3.3%); two late deaths occurred at 4 and 7 months, one due to liver failure and the other due to malnutrition and refeeding **syndrome** (3.57%); three patients required conversions (5.3%). The two early deaths and all the patients who required conversions had a previous vertical banded gastroplasty. Eleven patients had minor liver abnormalities corrected with medications, and one patient had severe diarrhea for more than a year. Eleven female patients have iron deficiency anemia that requires parenteral supplementation. Mean percent excess weight loss was 86% at 2.5 years. **CONCLUSIONS:** The DS has been, in our experience, an unsafe operation with unacceptably high operative and postoperative mortality. The conversion rate is acceptable. Weight loss, quality of food intake and life have been excellent. Inadequate follow-up can be dangerous if patients fail to report for regular visits.

Distal gastric bypass/**duodenal switch** procedure, Roux-en-Y gastric bypass and **biliopancreatic diversion** in a community practice.

Obes Surg 1998 Feb;8(1):53-9 (ISSN: 0960-8923)

Rabkin RA [[Find other articles with this Author](#)]

Pacific Institute of Surgery for Obesity, Ventura, California 93003, USA.

BACKGROUND: Hybrid procedures combining purely restrictive and purely malabsorptive components to achieve stable long-term weight reduction have evolved since the 1970s. In a solo surgical community-based practice over the period 1984-1997, three different hybrid procedures were utilized as primary operations in patients who had not had prior bariatric surgery. **METHODS:** Restrospective comparison of 32 patients who underwent **biliopancreatic diversion** (BPD), 138 patients who underwent distal gastric bypass Roux-en-Y (RGB) and 105 patients undergoing distal gastric bypass/**duodenal switch** procedure (DS) with 2-4 year follow-up in 37 DS patients. **RESULTS:** Height, initial weight and initial body mass index (BMI) were similar in the three groups. The DS patients were older. Mean BMI at 2 years fell from 49 to 29 kg/m² in both DS and RGB. Mean percentage maximum preoperative weight lost was 40% in both the DS and RGB groups. Two-year mean percentage excess weight lost in DS was 78%, compared to 74% in RGB. There were no operative deaths and no ulcers in the DS group. **CONCLUSION:** DS is an important new option for primary treatment of morbid obesity. It can be performed safely, with up to 4 year follow-up showing stable weight loss.

Biliopancreatic diversion (duodenal switch procedure).

Eur J Gastroenterol Hepatol 1999 Feb;11(2):99-103 (ISSN: 0954-691X)

Marceau P; Hould FS; Potvin M; Lebel S; Biron S [[Find other articles with these Authors](#)]

Department of Surgery, Laval Hospital, Laval University, Quebec, Canada.

The physiological principle underlying **biliopancreatic diversion** (BPD) is attractive. It decreases food absorption and particularly that of fat. It preserves normal eating habits and is compatible with a good quality of life. Because weight loss is not a function of an imposed aversion to eating, it is more appealing to patients. Data are accumulating showing that BPD can permanently cure morbid obesity in a majority of patients and is remarkably well tolerated. While long-term systemic side-effects from decreased absorption continue to raise concerns, available results have already shown that, within 20 years, metabolic disturbances are well tolerated while weight loss and quality of life are maintained. Vitamin and mineral replacement therapy and periodic monitoring are essential. The original procedure described by Scopinaro with subsequent modifications will be presented, focusing on the **duodeno-ileal switch** procedure.

Biliopancreatic Diversion with a New Type of Gastrectomy: Some Previous Conclusions Revisited [Record Supplied By Publisher]

Obes Surg 1995 Nov;5(4):411-418 (ISSN: 0960-8923)

Lagace M; Marceau P; Marceau S; Hould FS; Potvin M; Bourque RA; Biron S [[Find other articles with these Authors](#)]

Department of Surgery, Laval Hospital, Laval University, Sainte-Foy, Quebec, G1V 4G5, Canada.

BACKGROUND: In 1990, we modified Scopinaro's biliopancreatic **diversion** (BPD); instead of a distal gastrectomy and gastroileal anastomosis, a parietal gastrectomy was performed with nutrients diverted through a **duodenal switch**. Also, the length of the common channel (50 cm) was doubled to 100 cm, while the nutrient limb remained 250 cm. In 1991, we reported initial results after 16 months, weight loss was as expected following BPD, but patients reported fewer side-effects and the prevalence of excessive malabsorption was less. This cohort of patients had their **duodenum** stapled shut to construct the **duodenal switch**. This staple-line failed insidiously in some patients, allowing the **duodenum** to recanalize partially or completely. This resulted in an incomplete BPD. **METHODS:** Since 1992, the **duodenal switch** has been constructed with a complete transaction of the **duodenum** to prevent recanalization. We report here on the first 61 patients who underwent this definitive procedure. **RESULTS:** At 16 months, we observed a mean weight loss of 84% of initial excess weight, the number of daily stools at 2.9 +/- 1.6 and the prevalence of diarrhea at 10%. Twenty per cent of patients experienced mild anemia, hypocalcemia, or hypoalbuminemia, which required added supplements. **CONCLUSIONS:** BPD with parietal gastrectomy, **duodenal switch** and longer common channel improved weight loss and decreased gastrointestinal side-effects without an increased prevalence of excessive malabsorption. The parietal gastrectomy may contribute to weight loss by increasing satiety, and decreasing side-effects by regulating gastric emptying.

Biliopancreatic diversion with transitory gastroplasty preserving **duodenal** bulb: 3 years experience.

Obes Surg 1997 Feb;7(1):30-3 (ISSN: 0960-8923)

Vassallo C; Negri L; Della Valle A; Salvaneschi M; Vegezzi C; Griziotti A; Dono C; Mussi P; Bausardo MG; Pietrobono P [[Find other articles with these Authors](#)]
Interdisciplinary Centre of Obesity, Surgical Division, Stradella's Hospital, Italy.

BACKGROUND: The authors have performed 521 bariatric surgery operations (319 restrictive procedures and 202 malabsorptive procedures). **METHODS:** During the last few years we have introduced an evolution of **biliopancreatic diversion** (BPD): BPD with transitory gastroplasty, preserving the **duodenal** bulb (53 cases). From a technical point of view, the operation consists of a BPD, coupled with a gastroplasty which is transitory due to the use of a polydioxanone (PDS) band. In the last few cases, instead of a VBG (with PDS band) in order to make the operation completely reversible without any suture on the stomach, we made a gastric pouch by banding with PDS calibrated with the same tube as for the Lap-band (20 cc). We maintained completely the **duodenal** bulb (5 cm from the pylorus), making an end-to-side **duodeno**-ileal isoperistaltic anastomosis. **RESULTS:** With this anastomosis, only 2% of patients developed an anastomotic **ulcer**. With this new procedure, results have been good in terms of weight loss (similar to that of BPD-AHS) and in nutritional complications. No patient has had hypoalbuminemia, diarrhea or halitosis. **CONCLUSION:** BPD with temporary gastric restriction has provided satisfactory results.

Duodenal switch: an effective therapy for morbid obesity--intermediate results
[In Process Citation]

Obes Surg 2001 Feb;11(1):54-8 (ISSN: 0960-8923)

Baltasar A; Bou R; Bengochea M; Arlandis F; Escriva C; Mir J; Martinez R; Perez N

[\[Find other articles with these Authors\]](#)

Surgical Service, Virgen de los Lirios Hospital, Alcoy, Alicante, Spain.

abaltasar@seco.org.

BACKGROUND: The **duodenal switch** (DS) is a variant of the **biliopancreatic diversion** (BPD), with a vertical subtotal gastrectomy and pylorus preservation. **METHODS:** DS was used to treat morbid obesity in 125 patients, with mean BMI 50, with 65% of the patients super obese (SO). Patients have been followed for an intermediate period. **RESULTS:** The percentage of excess weight loss (%EWL) was > 70% at 1 year, and reached 81.4% at 5 years when 97% of the patients had a %EWL > 50%. Comorbidities were cured or improved in all patients. **CONCLUSION:** DS was very effective for the treatment of the morbid obesity in the SO patients.

Surgical intervention as a strategy for treatment of obesity.

Endocrine 2000 Oct;13(2):213-30 (ISSN: 0969-711X)

Sjostrom L [[Find other articles with this Author](#)]

The SOS, Secretariat, Sahlgrenska University Hospital, Goteborg, Sweden.
lars.sjostrom@medfak.gu.se.

A very large number of weight-reducing surgical techniques have been developed over the last 25 years. Today only a handful of these techniques can be recommended. Gastric bypass, vertical banded gastroplasty, and variable banding can all be recommended although gastric bypass should be reserved for heavier patients. For the heaviest, **biliopancreatic diversion** or **biliopancreatic diversion** with **duodenal switch** might be considered. The controlled intervention study Swedish Obese Subjects has shown that most but not all cardiovascular risk factors are improved over 10 years by surgically induced weight loss. Quality of life as well as cardiac structure and function are dramatically improved. The average weight loss for gastric bypass and vertical banded gastroplasty was 16% after 10 years. No non-surgical treatment available today can achieve such results, not even over 2 years. Surgical treatment for obesity needs to become much more common, particularly in obese patients with metabolic disturbances.

Duodenal switch: a new form of pancreaticobiliary diversion.

Surg Clin North Am 1992 Apr;72(2):487-99 (ISSN: 0039-6109)

Hinder RA [[Find other articles with this Author](#)]

Department of Surgery, Creighton University School of Medicine, Omaha, Nebraska.

The **duodenal switch** operation is a new form of pancreaticobiliary **diversion** with **superior** physiologic consequences compared with the Roux-en-Y procedure. The new technique has been extensively tested in the laboratory and found to be nonulcerogenic and to be less disruptive of foregut physiology than the Roux-en-Y procedure. The **duodenal switch** has been used in more than 40 patients with confirmed duodenogastric reflux and has proved to be well tolerated and successful in long-term follow-up.

[Use of mechanical staplers in **biliopancreatic diversion** intervention]

[L'impiego delle suturatrici meccaniche nell'intervento di diversione biliopancreatica (BPD).]

Minerva Chir 1994 Sep;49(9):779-81 (ISSN: 0026-4733)

Grassi N; Pantuso G; Salanitro L; Ricevuto G; Pischedda G; Attanzio MT; Barranco G; Latteri M; Bajardi G [[Find other articles with these Authors](#)]

Dipartimento di Discipline Chirurgiche ed Anatomiche, Università degli Studi di Palermo.

The use of mechanical staplers in general surgery and in particularity in **biliopancreatic diversion** (BPD) has led to a marked reduction in the duration of surgery, thus requiring shorter anesthesia times. In obese subjects this also serves to reduce the risks related to their particular clinical and metabolic conditions. The authors report their experience in 53 patients; in 26 cases automatic linear staplers were used to create the ileal-**duodenal** and gastric tomy only, whereas the entero-entero anastomosis and gastro-entero anastomosis were performed manually using a **biliopancreatic diversion** technique. In the remaining 27 cases the operation was performed exclusively using automatic staplers. The paper then examines the complications arising from the use of mechanical staplers, dividing them into early and late. Among the first were two episodes of GEA hemorrhage (7.4%) and an asymptomatic fistula again of the GEA (3.7%). The late complications only **included** two stenoses (7.4%) of the GEA, both resolved using endoscopic pneumatic dilation.

Steatohepatitis and fatal hepatic failure after **biliopancreatic diversion**.

Am J Gastroenterol 1992 Jun;87(6):775-9 (ISSN: 0002-9270)

Grimm IS; Schindler W; Haluszka O [[Find other articles with these Authors](#)]
Department of Internal Medicine (Gastroenterology Division), Naval Hospital, San Diego, California.

Steatohepatitis and hepatic failure are well known complications of jejunoileal bypass, an operation that has been abandoned as a treatment for severe obesity because of its potential for adverse metabolic consequences. **Biliopancreatic diversion** is a novel operation designed to avoid the harmful effects of jejunoileal bypass. Although it has not gained wide acceptance, this procedure is being advocated by some surgeons as a safe and effective treatment for severe obesity. Published reports indicate that liver histology generally remains stable or improves after **biliopancreatic diversion**. We present a patient who developed steatohepatitis and subsequently died in hepatic failure after this operation. Severe liver **disease** should be added to the list of complications that may follow **biliopancreatic diversion**.

: Am J Gastroenterol. 1993 Feb; 88(2):321

[Care of the patient after **biliopancreatic diversion** (BPD) surgery]

[L'assistenza al paziente operato di diversione biliopancreatica (BPD).]

Minerva Chir 1994 Sep;49(9):783-5 (ISSN: 0026-4733)

Salanitro L; Pantuso G; Grassi N; Barranco G; Ricevuto G; Graceffa G; Attanzio MT;
Grillo A; Bajardi G; Latteri M [[Find other articles with these Authors](#)]

Dipartimento di Discipline Chirurgiche ed Anatomiche, Università degli Studi di
Palermo.

The authors report their experience in the care of severely obese patients undergoing **biliopancreatic diversion** (BPD) surgery. The success of this surgical technique not only depends on its correct application but also on correct postoperative management, both immediately and over time. After a short summary of the methods of management used immediately after surgery, the authors focus in greater detail on the most frequent complications in this type of surgery: these are divided into early and late. Among the former, the authors discuss thromboembolic **disease**, the most severe complications and bronchopneumonia disorders. The authors illustrate the methods of treating both as well as therapies for their prevention. The most frequent and potentially dangerous late complications are examined in detail: protein malnutrition, sideropenic anemia and diarrhea. Lastly, the authors underline the need for a constant rather than episodic approach to the problem of severe obesity since, in their opinion, only continuous and long term application ensures the best results with the fewest complications.

Severe corneconjunctival xerosis after **biliopancreatic** bypass for obesity
(Scopinaro's operation).

Am J Ophthalmol 1994 Dec 15;118(6):817-8 (ISSN: 0002-9394)

Quaranta L; Nascimbeni G; Semeraro F; Quaranta CA [[Find other articles with these Authors](#)]

Clinica Oculistica, Universita degli Studi di Brescia, Italy.

PURPOSE/METHODS: A 35-year-old woman, who had undergone an uncomplicated Scopinaro-type **biliopancreatic** bypass for obesity nine years previously, was examined because of severe bilateral corneconjunctival xerosis and markedly decreased vision. One month earlier she had had a bout of nonspecific enteritis. She was treated with intramuscular vitamin A. **RESULTS/DISCUSSION:** After one month of therapy, the ocular xerosis had cleared completely and her vision had returned to normal. This case suggests that this kind of operation can cause instability of vitamin A absorption.

[Organization of a center for prevention and treatment of obesity]

[Organizzazione di un Centro per la prevenzione e cura dell'obesita.]

Minerva Chir 1994 Sep;49(9):837-9 (ISSN: 0026-4733)

Graceffa G; Pantuso G; Grassi N; Salanitro L; Mastrandrea G; Attanzio MT; Latteri M;
Bajardi G [[Find other articles with these Authors](#)]

Dipartimento di Discipline Chirurgiche ed Anatomiche, Università degli Studi di
Palermo.

Obesity, a pathology with a multifactorial etiopathogenesis currently has an incidence of around 6% in the adult population in Italy. Considering that this **disease** provokes a statistically significant reduction of life expectancy, there is an evidence need to create structures which can deal with this problem. For this purpose, the Centre for the prevention and cure of obesity was set up by the Department of Surgery and Anatomy at the University of Palermo in 1990. It makes use of the specialist skills of experts in internal medicine, dieticians, cardiologists, psychologists and surgeons. In particular the authors give a detailed description of the diagnostic iter used and the methods of follow-up adopted for patients undergoing **bilopancreatic diversion** (BPD) surgery. In conclusion, the authors emphasize the need for a multidisciplinary approach to this pathology since this is the only way of minimizing complications arising during BPD surgery and obtaining the best results.

Imaging of patients with pancreaticobiliary **diversion** for obesity: post-operative anatomy and findings in small bowel **obstruction**.

Br J Radiol 1996 Aug;69(824):708-6 (ISSN: 0007-1285)

Bertolotto M; Gianetta E; Rollandi GA; Perrone R; Carrabetta S; Martinoli C; Scopinaro N; Cittadini G; Derchi LE [[Find other articles with these Authors](#)]
Institute of Radiology, University of Genoa, Italy.

Pancreaticobiliary **diversion** is a surgical procedure undertaken for obesity. It consists of a distal gastrectomy with a long Roux-en-Y reconstruction, the enteroenterostomy being placed 200 cm distal to the gastroenterostomy and 50 cm proximal to the ileocaecal valve. Three intestinal limbs are recognized: (a) the alimentary loop from the gastroenterostomy to the enteroenterostomy; (b) common loop from the enteroenterostomy to the ileocaecal valve and (c) pancreaticobiliary loop from the **duodenum** to the enteroenterostomy. The radiological findings in 15 pancreaticobiliary **diversion** patients with small bowel **obstruction** were reviewed (15 plain abdominal radiographs, 13 ultrasound (US), 8 CT) and compared with 20 plain abdominal radiographs, 10 US, and 10 CT studies performed for other causes in patients with pancreaticobiliary **diversion** and 15 CT scans from non-operated patients. After pancreaticobiliary **diversion** the pancreaticobiliary loop was completely air-free. In the patients operated on more than 1 year previously, alimentary and common loops were significantly larger than the pancreaticobiliary loop and small bowel loops of non-operated subjects. **Obstruction** of the pancreaticobiliary loop arrests only the flow of pancreaticobiliary secretions with non-specific clinical findings. Plain abdominal radiographs were not diagnostic in all but two cases with radiographically detectable dilated fluid filled loops. Air-fluid levels were never apparent. US and CT showed markedly dilatated intestinal loops and **duodenum**. **Obstruction** of the alimentary and common loops presented with symptoms, clinical signs, and radiological findings more typical for bowel **obstruction** in intact subjects.

Biliopancreatic diversion with pylorus-preserving technique: a new method for the surgical control of hypercholesterolaemia and diabetes II?

Panminerva Med 1997 Mar;39(1):35-40 (ISSN: 0031-0808)

Noya G; Cossu ML; Iannuccelli M; Coppola M [[Find other articles with these Authors](#)]
Clinica Chirurgica Generale, Universita degli Studi di Sassari, Italy.

OBJECTIVE: The aim of this study was to evaluate the efficacy of **biliopancreatic diversion** by Scopinaro's method, with a pylorus-preserving modification, in correcting hypercholesterolaemia and diabetes II not controllable by diet or medical treatment. **DESIGN:** Besides weight loss, Scopinaro's operation produces a correction of hypercholesterolaemia and diabetes. These results encouraged us to perform BPD without gastric resection, thus preserving the functions of the stomach and pylorus in moderately overweight patients with hypercholesterolaemia and diabetes. **SETTING AND PATIENTS:** The pylorus-preserving technique has been performed on two patients suffering from severe hypercholesterolaemia and hyperglycaemia and who were not more than 30% overweight, at Clinica Chirurgica and Chirurgia d'Urgenza Department, University of Sassari, Italy. Both patients had a six-month follow-up assessment. **MAIN OUTCOME MEASURES.** Examination of cholesterol and glycaemia levels after the operation, and the moderate weight loss. **INTERVENTION:** The operation is the same as Scopinaro's with regard to the length of intestine forming the alimentary loop and the common tract. The difference lies in the fact that instead of resecting the stomach and creating a gastroileostomy, we resect the **duodenum**, and perform a duodenoileostomy. **RESULTS.** In both patients the cholesterol and glycaemia levels had returned to normal 1 month after the operation and are stable after six months. Weight loss was only moderate. **CONCLUSION:** By the preliminary data on two patients treated with our modified technique this method seems to be as effective in controlling lipidic metabolism and diabetes II as the original version of **biliopancreatic diversion**.

[Preliminary results of **biliopancreatic diversion** in the treatment of morbid obesity. Clinical considerations on 69 patients with a 3-year follow-up]

[Risultati preliminari della diversione biliopancreatica nel trattamento della grande obesità. Considerazioni cliniche su 69 pazienti con follow-up a 3 anni.]

Minerva Chir 2000 Apr;55(4):211-9 (ISSN: 0026-4733)

Cossu ML; Coppola M; Fais E; Ruggiu M; Noya G [[Find other articles with these Authors](#)]

Cattedra di Chirurgia d'Urgenza, Università degli Studi, Sassari.

BACKGROUND AND AIMS: The aim of this study was to evaluate the results obtained using Scopinaro's **biliopancreatic diversion** technique (AHS-BPD) in the surgical treatment of morbid obesity. **METHODS:** A retrospective study was carried out in 69 patients with a follow-up ranging between 6-44 months. All patients were operated and monitored by the Obesity Surgery Centre operating in Sardinia since February 1995 at the Department of Emergency Surgery of Sassari University. All the patients were severely obese with a mean BMI of 51.58 and, in the majority of cases, presented associated metabolic **diseases** with the following incidence: type 2 diabetes in 40.57%, arterial hypertension in 36.23%, severe alteration of lipid status in 52.17%; in overall terms, a plurimetabolic **syndrome** was present in 24.63% of cases. All patients underwent **biliopancreatic diversion** using Scopinaro's classic technique (AHS-BPD). Controls were carried out at set intervals (1-3-6-12-18 and 24 months) to evaluate weight loss and the metabolic effects of surgery in terms of the lipid, glucose and protein status. **RESULTS:** Results were good, as confirmed by the marked weight loss (BMI after 24 months: 30) and the normalisation of cholesterol and glycemia. No major reductions were observed in proteinemia and albuminemia levels. **CONCLUSIONS:** In the light of these results, the authors affirm that Scopinaro's technique is a valid solution for the treatment of morbid obesity. Its relatively invasive nature is justified by the results obtained in terms of weight control and its effect on associated metabolic **diseases**.

Biliopancreatic Diversion with a New Type of Gastrectomy [Record Supplied
By Publisher]

Obes Surg 1993 Feb;3(1):29-35 (ISSN: 0960-8923)

Marceau P; Biron S; Bourque RA; Potvin M; Hould FS; Simard S [[Find other articles with these Authors](#)]

Department of Surgery, Laval Hospital, Sainte-Foy, Quebec, G1V 4G5, Canada.

In an attempt to improve the results of **biliopancreatic diversion** in the treatment of morbid obesity, two aspects of the procedure performed at Laval Hospital were modified to reduce adverse physiological consequences. The distal gastrectomy was replaced by a parietal gastrectomy which preserves vagal continuity along with the lesser curvature, and leaves intact the antro-pyloroduodenal pump. The **duodenum** was stapled shut and nutrients were diverted through a **duodeno**-ileal anastomosis. The **biliopancreatic** diverting intestinal limb was anastomosed to the nutrient ileal limb 100 cm proximal to the ileocaecal valve instead of 50 cm proximal to it, thus doubling the length of the common ileal absorptive segment. Weight loss after either operation was greater than 70% of initial excess weight. Following the new operation, there was a lesser prevalence of side-effects, especially loose stools and malodorous gas, a lesser degree of hypocalcemia and no hypoalbuminemia. The **duodenum** recanalized at the staple line in 20% of the patients who had the new operation. When data from these patients were excluded, weight loss following the new operation was greater than that seen after the old one. The prevalence of side-effects and the degree of calcium and protein malabsorption remained significantly lower. Weight loss remained satisfactory with a common limb measuring 100 cm. The parietal gastrectomy was not restrictive as shown by the failure to lose further weight when the **duodenal** stapled **diversion** failed. Weight loss was thus mainly a function of **biliopancreatic diversion**, but increased weight loss in the new procedure despite a doubling of the common ileal limb suggests that parietal gastrectomy contributed to weight loss. Because **duodenal** recanalization can be corrected surgically and now prevented, the modified **biliopancreatic** bypass is preferred.

Eating disorder inventory in the assessment of psychosocial status in the obese patients prior to and at long-term following **biliopancreatic diversion** for obesity.

Int J Eat Disord 1994 Apr;15(3):265-74 (ISSN: 0276-3478)

Adami GF; Gandolfo P; Campostano A; Bauer B; Cocchi F; Scopinaro N [[Find other articles with these Authors](#)]

Department of Internal Medicine, University of Genoa, Italy.

Psychological traits of obese patients, assessed with the Eating Disorder Inventory (EDI), were compared to those of subjects in the long-term following **biliopancreatic diversion** for obesity (BPD), when body weight has been steadily normal for over 1 year and any preoccupation with dieting and weight has been completely abandoned. The overall results suggest that the stable body weight normalization on a completely free diet does confer considerable psychological benefit on obese individuals. On the basis of the EDI results, post-BPD subjects were divided into weight-preoccupied and not-weight-preoccupied individuals. In the not-weight-preoccupied subjects, the psychosocial status and emotional reactivity were closely similar to those observed in lean control persons, whereas the few weight-preoccupied subjects, in spite of completely normal body weight, showed residual body dissatisfaction and personality traits very similar to those of eating-disordered patients.

Biliopancreatic diversion for treatment of morbid obesity: experience in 180 consecutive cases.

Obes Surg 1999 Apr;9(2):161-5 (ISSN: 0960-8923)

Totte E; Hendrickx L; van Hee R [[Find other articles with these Authors](#)]
Academic Surgical Center Stuivenberg, Antwerp, Belgium. totte@village.euunet.be.

BACKGROUND: **Biliopancreatic diversion** (BPD) by Scopinaro's method is used by many as a surgical treatment for morbid obesity. The authors present their results in 180 consecutive cases. **METHOD:** Between June 1995 and May 1998, the authors performed BPD by Scopinaro's method on 180 patients (36 men) with morbid obesity, mean age 35.8 years (range 18-58 years), mean body mass index (BMI) 48.8 kg/m² (range 35-66 kg/m²). **RESULTS:** In all cases, a gradual decrease in weight was obtained: the mean BMI at 1 month was 40.3 kg/m², at 6 months 34 kg/m², at 1 years 32 kg/m², at 18 months 30.2 kg/m², and at 36 months 28.8 kg/m². At the same time a significant improvement in the pathologic conditions associated with morbid obesity was observed. Postoperative complications were two **duodenum** blowout syndromes requiring prolonged intensive care, and an 18% rate of incisional hernias. Conversion to normal small bowel continuity was necessary in three cases. Protein malnutrition developed in 2 patients (1.1%), in 1 patient coinciding with addiction to cocaine. One patient could not psychologically accept the physical changes and requested conversion. Anastomotic ulceration was seen in 11% of the patients. Operation for late **obstruction** occurred in 2 patients. There was no mortality. **CONCLUSIONS:** Although BPD by Scopinaro's method is technically complex, it is safe and effective.

Survey of vitamin and mineral supplementation after gastric bypass and **biliopancreatic diversion** for morbid obesity.

Obes Surg 1999 Apr;9(2):150-4 (ISSN: 0960-8923)

Brolin RE; Leung M [[Find other articles with these Authors](#)]

Department of Surgery, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, New Jersey 08903, USA.

BACKGROUND: The authors investigated whether practice patterns of bariatric surgeons correlate with published data regarding metabolic deficiencies after Roux-en-Y gastric bypass (RYGB) and **biliopancreatic diversion** (BPD). **METHODS:** 109 surgeons completed a questionnaire to determine use of supplements and frequency of lab tests. **RESULTS:** Regarding supplements routinely prescribed after RYGB, 96% of surgeons gave multivitamins, 63% gave iron, and 49% gave vitamin B12. After BPD, 96% of surgeons gave multivitamins, 67% gave iron, 42% gave vitamin B12, 97% gave calcium, 63% gave fat-soluble vitamins, and 21% gave protein supplements. Regarding laboratory tests obtained routinely after RYGB, 95% of surgeons do complete blood counts, 56% do iron determinations, 66% do vitamin B12 determinations, 58% do folate determinations, 76% do electrolyte determinations, and 8% test for proteins. After BPD, 96% of surgeons do complete blood counts, 80% do iron determinations, 67% do vitamin B12 determinations, 71% do folate determinations, 88% do electrolyte determinations, 84% do protein determinations, and 46% test for fat-soluble vitamins. Regarding frequency of blood tests, after RYGB, 22% of surgeons obtain them after 3 months, 33% after 6 months, and 41% after 12 months; 4% do not routinely obtain postoperative laboratory tests. After BPD, 46% of surgeons obtain them after 3 months, 33% after 6 months, and 16% after 12 months; one does not obtain laboratory tests. Surgeons estimated these deficiencies after RYGB: 16% iron, 12% vitamin B12, 14% anemia, 5% protein, and 3% calcium. They estimated these deficiencies after BPD: 26% iron, 11% vitamin B12, 21% anemia, 18% protein, 16% calcium, and 6% fat-soluble vitamins. The estimated incidence of deficiencies after RYGB was considerably lower than the published incidence. Unnecessary tests were commonly performed (electrolytes after RYGB). **CONCLUSION:** Despite wide variations in the performance of laboratory tests and the use of supplements, the practice patterns of most surgeons protect patients from developing severe metabolic deficiencies after RYGB and BPD.

Binge eating in obesity: a longitudinal study following **biliopancreatic diversion**.

Int J Eat Disord 1996 Dec;20(4):405-13 (ISSN: 0276-3478)

Adami GF; Gandolfo P; Meneghelli A; Scopinaro N [[Find other articles with these Authors](#)]

Department of Internal Medicine, University of Genoa, Italy.

OBJECTIVE: Evaluating the influence of dieting and of being overweight on binge-eating episodes and on psychological traits in severely obese patients. **METHODS:** Clinical interviews and self-report questionnaires prior to and 2 years following **biliopancreatic diversion** (BPD) when subjects adopt a completely free eating style and achieve in maintaining a normal or nearly normal body weight. **RESULTS:** At two years following the operation, the prevalence of binge-eating episodes sharply fell and the subjects' overall psychological conditions improved; only a few patients started bingeing. **DISCUSSION:** These results point out the importance of dieting and of overweight itself in determining eating behavior disturbances or psychopathology. The fact that only a very small number of patients continue or start bingeing following BDP suggests that a minority of obese bingers should be considered as true eating-disordered patients.

Food- and weight-related attitudes in obese persons: a longitudinal study over two years following **biliopancreatic diversion**.

J Psychosom Res 1996 Jul;41(1):31-8 (ISSN: 0022-3999)

Adami G; Gandolfo P; Meneghelli A; Scopinaro N [[Find other articles with these Authors](#)]

Istituto di Clinica Chirurgica, Universita di Genova, Italy.

Food- and weight-related attitudes were assessed in obese subjects prior to **biliopancreatic diversion** (BPD) and at 1 and 2 years after BPD, when any preoccupation with dieting and body weight and shape should have been abandoned. A decrease in the number of subjects whose food attitudes suggested some loss of control over food consumption, such as snacking, nibbling, getting hungry and eating in response to non-alimentary stimuli or arousal conditions was observed, confirming the role of dieting in leading to loss of control over food intake. The stable weight loss correlated with changes in the body attitudes and in the overall psychological status. The changes observed in obese persons after BPD suggest that 1) the food-related attitudes are influenced by the preoccupation with food and with dieting; 2) the weight-related attitudes are accounted for more by dissatisfaction with a body shape that is very different from the socially accepted one than by an individual's psychological traits.

Binge eating following **biliopancreatic diversion** for obesity.

Appetite 1995 Oct;25(2):177-88 (ISSN: 0195-6663)

Adami GF; Gandolfo P; Cocchi FH; Bauer B; Petti AR; Scopinaro N [[Find other articles with these Authors](#)]

Istituto di Clinica Chirurgica, Universita di Genova, Italy.

The prevalence of binge eating disorder (BED) was assessed in 68 massively obese patients prior to and following **biliopancreatic diversion** (BPD) for obesity. The eating behavior and the psychological traits were evaluated by the Three Factor Eating Questionnaire and the Eating Disorder Inventory. Since after BPD the body weight regulation is substantially dependent on intestinal absorption, the individuals operated on have to be considered as absolutely free eaters. In this population, 30 patients were affected by BED and in 24 of them binge eating disappeared spontaneously following BPD, highlighting the main role of preoccupation with food, diet and overweight in causing or in maintaining BED.

Eating behavior following **biliopancreatic diversion** for obesity: study with a three-factor eating questionnaire.

Int J Eat Disord 1993 Jul;14(1):81-6 (ISSN: 0276-3478)

Adami GF; Gandolfo P; Dapuzo R; Jurich D; Scopinaro N [[Find other articles with these Authors](#)]

Department of Internal Medicine, University of Genoa, Italy.

The eating behavior of obese patients and of subjects who had normalized their body weight following **biliopancreatic diversion** (BPD) was assessed by a three-factor eating questionnaire (TFEQ), constructed to measure cognitive dietary restraint, the tendency to disinhibition, and susceptibility to hunger. In the obese patients higher values of both disinhibition and hunger score were found than in normoweight persons. In BPD subjects a negative association between the time elapsed from the operation and both the disinhibition and hunger score values was observed. In patients operated more than 2 years before, the eating behavior, as assessed by the TFEQ, was similar to that of normoweight persons. After BPD the operated subjects do not have to respect any dietary advice, the loss of weight and the maintenance of a normal body weight occurring in spite of an absolutely free food consumption. Similarity to the control values of disinhibition and hunger score following BPD suggests that in the long term, when the preoccupation with food and diet is abandoned, a normal eating pattern can be achieved.

**Biliopancreatic Diversion, with Distal Gastrectomy, 250 cm and 50 cm
Limbs: Long-term Results [Record Supplied By Publisher]**

Obes Surg 1995 Aug;5(3):302-307 (ISSN: 0960-8923)

Marceau S; Biron S; Lagace M; Hould FS; Potvin M; Bourque RA; Marceau P [[Find other articles with these Authors](#)]

Department of General Surgery, Laval University, Laval Hospital, Sainte-Foy, Quebec, G1V 4G5, Canada.

BACKGROUND: Since 1984, **biliopancreatic diversion** (BPD) has been our procedure of choice in the treatment of morbid obesity. Better understanding of long-term outcome following BPD is needed. **METHODS:** We report the results of our first consecutive 92 patients who underwent BPD more than 5 years ago. Of these 92, only 82 were available for a recent formal evaluation after a mean of 79 months. **RESULTS:** Weight loss, was maintained over the years at 62% of initial excess weight; the success rate for losing more than 50% of initial excess weight was 72%. The gastrointestinal side-effects decreased with time, but diarrhea was still present in 13%. The average number of daily stools was 3 +/- 1.0. Of the patients, 76% were free from any gastrointestinal side-effects, taking normal diet and having normal stools. Malabsorption, however, was still present. A third of patients had laboratory values slightly below normal levels for hemoglobin, albumin and calcium. These values were mostly without clinical manifestation and were well tolerated by the patients. Regarding associated **diseases**, 75% were cured or improved following BPD. In 14 patients, reoperation was required to improve diarrhea or serum albumin. In these patients, the common channel was lengthened from 50 to 100 cm. The revision was successful in 11 and did not cause significant weight gain. **CONCLUSIONS:** BPD, as proposed by Scopinaro, was an efficient surgical treatment of morbid obesity that allowed normal eating habits and despite malabsorption was well tolerated by the great majority of patients.

Wernicke-Korsakoff Encephalopathy Following **Biliopancreatic Diversion**
[Record Supplied By Publisher]

Obes Surg 1993 May;3(2):175-177 (ISSN: 0960-8923)

Primavera A; Brusa G; Novello P; Schenone A; Gianetta E; Marinari G; Cuneo S;
Scopinaro N [[Find other articles with these Authors](#)]

Department of Neurology, University of Genoa, Genoa, 16132 Italy.

Wernicke-Korsakoff **disease** with sensory-motor neuropathy was diagnosed in three out of a series of 1,663 patients (0.18%), with onset 2, 3 and 5 months after **biliopancreatic diversion**. Precipitating factors were vomiting, minimal food intake, anorexia, rapid weight loss, and glucose-containing intravenous feeding. Recovery was partial in two and complete in one of the patients. In the early postop, prophylactic thiamine should be given to the patients with excessively limited eating capacity. Larger doses of thiamine should be instituted parenterally either in the case of suspected Wernicke-Korsakoff encephalopathy or before starting feeding for protein malnutrition.

Body composition and energy expenditure in obese patients prior to and following **biliopancreatic diversion** for obesity.

Eur Surg Res 1996 Jul-Aug;28(4):295-8 (ISSN: 0014-312X)

Adami GF; Campostano A; Gandolfo P; Marinari G; Bessarione D; Scopinaro N [[Find other articles with these Authors](#)]

Istituto di Clinica Chirurgica I, Università di Genova, Italy.

Body composition and resting energy expenditure (REE) were assessed in 69 obese patients prior to and 1 year following **biliopancreatic diversion** (BPD). Fat-free mass (FFM) and body fat sizes were very similar to those of nonoperated subjects closely matched for body weight and FFM size. In the BPD subjects, the REE data were high, thus excluding a dilatation of non-energy-consuming extracellular spaces and suggesting an increase in the ratio between the organs and the less metabolically active muscle mass within the FFM.

Glucose-induced thermogenesis in postobese women who have undergone
biliopancreatic diversion.

Am J Clin Nutr 1994 Sep;60(3):320-6 (ISSN: 0002-9165)

Tataranni PA; Mingrone G; Greco AV; Caradonna P; Capristo E; Raguso CA; De Gaetano A; Tacchino RM; Castagneto M [[Find other articles with these Authors](#)]
Istituto di Clinica Medica, CNR, Universita Cattolica del Sacro Cuore, Roma, Italy.

We evaluated the metabolic response to a standard (75-g) oral-glucose-tolerance test (OGTT) in eight post-obese women (PO) who underwent **biliopancreatic diversion** and in eight healthy control women (C). All subjects had been weight-stable for $> \text{or} = 2$ y. Blood samples for glucose, insulin, C-peptide, and nonesterified free fatty acids were taken at baseline and during 180 min after the glucose load. Plasma glucose and insulin concentrations at baseline and during the OGTT were similar in the two groups, suggesting the absence of an insulin-resistant state in the PO. Continuous indirect calorimetry was performed throughout the test. Glucose-induced thermogenesis (GIT) was higher in PO than in C (8.6 ± 2.6 vs $4.3 \pm 1.9\%$; $P < 0.01$). These data indicate that GIT and insulin-glucose metabolism are not impaired in postobese patients when a near ideal body weight is reached and maintained after weight loss; this suggests that thermogenic deficiencies and hyperinsulinemia-insulin resistance are alterations secondary to obesity.

Long-limb gastric bypass in the superobese. A prospective randomized study.

Ann Surg 1992 Apr;215(4):387-95 (ISSN: 0003-4932)

Brolin RE; Kenler HA; Gorman JH; Cody RP [[Find other articles with these Authors](#)]
Department of Surgery, UMDNJ-Robert Wood Johnson Medical School, New Brunswick
08903.

This study was designed to determine whether greater **diversion** of bile and pancreatic secretions away from the functional gastrointestinal tract would produce greater weight loss in superobese patients (greater than or equal to 200 pounds overweight) in comparison with conventional Roux-en-Y gastric bypass (RYGB). During the past 7 years, two modifications of RYGB were prospectively compared in 45 superobese patients: RYGB-1, in which the length of defunctionalized jejunum measured 75 cm, and RYGB-2, in which the defunctionalized jejunum measured 150 cm. Respective mean preoperative weight/body mass indexes were 393 pounds/63.4 for 22 RYGB-1 patients and 404 pounds/61.6 for 23 RYGB-2 patients. Two patients (5%) had nonfatal early complications. There were six late incisional hernias. There were no cases of protein deficiency, hepatic dysfunction, or diarrhea after operation. Mean follow-up was 43 +/- 17 months. Postoperative weight loss in pounds and daily calorie intake were compared at 6-month intervals. Weight loss stabilized by 24 months at a mean 50% excess weight lost in RYGB-1 patients and 64% excess weight lost in RYGB-2 patients. Nineteen of 23 RYGB-2 patients achieved at least 50% excess weight lost versus 11 of 22 RYGB-1 patients (p less than or equal to 0.03). Weight loss was significantly greater at 24 through 36 months in RYGB-2 versus RYGB-1 patients (p less than 0.02). There was no significant difference in either calorie intake or incidence of iron and vitamin B-12 deficiency between the two groups. These data show that gastric restriction and **biliopancreatic diversion** without intestinal exclusion resulted in significantly greater weight loss than conventional RYGB but did not cause additional metabolic sequelae or diarrhea. This long-limb modification of Roux-en-Y gastric bypass is a safe and effective procedure in patients who are 200 pounds or more overweight.

[Surgical treatment of major obesity by **biliopancreatic** bypass: our experience]

[La therapie chirurgicale de la grande obesite par by-pass biblio-pancreatique: notre experience.]

J Chir (Paris) 1993 Mar;130(3):125-9 (ISSN: 0021-7697)

Fenaroli P; Piazzalunga D; Guffanti Pesenti G; Cassinelli G [[Find other articles with these Authors](#)]

1 Divisione di Chirurgia generale, Ospedali Riuniti di Bergamo, Italie.

The Authors report their experience in the surgical management of morbid obesity. The efficacy of the bilio-pancreatic by-pass, method created by Nicola Scopinaro in the 1976, is underlined. From November 1988, 41 patients affected by morbid obesity were treated with this method. Results obtained are comparable to those reported in literature, with important weight loss and decrease of the cardiovascular risk-factors.

Secondary hyperparathyroidism following **biliopancreatic diversion**.

Arch Surg 1996 Oct;131(10):1048-52; discussion 1053 (ISSN: 0004-0010)

Chapin BL; Le Mar HJ; Knodel DH; Carter PL [[Find other articles with these Authors](#)]
Department of Medicine, Madigan Army Medical Center, Tacoma, Wash., USA.

OBJECTIVE: To investigate the cause of osteomalacia following **biliopancreatic diversion**(BPD) surgery for obesity. **DESIGN:** A retrospective, case-comparison study. **SETTING:** A tertiary care center. **PATIENTS:** A case group of 12 subjects (including 9 women; mean age +/- SEM, 48.5 +/- 3.0 years; mean preoperative body mass index +/- SEM, 43.7 +/- 2.3 kg/m², and mean weight loss +/- SEM, 75 +/- 14 kg) who have undergone BPD (referred to as BPD group hereafter) and a comparison group of 10 subjects (including 9 women; mean age +/- SEM, 49.6 +/- 3.3 years; mean preoperative body mass index +/- SEM, 44.0 +/- 2.5 kg/m²; and mean weight loss +/- SEM, 55 +/- 15 kg) following vertical banded gastroplasty (VBG) (referred to as VBG group hereafter). **MAIN OUTCOME MEASURES:** Serum and urine markers for bone metabolism. **RESULTS:** Compared with the VBG group, the BPD group had significantly lower concentrations of the following components: serum calcium (2.14 +/- 0.05 mmol/L vs 2.37 +/- 0.05 mmol/L [8.6 +/- 0.2 mg/dL vs 9.5 +/- 0.2 mg/dL]), serum 25-hydroxyvitamin D (24 +/- 6 nmol/L vs 64 +/- 6 nmol/L), urine calcium excretion (1.7 +/- 0.7 mmol/d vs 4.5 +/- 0.7 mmol/d [68 +/- 28 mg/d vs 180 +/- 28 mg/d]), and serum carotene (0.40 +/- 0.15 mmol/L vs 1.29 +/- 0.16 mmol/L). The BPD group had significantly higher concentrations of the following components: serum parathyroid hormone (13.6 +/- 2.1 pmol/L vs 5.2 +/- 2.3 pmol/L), serum alkaline phosphatase (139 +/- 8 U/L vs 86 +/- 9 U/L), and urinary hydroxyproline/creatinine (52 +/- 5 mumol/mmol vs 19 +/- 5 mumol/mmol). **CONCLUSION:** These data suggest that following BPD, secondary hyperparathyroidism attributed to hypocalcemia results from malabsorption of vitamin D. However, we cannot exclude the possibility of concurrent calcium malabsorption with vitamin D malabsorption.

Twenty-four-hour energy and nutrient balance in weight stable postobese patients after **biliopancreatic diversion**.

Nutrition 1996 Apr;12(4):239-44 (ISSN: 0899-9007)

Tataranni PA; Mingrone G; Raguso CA; De Gaetano A; Tacchino RM; Castagneto M; Greco AV [[Find other articles with these Authors](#)]
Department of Internal Medicine, Catholic University of the Sacred Heart, Rome, Italy.

To better understand the long-term weight stability of postobese patients who underwent **biliopancreatic diversion** (BPD), we studied 24-h energy and nutrient balance in eight women at least 3 yr after surgery (PO) and compared the results to those obtained in eight normal never-obese control women (C), matched by age and weight. Body composition was measured by dual-energy x-ray absorptiometry (DXA). All the patients were on an ad libitum diet; 24-h energy and nutrient intake were measured on the experimental day. Twenty-four-hour energy expenditure (EE) and 24-h nutrient oxidation rates were measured in a respiratory chamber, and energy and nutrient balances were calculated after correcting for 24-h fecal nutrient loss. No differences in body composition were found between PO and C. PO had a higher gross energy intake than C (10.6 +/- 3.4 vs. 8.0 +/- 2.2 MJ/d; $p < 0.05$); however, due to the higher energy fecal loss in PO as compared to C (2.4 +/- 1.3 vs. 0.09 +/- 0.01 MJ/day; $p < 0.01$), 24-h metabolizable energy intake (MEI) was not different in the two groups. The energy fecal loss in the PO patients was mostly in the form of lipid. EE at 24 h was not different in PO as compared to C. Therefore energy balance, computed as the difference between 24-h MEI and 24-h EE, was similar in the two groups. Respiratory quotient was significantly higher in PO than in C (1.00 +/- 0.08 vs. 0.83 +/- 0.03; $p < 0.01$). Carbohydrate (-135 +/- 37 g/d in PO vs. 63 +/- 23 g/d in C; $p < 0.001$), and lipid (48 +/- 14 g/d in PO vs. -23 +/- 6 g/d in C; $p < 0.001$) balances were different in the two groups. We conclude that chronic lipid malabsorption was the main metabolic abnormality explaining the achievement of energy balance in postobese subjects after **biliopancreatic diversion**. A chronic reduction of lipid absorption seems to play a key role in the long-term weight stability of this group of postobese subjects.

Biliopancreatic diversion for obesity at eighteen years.

Surgery 1996 Mar;**119(3):261-8** (ISSN: 0039-6060)

Scopinaro N; Gianetta E; Adami GF; Friedman D; Traverso E; Marinari GM; Cuneo S; Vitale B; Ballari F; Colombini M; Baschieri G; Bachi V [[Find other articles with these Authors](#)]

Department of Surgery, University of Genoa School of Medicine, Italy.

BACKGROUND: Surgical attempts to treat obesity began because of the discouraging results of conservative medical treatment, which successfully achieved initial weight loss but failed to maintain it. Gastric restrictive procedures, currently the most popular surgical methods for obesity therapy, have proved to be effective in initiating weight loss, but some concerns regarding their long-term efficacy in weight maintenance have arisen. **METHODS:** Of a total of 1968 obese patients who underwent **biliopancreatic diversion** since 1976, the last consecutive 1217 underwent the "ad hoc stomach" type of **diversion** with a 200 cm alimentary limb, a 50 cm common limb, and a gastric volume varying between 200 and 500 ml. Mean age was 37 years old (11 to 69 years), and mean excess weight was 117%. Maximum follow-up was 115 months with nearly 100% participation. **RESULTS:** In the last half of the series, operative mortality was 0.4% with no general complications and with early surgical complications of wound dehiscence and infection (total, 1.2%) and late complications of incisional hernia (8.7%) and intestinal **obstruction** (1.2%). Mean percent loss initial excess weight (IEW) at 2, 4, 6, and 8 years was 78 +/- 16, 75 +/- 16, 78 +/- 18, and 77 +/- 16 in the patients with IEW up to 120% and 74 +/- 12, 73 +/- 13, 73 +/- 12, and 72 +/- 10 in those with IEW more than 120%. A group of 40 patients who underwent the original "half-half" **biliopancreatic diversion** maintained a mean 70% reduction of IEW during a 15-year follow-up period. Specific late complications **included** anemia (less than 5%), stomal **ulcer** (2.8%), protein malnutrition (7% with 1.7% requiring surgical revision by common limb elongation or by restoration). Clinical problems from bone demineralization were minimal in the short term and almost absent in the long term. **CONCLUSIONS:** **Biliopancreatic diversion** is a very effective procedure but is potentially dangerous if used incorrectly.

Hypogonadotropic hypogonadism in obese women after **biliopancreatic diversion**.

Fertil Steril 1999 Nov;72(5):905-9 (ISSN: 0015-0282)

Di Carlo C; Palomba S; De Fazio M; Gianturco M; Armellino M; Nappi C [[Find other articles with these Authors](#)]

Department of Obstetrics and Gynecology, University of Naples Federico II, Italy.

OBJECTIVE: To evaluate a particular form of weight-related amenorrhea occurring in severely obese patients after **biliopancreatic diversion**, a surgical procedure designed to cause weight loss. **DESIGN:** Prospective, open, controlled clinical trial. **SETTING:** Department of Gynecology and Obstetrics, University of Naples "Federico II", Naples, Italy. The surgical procedures were performed in various hospitals in the Naples metropolitan area. **PATIENT(S):** Eight severely obese women (mean [+/-SD] age, 26.9+/-5.3 years) who underwent **biliopancreatic diversion** (group A) and eight healthy women of normal weight (mean [+/-SD] age, 25.8+/-5.6 years) (group B). **INTERVENTION(S):** **Biliopancreatic diversion**, hormonal evaluation, and LH pulsatility evaluation. **MAIN OUTCOME MEASURE(S):** Weight parameters, hormone levels, and LH pulsatility amplitude and frequency before surgery and at the onset of amenorrhea after surgery, and the response of LH pulsatility to the infusion of naloxone at the onset of amenorrhea. **RESULT(S):** All patients lost weight after surgery and became amenorrheic after 3 months, when they had lost 25% of their basal weight but were still obese. The hormonal picture at that time was one of hypothalamic amenorrhea with significantly reduced LH pulsatility frequency and amplitude. The alterations in LH pulsatility were not modified by naloxone infusion. **CONCLUSION(S):** Obese patients who undergo dramatic weight loss may be affected by hypothalamic amenorrhea when still obese. Endogenous opioid activity does not play a significant role in this kind of hypogonadotropic hypogonadism.

Serum leptin and weight loss in severely obese patients undergoing
biliopancreatic diversion.

Int J Obes Relat Metab Disord 1998 Aug;22(8):822-4 (ISSN: 0307-0565)

Adami GF; Cordera R; Campostano A; Bressani A; Cella F; Scopinaro N [[Find other articles with these Authors](#)]

Istituto di Clinica Chirurgica, Universita di Genova, Ospedale San Martino, Italy.

OBJECTIVE: To evaluate the influence of body fat and food intake on serum leptin concentration. **DESIGN:** Longitudinal study of a group of obese patients prior to and at long term follow-up, after **biliopancreatic diversion** (BPD), when body weight was steadily reduced and food consumption was similar to or greater than preoperatively. **RESULTS:** In obese patients, very high serum leptin concentrations were found. Following the operation, with the body weight stable and normalized, a sharp fall of serum leptin concentration had occurred, with values returned to normal range. **CONCLUSION:** The changes in serum leptin concentration observed in the long term after weight loss are substantially accounted for by the loss of body fat and appear unrelated to the reduction of oral food intake.

[Postoperative venous thromboembolism in bariatric surgery]

[Le tromboembolie venose post-chirurgiche in chirurgia bariatrica.]

Minerva Chir 1993 May 31;48(10):539-42 (ISSN: 0026-4733)

Bajardi G; Ricevuto G; Mastrandrea G; Latteri M; Pischedda G; Rubino G; Valenti D;
Florena M [[Find other articles with these Authors](#)]

Dipartimento di Discipline Chirurgiche ed Anatomiche, Universita degli Studi di
Palermo.

The authors discuss the problem of venous thromboembolism as a complication of bariatric surgery. They consider obese patients at risk for these complications, even if different opinions exist about this topic in the literature. They report their experience in bariatric surgery consisting of 53 patients submitted to **biliopancreatic diversion**. Antithrombotic prophylaxis consisted for every patient in elastic bandaging of the lower limbs, preoperative hemodilution, early post-operative mobilization, and subcutaneous heparin. Complications consisted in one popliteo-femoral deep venous thrombosis (DVT) (1.6%), and two pulmonary embolisms (PE) (3.2%) of which one caused patient's death; total morbidity for venous thromboembolism. These results compared with literature are similar with other series of bariatric surgery and slightly higher than general surgery series. This difference is not however significant. Even in the absence of this significance, thromboembolism, as desumed from more than 2900 cases considered in the literature, remains the main cause of morbidity and mortality in the post-operative course of bariatric surgery patients, deserving particular attention in terms of prevention, also because of difficulty existing in early clinical diagnosis of DVT in obese people. Further studies intended to identify pathogenesis and risk factors of venous thromboembolism in obese people will allow a more correct prophylactic and therapeutic approach.

Bowel **obstruction** after **biliopancreatic diversion**: a deceptive complication.

Obes Surg 2000 Oct;10(5):470-3 (ISSN: 0960-8923)

Cossu ML; Ruggiu M; Fais E; Sparta C; Cossu F; Noya G [[Find other articles with these Authors](#)]

Department of Emergency Surgery and Obesity Surgery Unit, University of Sassari, Italy.
Urgenza@ssmain.uniss.it.

BACKGROUND: Although obesity surgery is now practiced in most of the world, many general surgeons, faced with an emergency, are not experienced in the diagnostic problems associated with these techniques, or about the most suitable treatment to resolve the acute pathology while preserving the weight loss. The **biliopancreatic diversion** (BPD), because of its complexity, could cause a delay in the diagnosis and therapy, with possible catastrophic consequences for the patient. **METHODS:** We report 3 patients with bowel **obstruction** after BPD. In the first patient intestinal occlusion was due to an adhesion obstructing the alimentary tract; in the other two patients the occlusion was localized to the **biliopancreatic** tract, due to a serrate stenosis of the entero-entero anastomosis in one patient and due to volvulus of the **biliopancreatic** loop in the other patient. **RESULTS:** Signs and symptoms were different according to whether the **obstruction** was in the alimentary tract or the **biliopancreatic** tract. In all cases a prompt gastrointestinal x-ray with barium and ultrasound scan and/or CT scan induced us to a mandatory laparotomy with resolution of the **obstruction**. **CONCLUSIONS:** After BPD, diagnosis of an intestinal **obstruction** must be made promptly. Even colleagues who express doubts must be persuaded to perform immediately an upper gastrointestinal tract x-ray and an U/S or CT scan. In this way, it may be possible to avoid intestinal resection and catastrophic complications.

Short-term changes in serum leptin concentration following **biliopancreatic diversion**.

Obes Surg 2000 Oct;10(5):442-4 (ISSN: 0960-8923)

Marinari GM; Camerini G; Cella F; Scopinaro N; Adami GF [[Find other articles with these Authors](#)]

University of Genoa, Genoa, Italy.

BACKGROUND: The influence of the new anatomico-functional structure created by **biliopancreatic diversion** (BPD) in the postoperative fall of serum leptin concentration was evaluated. **METHODS:** Serum leptin concentration was determined in obese women before and immediately after BPD, before the usual postoperative intestinal rest. The measurements were repeated at the second postoperative month, when oral intake had nearly totally resumed and the patients had lost the first amount of weight. **RESULTS:** 5 days following BPD, a sharp reduction of serum leptin concentration was observed. At the second postoperative month the values remained nearly unchanged and were indistinguishable from those observed in a group of obese non-operated patients with a closely similar body weight. **CONCLUSIONS:** Changes in the upper gastrointestinal tract due to BPD appear to have no influence in the postoperative reduction of serum leptin concentration, which appears to be substantially related only to the patient's adiposity.

Energy and nitrogen absorption after **biliopancreatic diversion**.

Obes Surg 2000 Oct;10(5):436-41 (ISSN: 0960-8923)

Scopinaro N; Marinari GM; Pretolesi F; Papadia F; Murelli F; Marini P; Adami GF [[Find other articles with these Authors](#)]

Department of Surgery, University of Genoa Medical School, Genoa, Italy.
scopinar@unige.it.

BACKGROUND: The strict long-term weight maintenance in good nutritional conditions observed after **biliopancreatic diversion** (BPD) needs to be explained. **MATERIALS AND METHODS:** 15 operated subjects were maintained at an isoenergetic and isonitrogenic diet as similar as possible to their usual diet. Apparent absorption (AA) of energy, fat, nitrogen and calcium was calculated subtracting the fecal content, measured directly, from the oral intake, derived from tables. The alimentary protein absorption was directly determined by I125 albumin oral administration. **RESULTS:** Mean AA for energy and fat was 57% and 32%, respectively; AAs were unrelated as absolute value and negatively associated as percent of the intake with the energy and fat intake. I125 intestinal absorption was 73%, while nitrogen percent AA was 57%, indicating higher than normal loss of endogenous nitrogen. Calcium AA was 551 mEq/day, 26% of the intake. A positive correlation between nitrogen and calcium AA as absolute values and alimentary intake was observed, while there was no correlation when AA were considered as per cent of the intake. **CONCLUSIONS:** For energy and fat, an increase in intake corresponds to an increase in percent malabsorption, so that the absolute amount absorbed tends to remain constant, accounting for the excellent weight maintenance observed following BPD. This was confirmed by a long-term hypernutrition study after BPD. On the contrary, for nitrogen and calcium, the percent absorption tends to remain constant when intake varies, so that an increase in alimentary intake results in an increased absolute amount absorbed.

Failure of **biliopancreatic diversion** in Prader-Willi **syndrome**.

Obes Surg 2000 Apr;10(2):179-81; discussion 182 (ISSN: 0960-8923)

Grugni G; Guzzaloni G; Morabito F [[Find other articles with these Authors](#)]
Department of Auxology, IRCCS S. Giuseppe Hospital, Istituto Auxologico Italiano
Foundation, Verbania, 28921 Italy. gragru@jumpy.it.

BACKGROUND: Prader-Willi **syndrome** (PWS) is the most common genetic obesity. Excessive weight gain follows failure-to-thrive in early infancy; in adolescents and young adults, excess body weight can exceed 100%. The hyperphagia associated with PWS is responsible for the early mortality. Dietary restriction, alone or combined with anorexic drugs, are ineffective to induce a permanent weight loss. Thus, surgical treatment of morbid obesity in PWS has been attempted, but gastric restrictive operations are unable to produce stable weight loss. In a small number of patients, favorable results have been reported with **biliopancreatic diversion** (BPD). **CASE REPORT:** A 24-year-old woman with PWS, Pickwickian, at age 21 weighed 80 kg (BMI= 50) and underwent BPD. **RESULTS:** 3 years after the BPD she regained 21 of the 26 kg lost; somnolence and respiratory difficulties were the same as before surgery. The patient now presents severe reduction of bone mass density, hypochromic anemia, hypoproteinemia, and diarrhea associated with eating. **CONCLUSION:** The regain of weight following BPD suggests that this procedure alone is not adequate for long-term control of obesity in PWS.

Unusual combination of night blindness and optic neuropathy after
biliopancreatic bypass.

Bull Soc Belge Ophtalmol 1999;271:93-6 (ISSN: 0081-0746)

Smets RM; Waeben M [[Find other articles with these Authors](#)]

Department of Ophthalmology, University Hospital Antwerp, Edegem, Belgium.

Night blindness and optic neuropathy were the presenting symptoms of an iatrogenic malabsorption **syndrome** in a 64-year old female. This case illustrates the necessity of lifelong vitamin supplementation after **biliopancreatic** bypass for morbid obesity.

[**Biliopancreatic** bypass in the treatment of severe obesity: long-term clinical, nutritional and metabolic evaluation]

[Diversione bilio-pancreatica per la terapia della grave obesita: valutazioni clinico-nutrizionali e metaboliche a lungo termine.]

Minerva Gastroenterol Dietol 1995 Jun;41(2):149-55 (ISSN: 1121-421X)

Sileo F; Bonassi U; Bolognini C; Miglioranzi A; Possenti A; Svanoni F; Tengattini F; Tentorio A; Pagani G [[Find other articles with these Authors](#)]
Divisione Endocrinologica, Ospedali Riuniti, Bergamo.

Biliopancreatic bypass surgery leads to considerable weight loss and the stabilisation over time of the newly acquired body weight. The aim of this study was to evaluate the long-term clinical and nutritional conditions of patients undergoing this operation. Thirty subjects who had undergone **biliopancreatic** bypass surgery (7 males and 23 females) aged between 20 and 55 years old, with body mass indexes between 35 and 80, were examined at yearly intervals (maximum follow-up 5 years). The following parameters were evaluated at each control: body weight, presence of collateral effects, support therapy, main hematochemical parameters, nutritional behavior and calorie intake. All patients recorded a significant reduction in body weight with a mean weight loss of 28% during the first year; these values were confirmed during the second year, whereas body weight tended to stabilise in the long-term. Laboratory data showed a significant reduction in triglycerides, cholesterol, glycemia in all patients; sideropenic anemia appeared in 50% of patients. Mean daily calorie intake was 2,200 kcal/day, broken down as follows: glucides 50%, lipids 33%, proteins 17%. The main collateral effects reported were: diarrhea, vomit, flatulence, onset of food intolerances. The following support therapies were used: iron in 90% of cases, calcium in 60% and 30% of patients also underwent surgery. In conclusion, **biliopancreatic** bypass surgery enables a significant weight loss to be achieved together with an improved glycolipid status without leading to nutritional deficiencies. (**ABSTRACT TRUNCATED AT 250 WORDS**).

Plasma leptin levels after **biliopancreatic diversion**: dissociation with body mass index.

J Clin Endocrinol Metab 1999 Jul;84(7):2386-9 (ISSN: 0021-972X)

de Marinis L; Mancini A; Valle D; Bianchi A; Milardi D; Proto A; Lanzone A; Tacchino R [[Find other articles with these Authors](#)]

Department of Endocrinology, Catholic University School of Medicine, Rome, Italy.

Human obesity is associated with increased leptin levels, related to body composition and fat mass (FM). Insulin has been suggested to be a regulator of in vivo leptin secretion. To further investigate the relationships between insulin and leptin levels in human obesity, we have studied 10 obese females, aged 26-57 yr [body mass index (BMI), 42.9+/-6.3], successfully treated by **biliopancreatic (BPD) diversion**, in an early postoperative period (2 months after surgery, post-BPD I; BMI, 37.2+/-7.5) and a late postoperative period (16-24 months after surgery; BMI, 27.6+/-3.96). Fourteen normal female subjects (18-59 yr; BMI, 27.9+/-1.4 kg/m²) were studied as controls. In pre-BPD obese subjects, leptin levels were higher than those in controls (60.5+/-18.8 vs. 28.7+/-4.8 ng/mL; P<0.001). BMI and insulin levels were also significantly greater (P<0.0001 and P<0.03, respectively). After surgery, the three parameters considered significantly decreased (P = 0.0007 for BMI, P<0.0001 for leptin, and P = 0.038 for insulin, using Friedman's test for repeated data). Concerning the correlation between leptin and FM in our patients, control subjects and pre-BPD subjects confirmed the correlation found in the general population (r = 0.78; P<0.01). On the contrary, post-BPD patients at 2 months lay outside the general correlation between FM and leptin; in fact, patients with low leptin levels still had a high FM. Moreover, in the post-BPD patients there was no longer a significant correlation between FM and leptin. Concerning the correlation between insulin and leptin levels, a significant correlation was present in control subjects and pre-BPD patients (r = 0.46; P<0.05). Using correlation analysis for repeated measures in surgically treated obese patients, a significant correlation within the subjects was present (r = 0.91; P<0.0001). After operation, BMI and leptin levels had a different pattern of decrease; leptin decreased rapidly, without correlation with BMI, indicating that body composition is not the only factor regulating leptin levels. The consistent correlation with insulin levels suggests an important interaction between these two hormones in post-BPD obese subjects.

Evaluation of pre- and postprandial growth hormone (GH)-releasing hormone-induced GH response in subjects with persistent body weight normalisation after **biliopancreatic diversion**.

Int J Obes Relat Metab Disord 1998 Oct;22(10):1011-8 (ISSN: 0307-0565)

De Marinis L; Mancini A; Valle D; Tacchino RM; Bianchi A; Gentilella R; Perrelli M; Castagneto M; Gasbarrini G [[Find other articles with these Authors](#)]
Institute of Endocrinology, Centro per la fisiopatologia dello shock-CNR, Rome, Italy.

BACKGROUND: Obesity is characterised by growth hormone (GH) abnormalities, including a blunted response to stimulation and a 'paradoxical' increase after meals. The blunted GH release is reversed by a surgical intestinal bypass procedure. However, this does not mean that normal GH dynamics have been restored. The present study assessed whether post-surgical weight reduction in obese patients normalised the modulation of GH release produced by metabolic fuels. **SUBJECTS:** Ten obese female subjects, aged 23-54 y, were studied before and after **biliopancreatic diversion** (BPD). All patients, after surgery, had experienced a significant reduction in body weight (mean body mass index (BMI) 25.78 +/- 1.01 kg/m² vs 44.68 +/- 1.73 kg/m²). Two groups were also studied as controls: Ten normal body weight female subjects and ten patients suffering from anorexia nervosa (AN, mean BMI 17.46 +/- 1.12 kg/m²). **MEASUREMENTS:** We have studied the GH response to a GH releasing hormone (GHRH) bolus (1 microg/kg i.v., at 13.00 h) before and after a standard meal. **RESULTS:** In post-BPD subjects, the GH response to GHRH in the fasting state, was clearly augmented in comparison with the pre-BPD values (peak values 18.06 +/- 4.56 vs 3.24 +/- 0.68 microg/L). In post-BPD subjects the postprandial GH response was further augmented in comparison with the fasting test (peak 30.12 +/- 4.99 microg/L, P < 0.05). This pattern was similar to that observed in anorexic patients. **CONCLUSION:** The surgical procedure restores a normal GH response to GHRH in the fasting state, but the 'paradoxical' GH response after meals remains present, suggesting a persistent GH derangement in such patients, which is not related to body weight per se. The surgical procedure makes obese patients similar to anorexics, in the relationships between metabolic fuels and GH secretion. The persistence of the GH postprandial response to GHRH in post-BPD subjects suggests a role for metabolic fuels in the regulation of somatostatin (SRIF) secretion.

Opioid dysregulation after **biliopancreatic diversion**: effect of naloxone on preprandial and postprandial growth hormone (GH)-releasing hormone-induced GH release in surgically induced weight loss.

Metabolism 2001 Apr;50(4):382-6 (ISSN: 0026-0495)

Mancini A; Bianchi A; Tacchino RM; Perrelli M; Milardi D; Gentilella R; Giampietro A; Fusco A; Valle D; De Marinis L [[Find other articles with these Authors](#)]
Institutes of Endocrinology and Clinical Surgery, "Centro per la fisiopatologia dello shock-CNR," Catholic University School of Medicine, Rome, Italy.

Previously, we have shown that in the opposite extremes of nutritional status (obesity and anorexia nervosa [AN]), the growth hormone (GH) response to GH-releasing hormone (GHRH) is not inhibited by the ingestion of a normal 800-kcal meal at noon. In obese subjects, GHRH-induced GH release is significantly increased (known as the "paradoxical response"). An opiate antagonist infusion (naloxone [NAL]) inhibited this postprandial meal-induced augmenting effect in obese subjects, suggesting opioid involvement in the paradoxical response. The paradoxical postprandial GH release persisted in obese subjects, who after **biliopancreatic diversion** (BPD) experienced a reduction in body weight, despite the elevation of fasting GH levels. We therefore tested a group of patients, before and after BPD, composed of 10 females, aged 23 to 54 years, who after surgery had experienced a significant reduction in body weight (mean body mass index [BMI], 25.78 +/- 1.01 kg/mg v 44.68 +/- 1.73 kg/mg). The subjects were studied 16 to 24 months after operation, in a phase of stabilized body weight. They underwent, in randomized order, the following tests: GHRH (1 microg/kg as an intravenous [IV] bolus) at 1:00 PM, in the fasting state; GHRH (1 microg/kg) at 1:00 PM, 45 minutes after a standard 800-kcal meal consumed between noon and 12:15 PM; and fasting state and postprandial GHRH (1 microg/kg) during NAL infusion (1.6 mg/h x 2.5 h, starting at noon). We found that NAL inhibited the paradoxical postprandial GH increase only in pre-BPD subjects (GH area under the concentration time curve [AUC] in microg/L/90 min)-before meal: after GHRH 237.54 +/- 62.28, after NAL + GHRH 699.2 +/- 271.57; after meal: after GHRH 575.46 +/- 109.68, after NAL + GHRH 156.17 +/- 24.96. On the other hand, NAL failed to have significant effects in post-BPD subjects (GH AUC in microg/L/90 min)-before meal: after GHRH 871.11 +/- 256.38, after NAL + GHRH 449.19 +/- 119.13; after meal: after GHRH 1,981.54 +/- 319.92, after NAL + GHRH 1,665.91 +/- 315.4. It could be hypothesized that the opioid system is radically modified by the surgical procedure, and that opioids are not the only mediators in the paradoxical response, which persists after BPD, despite the reversion of the hyposecretory GH state, which is a characteristic of obese subjects. Copyright 2001 by W.B. Saunders Company.

Surgical treatment of morbid obesity with **biliopancreatic diversion** and gastric banding: report on an 8-year experience involving 235 cases.

Ann Chir 2000 Feb;125(2):155-62 (ISSN: 0003-3944)

Bajardi G; Ricevuto G; Mastrandrea G; Branca M; Rinaudo G; Cali F; Diliberti S; Lo Biundo N; Asti V [[Find other articles with these Authors](#)]
Dipartimento di Discipline Chirurgiche, Anatomiche ed Oncologiche, Cattedra di Chirurgica Generale, Università degli Studi di Palermo, Italy.

STUDY AIM: Developments have recently been made in bariatric surgery outside the USA. The aim of this retrospective non-randomized study was to report on our experience regarding **biliopancreatic diversion** (BPD) and non-adjustable gastric banding (GB) in a population of 235 obese patients.
PATIENTS AND METHODS: From March 1990 to March 1998, 235 obese patients were operated on, 142 by BPD and 93 by GB, via laparotomy after rigorous selection of the patient population. **RESULTS:** The mean duration of surgery was 2 h 50 minutes for BPD and 1 h for GB. One postoperative death occurred due to massive pulmonary embolism. Early major complications were frequent in the BPD group (n = 21) but rare in the GB group (n = 1). Mean duration of hospitalization was 16 days in the BPD group versus 9 days in the GB group. Mean percentage excess weight loss was 48% for the GB group and 60% for the BPD group after two years. Late mortality was limited to the BPD group (3.5%). Late complications were evenly distributed between the two groups, with a prevalence of malnutrition in the BPD group and outlet stenosis in the GB group. A high incidence of band removal was recorded related to this complication (17.2%). Incisional hernias were present in both groups. **CONCLUSIONS:** GB and BPD are techniques which can induce weight loss and bring about subsequent health benefits. Nevertheless, in a few patients further intervention or adaptation of the approach due to clinical failure or to a high complication rate is required. Additional research is needed regarding determination of the surgical treatment that is best adapted to the case in question, i.e., taking into consideration both the restrictive and malabsorptive aspects.

'Hybrid' Bariatric Surgery: Bilio-pancreatic **Diversion** and **Duodenal Switch**-
Preliminary Experience [Record Supplied By Publisher]

Obes Surg 1995 Nov;5(4):419-423 (ISSN: 0960-8923)

Baltasar M; Bou R; Cipagauta LA; Marcote E; Herrera GR; Chisbert JJ [[Find other articles with these Authors](#)]

The Surgical Service, 'Virgen do los Lirios' Hospital, ALCOY, Alicante, 03804, Spain.

BACKGROUND: Hybrid, combined or mixed bariatric surgery is the combination of a degree of 'malabsorption' (as achieved by the intestinal bypass) with a 'restriction' (as achieved by gastric bypass or gastroplasty), thereby simultaneously reducing the absorption of fats in the small bowel and decreasing the intake of food. **METHODS:** A modification of the bilio-pancreatic **diversion** (BPD) with a **duodenal switch** procedure, vertical lineal gastrectomy and preservation of the pylorus, has been used in 23 patients. The antropyloric pump and 4 cm of the **duodenum** are left intact to preserve physiologic gastric emptying and to prevent anastomotic **ulcer**. The use of staplers and continuous running sutures reduces surgical risks and operative time. **RESULTS:** One patient, converted from a vertical gastroplasty, had an intrathoracic esophageal perforation and died of multi-systemic organ failure, a mortality rate of 4.5%. One patient had a partial dehiscence of the laparotomy wound. Three patients developed subcutaneous seromas. Mean weight losses during the first 4 months were 13, 11, 6 and 5 kg, with a loss of 70% of excess weight in patients approaching 1 year. No patient needs treatment for diarrhea. No serious secondary side-effects have been detected. **CONCLUSION:** This operation appears to result in very satisfactory weight loss, improved quality of life, and a low incidence of complications.

Orally administered ranitidine plasma concentrations before and after
biliopancreatic diversion in morbidly obese patients.

Obes Surg 1999 Feb;9(1):36-9 (ISSN: 0960-8923)

Cossu ML; Caccia S; Coppola M; Fais E; Ruggiu M; Fracasso C; Nacca A; Noya G [[Find other articles with these Authors](#)]

Cattedra di Chirurgia d'Urgenza, Clinica Chirurgica Generale, Universita di Sassari, Italy.

BACKGROUND: Patients undergoing **biliopancreatic diversion** (BPD) may develop gastric ulcers, particularly within the first postoperative year. The prophylactic use of antisecretory compounds at the usual therapeutic doses, mainly conventional H₂-receptor antagonists such as ranitidine, may reduce the incidence of this complication, which occurs in approximately 5% of patients after BPD. **METHODS:** The authors measured the plasma concentrations of ranitidine (300 mg orally) in obese patients, before and 8 months after BPD, and in control subjects of normal weight. The study **included** 11 obese patients undergoing BPD (age 45+/-14 years; preoperative and postoperative weights 124+/-21 and 92+/-11 kg) and 10 normal-weight subjects (age 37+/-13 years, weight 67+/-9 kg). **RESULTS:** Postoperative ranitidine plasma concentrations showed only minor differences from preoperative levels, with slightly higher maximum concentrations occurring sooner. The mean area under the curve was on the average 30% higher than preoperatively. All parameters, however, were similar to those in control subjects. **CONCLUSIONS:** BPD per se does not greatly affect the pharmacokinetic behavior of ranitidine, and therefore a conventional dosage regimen appears adequate for the prophylaxis and therapy of gastric ulcers associated with this operation.

Complications of **Biliopancreatic Diversion** Surgery as Proposed by Scopinaro in the Treatment of Morbid Obesity [Record Supplied By Publisher]

Obes Surg 1996 Oct;6(5):416-420 (ISSN: 0960-8923)

Michielson D; Van Hee R; Hendrickx L [[Find other articles with these Authors](#)]
The Academic Surgical Centre Stuivenberg, University of Antwerp, Antwerp, B-2060, Belgium.

BACKGROUND: This study concerns 33 patients treated for morbid obesity with the procedure proposed by Scopinaro. Results are reviewed retrospectively in terms of complication rates. **METHODS:** The group consisted of ten men and 23 women with a mean age of 34 years (range 20-51 years), and a mean BMI of 49.5 kg/m² (range 37-77). Adequate attempts at medical management had failed repeatedly. The operative procedure involved a 2/3 partial gastrectomy and **biliopancreatic diversion** by Roux-en-Y reconstruction 50 cm before the ileocecal valve. In one patient, a cholecystectomy was added. **RESULTS:** The mean weight loss after 6 months was 18.9% of the initial weight, with mean BMI 41 kg/m² (range 29-60). Early complications **included** four wound infections (15%), while two patients complained of an early dumping **syndrome** (6%), treated by dietary measures. There were no respiratory infections and no pulmonary embolism, likely as a result of the thoracic epidural anesthesia and high doses of prophylactic heparin used. There was no mortality. As to late complications, nine patients complained of diarrhea due to bacterial overgrowth (27%) and were treated with antibiotic therapy. There were five incisional hernias (15%). Five patients had a peptic **ulcer** (15%) and required medical treatment. Two patients had acute cholecystitis (6%). One patient had an afferent loop **obstruction** (3%), requiring reoperation. **CONCLUSIONS:** Overall, this series of intestinal **diversion** procedures by the method of Scopinaro had a larger complication rate than generally accepted.

Biliopancreatic Diversion in Prader-Willi **Syndrome** Associated with Obesity
[Record Supplied By Publisher]

Obes Surg 1996 Feb;**6(1):58-62** (ISSN: 0960-8923)

Antal S; Levin H [[Find other articles with these Authors](#)]
Herzlia Medical Center, Haifa, 34362, Israel.

BACKGROUND: Prader-Willi **Syndrome** (PRWS) is an uncommon neuroendocrine disorder of genetic origin, described in 1956 by Prader, Labhart and Willi. The main clinical manifestations in the adult are mental retardation, hyperphagia with gross obesity, hypogonadism, cryptorchidism and short stature. The life expectancy of the affected individual ranges between 20 and 30 years rarely beyond - due to complications related to excessive obesity. Sustained dieting combined with behavior modification programs, as well as gastric restrictive surgery for obesity, proved to have a high failure rate in PRWS, due to the patients' inability to cooperate in changing their eating habits. **METHODS:** **Biliopancreatic Diversion** (BPD), which does not require the patient's cooperation in changing eating habits after surgery, was performed in two PRWS patients (13- and 22-years-old), both with excessive obesity, severe respiratory distress, day sleepiness and limited mobility. **RESULTS:** Two years after surgery, the 13-year-old had lost 80% of her overweight, while the 22-year-old, after 1 year, had lost 34%. Recent laboratory tests showed normal data in both patients. Their respiratory distress had subsided completely, their mobility improved dramatically, and their self-image and alertness enhanced. **CONCLUSION:** BPD resulted in an improved quality of life in these patients.

Modifications of Intestinal Permeability Test Induced by **Biliopancreatic Diversion**: Preliminary Results [Record Supplied By Publisher]

Obes Surg 1995 Nov;5(4):424-426 (ISSN: 0960-8923)

Gaggiotti G; Catassi C; Sgattoni C; Bonucci A; Ricci S; Spazzafumo L; Coppa GV [[Find other articles with these Authors](#)]

Department of Surgery, University of Ancona, Ancona, 60124, Italy.

BACKGROUND: **Biliopancreatic Diversion** (BPD), excluding the jejunum and part of the ileum from the transit of the food, reduces the absorptive intestinal area available to 250 cm of the distal ileum. The Intestinal Permeability Test (IPT) with Lactulose/Mannitol is performed to assess the intestinal mucosa function. The aim of this study was to investigate the effect of intestinal anatomical modifications induced by BPD on IPT in a group of severely obese patients. **METHODS:** Group A: 18 severely obese subjects who underwent BPD; the IPT was performed before (T0) and 8.2 +/- 0.9 days after BPD (T1). Group B: nine subjects of Group A; IPT was repeated 96.1 +/- 12.7 days (T2) and 180.4 +/- 19.7 days (T3) after BPD, respectively. IPT was expressed as the %Lactulose/%Mannitol ratio in the urine collected during 5 h after oral administration (normal %L/%M < 0.04). **RESULTS:** Data from Group A (paired Student's t-test) exhibited significantly higher values in T, with respect to T0 for %L/%M ($p < 0.05$) and for %L ($p < 0.05$), and significantly lower values in T, with respect to T0 ($p < 0.001$) for %M. In the Group B analysis of Variance from T0-T1-T2-T3 resulted statistically significant ($p < 0.05$) for % L/ % M and % M. **CONCLUSIONS:** The reduction of intestinal absorption surface induced by BPD causes a significant increase of the Lactulose/Mannitol IPT values, showing an intestinal mucosa function impairment. The IPT values improve progressively at 3 and 6 months after this surgical procedure.

Prevention and Reversal of Liver Damage following **Biliopancreatic Diversion** for Obesity [Record Supplied By Publisher]

Obes Surg 1994 Aug;4(3):285-290 (ISSN: 0960-8923)

Antal SC [[Find other articles with this Author](#)]
Elisha Hospital, Mount Carmel, Haifa, 34362, Israel.

Liver damage following **biliopancreatic diversion** (BPD) for obesity is an infrequent, dangerous and, when left untreated, even potentially fatal complication. The laboratory expression of developing liver damage is the progressive deterioration of the liver enzymes over 70 i.u., persisting and progressing beyond 6 months after surgery. Until recently, the treatment for this complication consisted of hospitalization for total parenteral nutrition and then, if this proved unsatisfactory, surgical reversal. In this report, a new therapeutic approach to this condition is presented. Four patients who, following a BPD for obesity, developed deterioration of the liver enzymes (AST, ALT over 70 i.u.) which persisted and progressed beyond the first 6 months after surgery, were given a treatment consisting of the ambulatory administration of 'Viokase' tablets, an uncoated pancreas extract with a high protease content (30,000 i.u.) taken with protein-rich meals. After 2-4 months of Viokase treatment, in all four patients the liver enzymes returned to normal levels: AST from 160, 86, 120 and 89 i.u. to 26, 20, 24 and 27 i.u. Two patients who complained of diarrheic stools (ten per day) received metronidazole for several days, dramatically improving their condition and returning their daily stool count to normal.

Resting Energy Expenditure in Long-Term Postobese Subjects after Weight Normalization by Dieting or **Biliopancreatic Diversion** [Record Supplied By Publisher]

Obes Surg 1993 Nov;3(4):397-399 (ISSN: 0960-8923)

Adami GF; Compostano A; Bessarione D; Gandolfo P; Marinari G; Lamedica G; Scopinaro N [[Find other articles with these Authors](#)]
Istituto di Clinica Chirurgica, Universita' di Genova, Genova, 16132, USA.

Resting energy expenditure (REE) was measured by Indirect calorimetry in three groups of subjects closely matched for body weight (BW) and body composition. Five subjects had reduced from 103 kg (129-90) to normal BW by dieting. Fourteen subjects had normalized their weight (preop 120 kg, from 168 to 100) following **biliopancreatic diversion** (BPD). All subjects in both groups had essentially maintained a stable weight for at least 2 years before the study. Ten healthy volunteers who had never been obese served as controls. No differences in REE were observed between post-BPD and control subjects, while lower ($p < 0.05$) values of REE were found in post-diet subjects. A long-lasting reduction of REE, in spite of a normal body composition, might partly account for the very poor long-term results of conventional dietary treatment. The unreduced REE following BPD may contribute, along with the permanent intestinal malabsorption, to the excellent long-term weight maintenance caused by this surgical procedure.

Biliopancreatic Diversion: 170 patients in a 7-year follow-up [Record Supplied By Publisher]

Obes Surg 1993 May;3(2):179-180 (ISSN: 0960-8923)

Luc L [[Find other articles with this Author](#)]
Antwerp Medical Center, Antwerp, 2000, Belgium.

During the past 7 years, 170 morbidly obese patients have been subjected to a **biliopancreatic diversion**. Mean weight loss achieved over 2 years was greater than 70% of excess weight and was maintained. Early complications were rare. The most common side-effects are discussed. The re-operation rate because of these side-effects was 7%. Eating normal meals, together with a stable weight loss, has provided these patients with a better quality of life.

Late Perforation of the Distal Roux-en-Y Anastomosis in a Patient with
Biliopancreatic Diversion [Record Supplied By Publisher]

Obes Surg 1992 Aug;2(3):269-270 (ISSN: 0960-8923)

Anderson PL; Velanovich V; Kaufman CR; Carter PL [[Find other articles with these Authors](#)]

General Surgery Service, Department of Surgery, Madigan Army Medical Center,
Tacoma, WA 98431 USA.

A 38-year old female with a history of **biliopancreatic diversion** for morbid obesity developed a perforation at the distal Roux-en-Y anastomosis 13 months after the original surgery. The etiology of this complication was not determined. Perforation of a Roux-en-Y anastomosis occurring this late in the postoperative period has not been described previously.

Biliopancreatic Diversion: early complications [Record Supplied By
Publisher]

Obes Surg 1992 May;2(2):177-180 (ISSN: 0960-8923)

Bajardi G; Latteri M; Ricevuto G; Mastrandrea G; Florena M [[Find other articles with these Authors](#)]

Department of Surgical and Anatomical Sciences, University of Palermo, Palermo, 90143
Italy.

The experience and early complications in 66 morbidly obese patients who underwent **biliopancreatic diversion** are presented. There was one death, due to a pulmonary embolus (PE) at home on the 15th postoperative day. Postoperative complications occurred in nine patients, consisting of gastric hemorrhage (2), gastric outlet **obstruction** (2), non-lethal PE (1), deep vein thrombosis (1), wound dehiscence (1), and asymptomatic gastric leak (1). In addition, there were 12 superficial wound infections. Four patients required urgent reoperation for gastric hemorrhage (2), gastric outlet **obstruction** (1), and wound dehiscence (1). The high complication rate is believed to represent the early part of the learning curve. Some reports of the early complications following other bariatric operations are discussed.

Biliopancreatic Diversion with Gastrectomy as Surgical Treatment of Morbid Obesity [Record Supplied By Publisher]

Obes Surg 1991 Dec;1(4):381-387 (ISSN: 0960-8923)

Marceau P; Biron S; St Georges R; Duclos M; Potvin M; Bourque RA [[Find other articles with these Authors](#)]

Department of General Surgery, Laval Hospital, Sainte-Foy, Quebec, G1V 4G5 Canada.

The best procedure for the treatment of morbid obesity has not yet been defined.

Biliopancreatic diversion is one of the techniques available, but its results have not been sufficiently documented and the addition of a subtotal gastrectomy to the **diversion** so as to avoid leaving a blind non-functioning stomach, is still questionable. The purpose of this paper is to report our experience with our first 149 consecutive patients who were treated by **biliopancreatic diversion** with subtotal gastrectomy for morbid obesity. Operative mortality was 3% and morbidity 12%. The weight loss was marked during the first 6 months and decreased during the following 12 months. The weight stabilized at 2 years and there was subsequently a small increase. In only two out of 48 cases was the weight loss less than 25% of the initial weight at 2 years. The undesirable side-effects were diarrhea in 6%, vomiting in 9% and dyspepsia in 4%. The intervention leads to a malabsorption of carotene, iron, albumin and calcium. Except for carotene the deficiencies were corrected by oral supplement. In two patients, with resistant deficiencies, the **diversion** was reversed. Eighty-eight percent of the patients are satisfied with this intervention. At 2 years, 70% have reached their weight loss objective without any major side-effects or nutritional deficiencies, but in 14% the outcome of the procedure must be considered unsatisfactory. **Biliopancreatic diversion** with subtotal gastrectomy is a major operation, but it gives encouraging results so far.

Orally-administered Serum Ranitidine Concentration after **Biliopancreatic Diversion** for Obesity [Record Supplied By Publisher]

Obes Surg 1991 Sep;1(3):293-294 (ISSN: 0960-8923)

Adami GF; Gandolfo P; Esposito M; Scopinaro N [[Find other articles with these Authors](#)]

Istituto di Clinica Chirurgica, University of Genoa, Genova 16132 Italy.

Stomal **ulcer** occurs in about 5% of patients after **biliopancreatic diversion** (BPD). Seven females were given 150 or 300 mg of ranitidine orally. Blood samples found a pharmacologically effective concentration from 0.5 to 8 h after both doses. Intestinal absorption of ranitidine is maintained after BPD.

Why the Operation I Prefer is **Biliopancreatic Diversion** (BPD) [Record
Supplied By Publisher]

Obes Surg 1991 Sep;1(3):307-309 (ISSN: 0960-8923)

Scopinaro N [[Find other articles with this Author](#)]

Istituto di Patologia Chirurgica dell'Universita, Ospedale S. Martino, Genoa 16132 Italy.

The author discusses why his operation of choice is **biliopancreatic diversion** (BPD). BPD is the most effective in obtaining long-term weight loss and permits unchanged eating habits. Although BPD is technically demanding, revisions for protein malnutrition or stomal **ulcer** have not been difficult and have become infrequent. However, lifelong follow-up must be guaranteed.

A Technique for Converting the Roux-en-Y Gastric Bypass to a Modified
Biliopancreatic Diversion [Record Supplied By Publisher]

Obes Surg 1991 Sep;1(3):311-313 (ISSN: 0960-8923)

Sapala JA; Sapala MA; Resto Soto AD; Quarermus JF [[Find other articles with these Authors](#)]

Departments of Bariatric Surgery and Gastroenterology, Thorn Hospital, Hudson, MI 49247 USA.

Our group has performed the Roux-en-Y gastric bypass (RYGB) in 1450 patients since 1983: 805 patients had primary operations, and 645 were converted from previous gastroplasty procedures, i.e. horizontal gastroplasty, vertical banded gastroplasty, and gastrogastrostomy. Within the last 2 years, 38 patients who failed the RYGB were converted to a modified **biliopancreatic diversion** (BPD) using a technique that did not require dismantling a major portion of the original gastric exclusion. A 24-month follow-up has demonstrated a significant and sustained weight loss in all patients. In addition, the modified BPD completely eliminated the problem of reflux bile gastritis in those patients with a short Roux-en-Y jejunal limb.

The Use of the **Biliopancreatic Diversion** as a Treatment for Failed Gastric Partitioning in the Morbidly Obese [Record Supplied By Publisher]

Obes Surg 1991 Mar;1(1):89-93 (ISSN: 0960-8923)

Fox SR [[Find other articles with this Author](#)]

Seattle, Washington, 98002, USA.

The dilemma with which every bariatric surgeon is confronted is: What to do with the inevitable failures? In vertical gastric partitioning, revising the gastroplasty results in a high second failure rate. In an effort to improve the Success rate in failed gastroplasty patients who request revisionary surgery, the **biliopancreatic** bypass (classic Scopinaro procedure) was carried out on 57 patients. They have been followed for up to 10 years. The long-term weight loss has averaged 69.4 lb, which is 87% of the pregastroplasty excess weight. The price paid by these patients, in terms of complications, has been significant. Twenty-two Percent have developed hypoalbuminemia with its accompanying peripheral edema; 24% have required i.v. hyperalimentation because Of malnutrition. Sixteen percent of the patients developed a late post-op bowel **obstruction**, one resulting in death. Osteomalacia, spontaneous fractures have occurred. The **biliopancreatic diversion** procedure (BPD) is an effective weight-loss operation in the failed gastroplasty patients, but a significant price must be paid in terms of careful follow-up, nutritional deficiencies, and rehospitalizations.

Biliopancreatic diversion preserving the stomach and pylorus in the treatment of hypercholesterolemia and diabetes type II: results in the first 10 cases.

Obes Surg 1998 Feb;8(1):67-72 (ISSN: 0960-8923)

Noya G; Cossu ML; Coppola M; Tonolo G; Angius MF; Fais E; Ruggiu M [[Find other articles with these Authors](#)]

Cattedra di Chirurgia d'Urgenza e Clinica Chirurgica Generale, Universita' di Sassari, Italy.

BACKGROUND: Besides weight loss Scopinaro's operation produces correction of hypercholesterolemia and noninsulin dependent diabetes mellitus in all patients who suffer from these conditions. These results encouraged us to perform **biliopancreatic diversion** (BPD) without gastric resection, thus preserving the functions of the stomach and pylorus in moderately overweight patients with hypercholesterolemia associated with diabetes type II and hypertriglyceridemia. **METHODS:** Between March 1996 and July 1997 we performed BPD without gastric resection on 10 moderately overweight patients [mean body mass index (BMI) = 33.2 kg/m²]. All patients had suffered from hypercholesterolemia and hypertriglyceridemia for more than 5 years. Ten patients suffered from diabetes type II; four of them had had insulin treatment or oral anti-diabetic agents; the other patients all had hyperglycaemia in the fasted state and diabetes confirmed by preoperative oral glucose tolerance test (OGTT). Five patients suffered from hypertension. **RESULTS:** In all patients, cholesterol and triglyceride levels returned to normal within the first postoperative month. Glycemia also stabilized at normal values in nine patients within the early weeks after surgery. One patient who took 70 U of insulin reduced his daily intake to 35 U 2 months postoperatively. In all patients blood pressure returned to normal. Weight loss was predictably slight (10-15 kg). **CONCLUSIONS:** Our experience with the procedure found that this new method seems to be as effective in controlling lipidic metabolism and diabetes II as the original version of BPD. As expected, weight loss is only moderate, so that the modified BPD is not suitable for very obese patients.

Biliopancreatic diversion for treatment of morbid obesity: experience in 50 cases.

Obes Surg 1998 Feb;8(1):61-6 (ISSN: 0960-8923)

Noya G; Cossu ML; Coppola M; Tonolo G; Angius MF; Fais E; Ruggiu M [[Find other articles with these Authors](#)]

Cattedra di Chirurgia d'Urgenza e Clinica Chirurgica generale, Universita' di Sassari, Italy.

BACKGROUND: **Biliopancreatic diversion** (BPD) by Scopinaro's method is an operation advocated by some surgeons as an effective treatment for morbid obesity. **METHODS:** Between February 1995 and April 1997 we performed BPD by Scopinaro's method on 50 patients with morbid obesity (23 males), average age 41.4 years (range 20-63 years), average body weight 135.08 kg (range 89-256 kg), mean body mass index (BMI) 50.65 kg/m² (range 37.01-81.56 kg/m²). **RESULTS:** In all cases a gradual decrease in weight was obtained [mean BMI at 1 month: 44.8 kg/m², at 6 months (31 patients): 35.09 kg/m², at 1 year (23 patients): 31.36 kg/m², at 18 months (14 patients): 29.89 kg/m² and at 2 years (5 patients): 29.27 kg/m²]. At the same time a significant improvement in the pathological conditions associated with morbid obesity was observed. The patients were able to suspend oral antihypertensive and antidiabetic therapy as these parameters spontaneously returned to normal values by the sixth postoperative month; all cases showed a marked reduction in hypercholesterolemia and hypertriglyceridemia. Postoperative complications were: one death (2%) on the third day due to heart failure; two late intestinal occlusions (4%); one acute dilatation of the stomach (2%); one peritonitis caused by early dehiscence of the anastomosis (2%); five anastomotic ulcers (10%); two cases of protein malnutrition (4%). **CONCLUSIONS:** BPD by Scopinaro's method is a bariatric procedure which is technically complex. However is it safe and reproducible and it induces a substantial weight loss.