

The common operations

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According to the IFSO Global Registry , in 2018 sleeve gastrectomy constituted 46%, gastric bypass 38%, one-anastomosis gastric bypass procedures 7.6% and gastric banding 5% of procedures. Other procedures include the biliopancreatic diversion (BPD) procedure and its duodenal switch variant (BPD/DS). The variety of procedures usually reflects surgeons' expertise and surgeons' and patients' preferences, as there are no RCTs beyond 5 years comparing different operations. Sleeve gastrectomy is now the most common operation and has gained rapid popularity at the expense of gastric banding and to a lesser extent gastric bypass. Some clinical outcomes are shown (Table 68.5). The mechanism of action of most weight-loss procedures remains incompletely understood. -

TABLE 68.5 Malabsorption, per cent excess weight loss a (% EWL) and diabetes remission after bariatric surgery. 3-year % EWL 3-year % Protein/ diabetes calorie remission malabsorption Sleeve No 50–60% 50% gastrectomy Gastric bypass No 50–60% 50% OAGB Yes 60–80% 80% Gastric band No

40–50% 20% BPD/DS, Yes 70–80%
80% SADI-S BPD, biliopancreatic
diversion; DS, duodenal switch;
OAGB, one-anastomosis gastric
bypass; SADI-S, single-
anastomosis duo

duodenal bypass with sleeve gastrectomy. a %EWL refers to the excess weight lost above a notional upper 2 normal body mass index of 25 kg/m². Per cent weight loss is another way of measuring weight change, preferred by physicians.

Reduced appetite and early satiety are common features that are potentially explained by changes in levels of gut hormones such as peptide YY (PYY) and GLP-1 and how these interact with the brain. Sleeve gastrectomy Sleeve gastrectomy (Figure 68.1) is less challenging to perform than gastric bypass. It evolved from the magenstrasse and mill operation, in which the divided fundus (the 'mill') was left in continuity with the lesser curve-based tube (the 'main street'). Initially , it was done as the first step of a duodenal switch operation; however, it was found to be effective on its own without the switch (see Biliopancreatic diversion/duodenal switch). The lesser curve-based gastric tube is constructed over a size 32–36Fr bougie, although some surgeons advocate use of larger sizes to reduce the risk of staple line leakage. Linear stapling devices are used. There is variation in the techniques employed between how wide the staplers should be and whether reinforcement strips should be used. The Achilles heel of the sleeve is the risk of a staple line leak at the angle of His, which can take months to heal owing to the high-pressure system in the stomach with an intact pylorus. Another concern in the long term is symptomatic reflux and de novo Barrett's oesophagus (see Chapter 66). A proportion of patients will need revisional surgery in future for weight regain. The mechanism of action is still being investigated. The initial belief that sleeve gastrectomy acts as a restrictive procedure has been challenged by studies which show gastric emptying is accelerated rather than delayed after sleeve gastrectomy . A change in satiety gut hormones and bile salt metabolism, similar to those described after gastric bypass, may explain some of the phenomena observed. Wilhelm His , 1831–1904, Professor of Anatomy , Leipzig, Germany . Norman Rupert Barrett , 1903–1979, surgeon, St Thomas' Hospital, London, UK. Roux-en-Y gastric bypass Despite the variety in laparoscopic techniques described and the lack of standardisation, most agree that Roux-en-Y gastric bypass (Figure 68.2) should include a short vertical lesser curvature-based gastric pouch. The techniques available for construction of the

pouch-jejunostomy are linear stapler - with suture closure of the defect, circular stapler and entirely - hand sewn. It is routine to perform a leak test. The Roux limb can be retro- or antecolic. There is no standard length of the biliary and Roux limbs; however, the biliary limb is usually kept short to reduce vitamin and mineral deficiencies and the Roux limb length is varied between 100 and 150 cm. There are no consistent data regarding the effect of different limb lengths on weight loss. Bowel continuity is restored by a 'Y' jejunojunction, which is either stapled with suture closure of the defect or stapled in its entirety. It is now recognised that the mechanism of action is complex. Patients lose weight, at least in part, because they eat less - owing to a change in appetite, which is facilitated by a change in satiety gut hormones. Other mechanisms such as changes in energy expenditure and change in food preferences may also play a role.

Gastric sleeve Pylorus Resected stomach Figure 68.1 Sleeve gastrectomy. (Adapted from Griffin SM, Raimes SA, Shen J. Oesophagogastric surgery, 5th edn. London: Saunders Elsevier, 2013.) Bypassed portion of stomach Proximal pouch of stomach 'Short' intestinal Roux limb Pylorus Duodenum Alimentary limb

Biliopancreatic limb Figure 68.2 Gastric bypass showing a short vertical lesser curve-based gastric pouch with a Roux-en-Y jejunojunction reconstruction. (Adapted from Griffin SM, Raimes SA,

Shen /f_i ne J. Oesophagogastric surgery , 5th edn. London: Saunders Elsevier, 2013.)

One-anastomosis gastric bypass One-anastomosis gastric bypass (OAGB) (Figure 68.3 previously known as a mini-gastric bypass, was first described by Rutledge. The objective was to develop a technique that is technically less demanding with only one anastomosis (antecolic loop gastrojejunostomy without a Roux-en-Y configuration) and a longer gastric pouch than for standard gastric bypass. Similar weight loss outcomes have been reported but there is concern regarding symptomatic biliary reflux causing gastritis or oesophagitis, marginal ulcers and the management of anastomotic leaks owing to a potentially high volume of biliary and pancreatic secretions. With the Roux-en-Y historically being the standard in surgery of the stomach for ulcer disease and cancer, there is further concern owing to possibly increased risk of Barrett's oesophagus and gastric or oesophageal cancer associated with biliary reflux. These outcomes will need long term investigation. Gastric banding Although use of adjustable gastric banding (Figure 68.4 declining, it did boost the popularity of bariatric surgery because of perioperative safety , lack of nutritional complications and relative ease and availability . The pars flaccida technique (through the window of the lesser omentum) is now standard practice with a band placed just below the oesophagogastric junction, making a small 'virtual' gastric pouch. The band Robert Rutledge , contemporary , surgeon, Las Vegas, NV , USA. Nicola Scopinaro , 1945–2020, Professor of Surgery , Genoa, Italy .), is sutured into place anteriorly with gastrogastroic tunnelling sutures to reduce slippage. The access port is routinely sutured - to the rectus sheath in the upper abdomen for ease of access by a non-coring, Huber needle for band adjustments. The operation appears to work by reducing hunger, probably vagally mediated. The initial surgical placement is only the eased beginning of the treatment. Specialist nurses, physicians and surgeons do 'band consultations' to assess eating habits and - then perform an adjustment with injection or aspiration of saline if indicated. The objective is to reach the so-called 'sweet spot' of optimal appetite control. Follow-up should be monthly to begin with as needed during the first year, with full MDT) is support to help patients get the best use out of their bands. Lack of appropriate follow-up is why results in the literature vary so much, with a consequent high band removal rate. Biliopancreatic diversion/duodenal switch BPD, described by Scopinaro, produces greater weight loss than /uni00A0 other procedures but is associated with a higher

Gastric pouch (new stomach) Bypassed stomach Bypassed small intestine Figure 68.3 Gastric bypass showing a longer vertical lesser curve-based gastric pouch with gastrojejunostomy reconstruction (one-anastomosis gastric bypass). Tube to carry /f_l uid Gastric band Subcutaneous injection port (b) Figure 68.4 Adjustable gastric band. Gastric band surgery showing (a) a small 'virtual' pouch of stomach below the gastro-oesophageal junction and (b) gastrogastroic tunnelling sutures. (Adapted from Griffin SM, Raimes SA, Shen /f_i ne J. Oesophagogastric surgery , 5th edn. London: Saunders Elsevier, 2013.)

nutritional complication rate. The mechanism of action appears to be mainly malabsorption of calories. BPD/DS is the version mainly performed (Figure 68.5). A sleeve gastrectomy is followed by division of the duodenum just distally to the pylorus. The ileum is divided with a linear stapler, followed by a duodenoileostomy and ileoileostomy with the objective of creating a common channel of 75–125 /uni00A0 cm and an alimentary channel of 100–250 /uni00A0 cm. The long remaining biliary limb is not measured. BPD/DS is increasingly seen as a definitive procedure, particularly after significant weight regain following sleeve gastrectomy . A high-protein diet and

regular vitamin and mineral supplements with lifelong monitoring and patient commitment, to avoid malnutrition, is essential postoperatively. Only a few centres offer these procedures. Single-anastomosis duodenoileal bypass with sleeve gastrectomy (SADI-S) is a novel procedure based on the BPD/DS. A sleeve gastrectomy is followed by an end-to-side duodenoileal anastomosis (Figure 68.6). The length of the common channel–alimentary limb is 250–300 cm. Potential advantages include the preservation of the pylorus, elimination of one anastomosis compared with the duodenal switch and reducing operating time and risk of perioperative complications.

Alimentary limb 100–250 cm Biliary limb Common channel 75–125 cm Figure 68.5 Biliopancreatic diversion with duodenal switch variant (BPD/DS).

Revision #1

Created 2025-12-31 15:25:25 UTC by Omar Ayman

Updated 2025-12-31 15:25:25 UTC by Omar Ayman