OBES SURG (2010) 20:1161–1163
DOI 10.1007/s11695-010-0188-x

TECHNICAL INNOVATION

Laparoscopic Adjustable Banded Sleeve Gastrectomy as a Primary Procedure for the Super-Super Obese (Body Mass Index>60 kg/m^2)

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Published online: 14 May 2010
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Abstract Isolated laparoscopic sleeve gastrectomy is increasingly being used for the treatment of morbid obesity. However, doubts still persist regarding long-term weight loss, and the 5-year results are awaited. Whether the aetiology of failed excess weight loss is the result of an inadequate sleeve or attributable to dilatation of the sleeve is not clear. In an effort to prevent gastric dilatation and increase gastric restriction to promote further weight loss in the long term, we performed a combined procedure of laparoscopic adjustable gastric banding with sleeve gastrectomy. The patient was a 39-year-old woman with a life-long history of obesity and a body mass index of 79.8 kg/m^2. The surgical technique of the laparoscopic adjustable gastric banded sleeve gastrectomy is described. There were no immediate complications, and the patient was discharged home on the third postoperative day. She is doing extremely well on clinic follow-up at 6 weeks. To the best of our knowledge, laparoscopic adjustable gastric banded sleeve gastrectomy, as a primary operation, has not been described in the literature. It is hoped that this combined procedure will be most useful in the super-super obese (body mass index>60) patients. More patients with a long-term follow-up are necessary to provide definitive conclusions regarding long-term benefits and complications of this combined bariatric procedure.

Keywords Adjustable gastric band · Sleeve gastrectomy · Morbid obesity · Super-super obesity · Laparoscopic

Introduction

Sleeve gastrectomy (SG) was first described as a modification to the bilio-pancreatic diversion (BPD) and combined with a duodenal switch (DS) in 1998 [1, 2]. It was first performed laparoscopically in July 1999 and reported the following year [3]. Laparoscopic sleeve gastrectomy (LSG), as a primary operation in the management of morbid obesity, was first reported in 2003 [4]. Since then, multiple recent reports have documented SG as single therapy in the treatment of morbid obesity [5, 6]. With increasing experience, a number of complications have been reported with SG including dilatation of the remaining stomach [7–9]. Also, doubts still persist regarding long-term weight loss, and the 5-year results are awaited. Whether the aetiology of failed excess weight loss is the result of an inadequate sleeve or attributable to dilatation or hypertrophy of the sleeve is not clear. In an effort to prevent gastric dilatation and increase gastric restriction to promote weight loss in the long term, we performed a combined procedure of laparoscopic adjustable gastric banding with sleeve gastrectomy as described below.

The patient was a 39-year-old woman with a life-long history of obesity and a body mass index of 79.8 kg/m^2 (241 kg with 174 cm height). Her co-morbidities included asthma, musculo-skeletal complaints, and depression on

Financial support None.

Submitted to the meeting of the 4th European IFSO Congress, 22–24 April, 2010, Lausanne, Switzerland.

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treatment. Following a thorough informed discussion with her regarding options of surgical treatment and subsequent multidisciplinary meeting, it was decided to perform either a laparoscopic long-limb Roux-en-Y gastric bypass or laparoscopic sleeve gastrectomy with an adjustable band as a primary procedure.

Surgical Technique

The patient was placed in the supine position, split-leg with reverse Trendlenberg position along with slight flexion of the hip to help increase surgical abdominal workspace [10]. The surgeon [B.D.] stood between the legs. A video monitor was positioned at the level of the patient's head. A 30° angled scope was used. Abdominal insufflation with carbon dioxide was achieved using a Veress needle. Intra-abdominal pressure was maintained at 15 mm Hg. A five-port technique was employed: a 10-mm port 10 cm below the xiphoid process, a 5-mm port high in the epigastrium on the midline, a 12-mm port in the right upper quadrant, and two 12-mm ports in the left upper quadrant. All the three 12-mm ports were placed on the same line of the 10-mm port.

Intraoperatively, extensive adhesions in the lower abdomen due to previous surgery prevented us from continuing with Roux-en-Y gastric bypass operation. The SG was done from approximately 5 cm proximal to the pylorus to the gastroesophageal junction (angle of His) over a 34-Fr bougie using a linear stapler (Echelon 60 Endopath stapler, Ethicon; Cincinnati, OH, USA). An adjustable gastric band (AGB) (HAGE, Helioscopie, France) was placed through a small opening between the blood vessels on the lesser curve and the sleeve approximately 6 cm below the gastro-oesophageal junction (Figs. 1 and 2). The band was sutured laterally with a couple of nonabsorbable sutures (2/0 ethibond, Ethicon) to the peripancreatic tissues. Test for leakage was done by forcefully injecting methylene blue through the orogastric tube after a clamp was placed to temporarily occlude the pylorus to achieve complete distension of the remaining stomach. The subcutaneous reservoir port was secured to the anterior rectus sheath in a midclavicular plane, and hollow tubing was used to connect the band to the port. The band was not filled at operation. Postoperatively, she was allowed free fluids from the second postoperative day and was discharged home on the third postoperative day. She was advised to be on liquid diet for 2 weeks and then advance to a pureed and solid diet over the next 4 weeks. She is doing extremely well on clinic follow-up at 6 weeks.

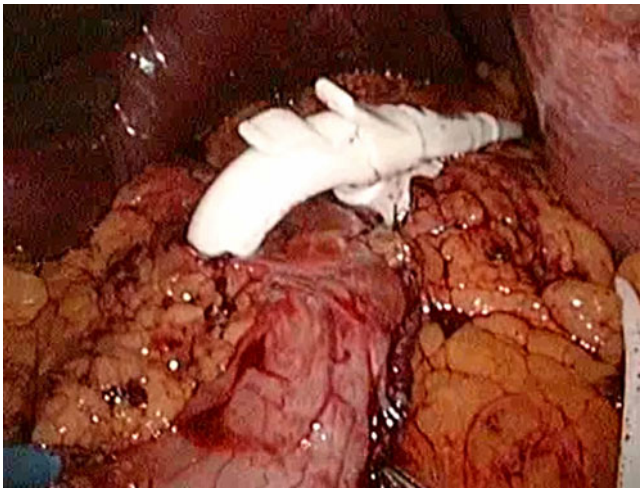

Fig. 2 Laparoscopic adjustable gastric banded sleeve gastrectomy

Fig. 1 Laparoscopic adjustable gastric banded sleeve gastrectomy

Discussion

To the best of our knowledge, a combination of an AGB with LSG, as a primary operation for the treatment of morbid obesity, has not been described in the literature. The placement of an adjustable band around the upper sleeve will further limit the volume of food intake and prevent dilatation or hypertrophy of the gastric sleeve distal to the band in the long term. With an LAGB component, there is a sequential action mechanism: LSG is mainly active at the beginning, while adjustable gastric restriction from an AGB will result in further weight loss following this period. Also, the adjustable band will help for weight maintenance, especially when restriction starts to fail and weight regain occurs due to gastric dilatation. The procedure thus combines the potential benefits of SG and an AGB.

Likewise, as a primary operation, Gagner et al. [11] as well as Vassallo et al. [12] reported morbidly obese patients who underwent a LAGB with BPD and DS and had satisfactory weight loss. Also, Gabriel et al. [13]

performed a LAGB with a BPD and reported as much as 99.6% reduction in excess weight at 2 years. Combining previous gastric restrictive surgery with a subsequent BPD has also been previously described [14, 15].These procedures are more invasive than this technique but represent other means for a combined restrictive/malabsorptive procedure.

In an effort to prevent gastric dilatation, several modifications of the SG can be done, thereby improving long-term results. There has been a recent report of using human collagen as a band for sleeve gastrectomy at the primary operation [16]. Greenstein et al. [17] recently reported placement of a laparoscopically inserted gastric band around the upper part of the stomach that had a previous sleeve gastrectomy that had become dilated and was associated with poor weight loss. At 9 months, the patient had a 57% loss of excess body weight, suggesting the utility of combining banding with sleeve gastrectomy. Another modification of a band with a sleeve gastrectomy was evaluated by de Paula et al. [18] who reported a series of 19 patients who had a laparoscopic sleeve gastrectomy over a 30-Fr orogastric calibration tube with placement of a silicone band around the stomach 3–4 cm below the cardia. However, they also interposed a 100-cm long segment of ileum into the jejunum 50 cm from the ligament of Treitz to provide a 'neuroendocrine brake'. Other techniques to prevent gastric dilatation include wrapping the gastric sleeve in polytetrafluoroethylene dual mesh. A preliminary study from New York found significantly less weight gain in a porcine model after 8 weeks [19].

The AGB, however, has been associated with late complications, including slippage and erosion of the band. Since the band is placed through a small opening between the blood vessels immediately adjacent to the stomach and the lesser curve and fixed laterally with the peripancreatic tissues, the chance of slippage is expected to be low. Whether or not late complications will occur remains to be seen.

Conclusion

The insertion of an AGB is feasible and safe during a LSG at the primary operation, with no immediate major complications in this case. We assume that combining an adjustable band can reduce the incidence of failed sleeve gastrectomies, leading to better excess weight loss results than those of a sleeve alone. It is hoped that this combined procedure will be most useful in the super-super obese (body mass index>60) patients. More patients with a long-term follow-up are necessary to provide definitive conclusions regarding long-term benefits and complications of this combined bariatric procedure.

Acknowledgement S.A. was supported by a travelling fellowship grant from Covidien plc, United Kingdom (UK) and awarded by the Association of Surgeons in Training (ASiT), UK.

Conflict of interest disclosure The authors declare that they have no conflict of interest.

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