CASE REPORT

Iatrogenic oesophageal transection during laparoscopic sleeve gastrectomy

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SUMMARY

Laparoscopic sleeve gastrectomy has been hailed as an easy and safe procedure when compared with other bariatric operations. However, it may be associated with well-recognised early complications such as leaks and bleeding, as well as late ones such as stenosis and weight regain. Iatrogenic complete oesophageal transection has never been reported before as a complication. We report a case of complete oesophageal transection during laparoscopic sleeve gastrectomy that was not recognised intraoperatively. The repair of this iatrogenic injury was staged, with the final stage carried out some 3 months after the initial procedure. This case report highlights the possible occurrence of complete oesophageal transection during laparoscopic sleeve gastrectomy, and suggests steps to avoid and correct such complications.

BACKGROUND

Laparoscopic sleeve gastrectomy (LSG) has been introduced initially as the first of a two-stage procedure for the treatment of morbid obesity.^{1 2} However, owing to its simplicity and favourable outcome, effectiveness in weight loss and comorbidities resolution, LSG is being increasingly offered as a primary, stand-alone procedure.^{3–6} Early and late complications may occur and the most commonly encountered complications after LSG are: leaks, bleeding, stenosis and reflux.^{4 6–8} There are, however some key operative steps that ensure the safe execution of the procedure without any inherent complications.⁹ One of these steps is the use of an oesophageal bougie or calibration tube. This helps to avoid fashioning a narrowed gastric sleeve, ensures removal of enough stomach, and also guards against iatrogenic injury to the oesophagus during the firing of the last staplers near the gastro-oesophageal junction.

We report here the case of complete oesophageal transection during LSG and highlight the challenges faced during the late repair.

CASE PRESENTATION

A 35-year-old paraplegic man underwent LSG for morbid obesity (weight 140 kg) in a nearby private hospital. He was known to suffer from kyphoscoliosis of the thoracic spine, osteogenesis imperfecta and obstructive sleep apnoea on Bi-PAP at home. The procedure was carried out without the use of an oesophageal calibration tube due to a difficulty faced by the anaesthetist in administering one. The operative time was 120 min and was reported as uneventful. A contrast study on the first operative

day showed complete hold up of the contrast in the lower end of the oesophagus at level of the diaphragm. This was initially attributed to oedema, but the repeated study on the second day showed similar findings. Hence, oesophageal injury was suspected and the patient was transferred to our facility for further management. A CT scan carried out just before his transfer showed no abdominal collection, but left pleural effusion was evident. However, on arrival (postoperative day 3), he looked septic with a pulse rate 110 bpm, temperature 38.5°C and blood pressure 90/60. Review of the operative video ([figure 1](#)) clearly demonstrated complete oesophageal transection.

TREATMENT

After adequate workup and resuscitation, he underwent emergency exploratory laparotomy which revealed a large amount of offensive pus in the left subphrenic area which was drained. Thorough inspection of the gastric remnant revealed no leaks and the oesophageal stump was retracted and was barely visible through the oesophageal hiatus. Hence, no attempt was made to establish the oesophagogastric continuity. Moreover, a 'spit' fistula was decided against due to the fact that the patient's neck was short and deformed. Two abdominal drains and one left chest tube were inserted after copious abdominal lavage. Injection of methylene blue dye through an oesophageal tube revealed no abdominal or thoracic extravagations. A feeding jejunostomy tube was fashioned and he was nursed electively ventilated in intensive care unit. He was weaned off the ventilator on postoperative day 4, and transferred to the surgical floor.

On day 6, the abdominal drains were noted to contain air and saliva (200–300 mL/day), raising the suspicion of an oesophageal fistula which was confirmed by a fistulogram ([figure 2](#)). The drains were later removed and replaced by stoma bags and he was discharged home on jejunostomy tube feeding.

He was re-admitted 3 months later and prepared for exploratory laparotomy. Preoperative CT scan showed the transected end of the oesophagus, site of the oesophageal fistula and an incisional hernia ([figure 3](#)). During surgery, the old mid-line incision over the incisional hernia was reopened and the hernia contents were freed carefully to avoid injury to the transverse colon or small bowel. The adherent left lateral segment of the liver was also freed. The fistula was intubated and all attached small bowel loops in the epigastrium were freed to

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Figure 1 Laparoscopic views of the steps of oesophageal transection: (A) stapler application, (B) closure of the staple device around the oesophagus, (C) partial transection and (D) completely transected oesophagus.

Figure 2 Fistulogram showing a fistulous track leading to the lower end of the transected oesophagus with somewhat dilated oesophageal end.

identify the fistula track that leads to the oesophageal stump. A calibration tube was then passed orally to help identifying the oesophageal stump. The stump was mobilised to get extra-abdominal length and the fistula track was excised with refashioning of the stump. As the stomach remnant was 'fixed' and difficult to mobilise, a jejunal Roux loop distal to the feeding jejunostomy site (longer than the usual limb, but shorter than bariatric limb) was fashioned and a stapled end-to-side oesophago-jejunojejunostomy was performed. The abdominal wall defect was repaired using a biological mesh (Permacol, Covidien, France).

OUTCOME AND FOLLOW-UP

The patient did well postoperatively and a gastrograffin swallow was normal on postoperative day 6 (figure 4). He was started on liquid diet and discharged home.

He remained well (weight 58 kg) with the resolution of his obstructive sleep apnoea at 9-month follow-up.

DISCUSSION

LSG is a restrictive bariatric operation. It also has a hormonal and metabolic action as ghrelin (a hormone produced in the gastric fundus) is significantly decreased after LSG.¹⁰ This procedure was first introduced as a bridge towards definitive bariatric surgery in high risk super-obese patients.^{1 2} However, it is now increasingly used as a definitive treatment (primary stand-alone) procedure.³⁻⁶ LSG is associated with several advantages when compared with other bariatric procedures. LSG is more physiological as it preserves the natural anatomical passage

Figure 3 A preoperative CT scan showing the stapled lower end of the oesophagus with the fistulous track. The incisional hernia is also seen.

of the ingested food, does not involve creation of abnormal tracts, or placement of a foreign body. Moreover, it is reasonably safe, technically easy to perform and the resultant postoperative

Figure 4 A normal gastrograffin swallow on postoperative day 6 after the restoration of the oesophagojejunal continuity.

complications are easy to manage. LSG is however disadvantaged by the lack of long-term evaluation and the possibility of future weight regain.⁶

LSG has a number of key steps for a safe and complication-free procedure. Some of these steps help to minimise iatrogenic oesophageal injury. Such essential steps include full mobilisation of the fundus to the angle of His and division of all fundal attachments to the left crus. This manoeuvre serves to avoid leaving a large pouch of fundus at the top of the stomach, which may contribute to higher incidence of future reflux and weight regain.⁹ Also it ensures a clear identification of the gastro-oesophageal junction; thereby helping to avoid injury during the final stapler firing. Another very important step is the use of a calibration tube or bougie (size 42–46 F).⁹ This reduces the risk of creating a stenosed or narrowed pouch, ensures removal of enough stomach and also helps to protect the oesophagus from transaction. Nevertheless, bougies should be passed with caution to avoid injury to the gastro-oesophageal junction. We believe, the omission of this step has contributed immensely to this major complication. There was an apparent difficulty to insert the calibration tube, perhaps due to severe kyphoscoliosis and cervicothoracic spine deformity. In such a situation, the complication could have been prevented by passing a gastroscope down the oesophagus into the stomach. This may have acted as a calibration tube during the procedure. This key step is crucial and some authors routinely perform LSG under intraoperative gastroscopic control for calibration as well as for suture/staple line inspection.^{11 12} By adopting this technique as a standard procedure, postsurgical bleeding and cicatricial stenosis occur equally at a low rate of 2.6%.¹¹ Moreover, it is extremely important for the operating surgeon to be aware of hiatal anatomy and stay at least 1 cm away from

the gastro-oesophageal junction on the greater curvature side to avoid leaks in this area.

Failure to recognise the complete transection of the oesophagus in this case has led to difficulties in the subsequent management. Restoration of the gastro-oesophageal continuity was hampered by the presence of the subphrenic collection and sepsis. Review of the operative video clearly showed that the surgeon was dissecting and mobilising the abdominal oesophagus at the hiatus (figure 2). Had the complication been recognised during the initial operation, surgical repair of the damage may have been conducted laparoscopically—if adequate expertise is available—or may have prompted conversion to laparotomy and the performance of either a stapled oesophagogastronomy or oesophagojejunostomy. Oesophagogastronomy is more physiological than oesophagojejunostomy and it does not hamper a future bariatric procedure if this is contemplated. However, it is associated with more reflux and in this case was difficult to perform as the gastric remnant was densely ‘fixed’ posteriorly and adequate mobilisation was deemed difficult to achieve tension-free anastomosis.

There are several lessons to be learned from this case:

1. The indication for bariatric surgery may be doubtful in a wheelchair user with kyphoscoliosis. However, it could be argued that the obesity-associated comorbidities such as the obstructive sleep apnoea were sufficient indication. This problem has completely resolved on subsequent follow-up after weight reduction.
2. The use of a calibration tube or bougie in LSG is crucial especially during the sequential stapling process. If, for any reason, it is impossible to pass the tube as in this case, an

endoscope (36 F) is passed down the oesophagus to guard against fashioning a narrowed gastric sleeve. It also allows inspection of the staple line and protects the oesophagus during the last stapler firing. If this was carried out in this case, transection of the oesophagus would have been averted.

3. The complete dissection of the fundus to the angle of His and off the left crus of the diaphragm early on before starting the sequential stapling process. This may also contribute to the protection of the oesophagus and minimisation of leak at the gastro-oesophageal junction. Review of the operative video revealed that this key step was left till the end after finishing the entire stapling process.
4. There should be a low threshold for conversion from laparoscopic to open if in doubt or in the event of difficulties. This is one of the basic principles of safe laparoscopic surgery.

This case is reported to highlight the potential risk of oesophageal transection during LSG if adequate precautions to guard against this are not taken. It also suggests lines of surgical management in cases of late diagnosis.

Contributors A-WNM was the primary surgeon who managed the case, wrote the initial and final draft. OHA-S searched the literature and helped preparing the final draft.

Competing interests None.

Patient consent Obtained.

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Learning points

- Laparoscopic sleeve gastrectomy (LSG) is a safe surgical procedure for the treatment of morbid obesity.
- Certain key steps are adhered to during performance of LSG to avoid major intraoperative complications.
- Iatrogenic oesophageal transection can be averted by the routine use of bougie or calibration tube.
- If passage of a calibration tube proves impossible, an endoscope (size 36 F) is passed down the oesophagus into the stomach. This allows inspection of the staple line and protects the oesophagus from an unexpected iatrogenic transection.
- A staged repair of missed iatrogenic oesophageal transection is recommended.
 - First stage: evaluation of the injury and insertion of a feeding jejunostomy.
 - Second stage: restoration of the oesophagogastric or oesophagoenteric continuity.

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