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CASE REPORT

The Use of Over the Scope Clip (OTSC) Device for Sleeve Gastrectomy Leak

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Sleeve gastrectomy is increasing in popularity for the treatment of morbid obesity. The most significant complication posed is leak from the resection line. Typically, this occurs at the proximal end of the sleeve, adjacent the gastroesophageal junction. Such leaks can be notoriously persistent resulting in a chronic gastric fistula. Even when low in output, these fistulas rarely spontaneously resolve. It may mean months of poor health, multiple interventions and prolonged hospitalisation.

Various strategies have been employed to aid closure of a sleeve leak, including "drain and wait", stenting, biological glues, mesh plugs and mucosal clips, all with variable and unreliable success. Many cases ultimately come to complex revisional surgery employing resection or diversion as a solution, but sometimes yielding a less than ideal bariatric result.

A simple endoscopic solution would be ideal to this difficult problem and potentially shift the paradigm of leak management. We report two consecutive cases of managing sleeve leak using an *over-the-scope endoscopic clip* (OTSC) device which differs from standard mucosal endoscopic clips by attempting full thickness or near full thickness circumferential closure of the area of perforation and discuss the technical aspects of this procedure.

Case 1

A 58-year-old female with a BMI of 45 and associated comorbidity of depression, type II diabetes, hypertension and obstructive sleep apnoea underwent sleeve gastrectomy over a 36-Fr Bougie without intraoperative incident. Seamguard^{R} was used to reinforce the staple line proximally. Initial recovery was unremarkable and she was discharged on the fourth postoperative day tolerating oral fluids without difficulty. She presented on the eighth postoperative day with abdominal pain and fever, and a CT scan confirmed extra-luminal air adjacent the staple line but no fluid collection. Despite initial conservative management with intravenous antibiotics and nil by mouth, progression of peritonitis over 24 h led to laparoscopic intervention for drainage. After 6 weeks of conservative management with good sepsis control, the leak persisted and the OTSC (Ovesco, Tubingen, Germany) device was employed. Endoscopy revealed a small defect at the gastroesophageal junction (GOJ) with an "end on" view with extrusion of staples centrally (Figs. 1 and 2).

The patient was placed supine under general anaesthesia. A large bore gastroscope (Olympus GIF-ITQ 160) with a 3.7-mm working channel and an external diameter of 11.3 mm was first passed to confirm visibility of the fistulae. The mucosal edges of the fistulae were briefly "raised" with saline injection then a mucosal wound was created with argon plasma coagulation to encourage mucosal healing over the fistula's internal opening.

The scope was withdrawn, and the over-the-scope endoscopic clip fitted. This was a 12/6t clip. The fistulae was centred and suctioned into the "cap", followed by a controlled release of the clip. The position of the clip was checked and documented. Serial imaging after the procedure confirmed cessation of the leak. The 2-week endoscopic re-examination revealed presence of the endoscopic clip and an obliterated fistula (Fig. 3).

To date (i.e. 8 months post-operatively), there is no evidence of recurrent leak or sepsis and inflammatory markers remain normal. At 3 months, her percentage of excess weight loss was 56 % and at 6 months, 82 %.

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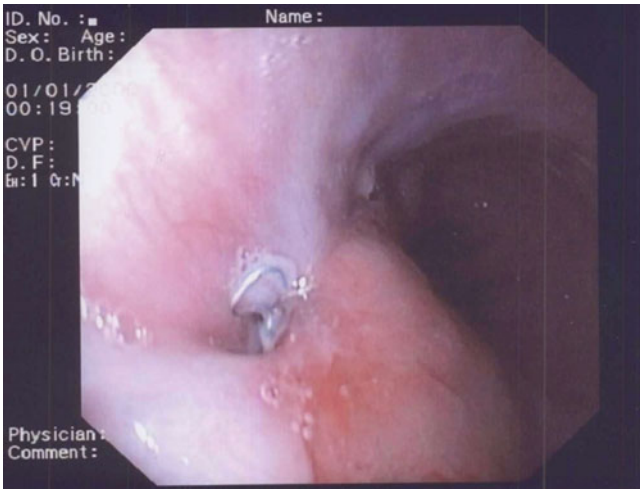

Fig. 1 End on view of fistula at gastroesophageal junction

Case 2

A 44-year-old lady was referred with a delayed gastric staple line leak (pain and fever) a month following revisional bariatric surgery. The surgery had been a conversion from laparoscopic adjustable gastric band to a sleeve gastrectomy. The surgeon had performed the procedure in a single stage and reinforced the staple line with Seamguard[R] and oversewing. Imaging confirmed a leak at the GOJ and a collection which was drained percutaneously. Nutritional support and antibiotics were instituted. Given the success of the previous case, consideration was given to using an OTSC (Fig. 4). Endoscopic assessment was performed confirming a leak point at the GOJ for which an end on view was obtainable.

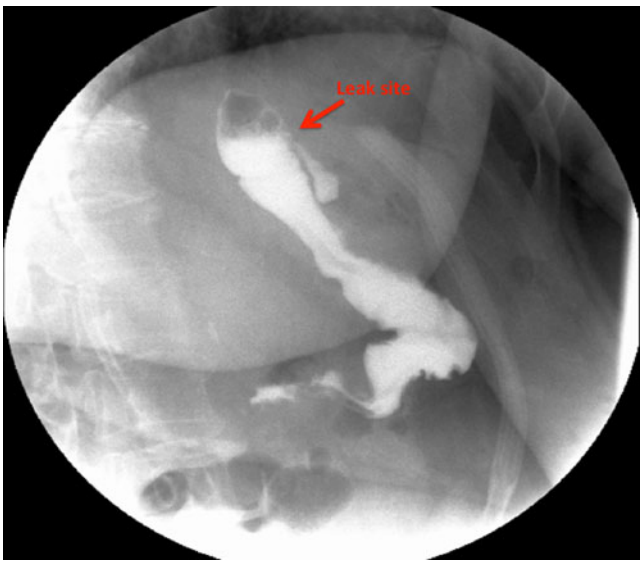

Fig. 2 Radiographic contrast study demonstrating fistula

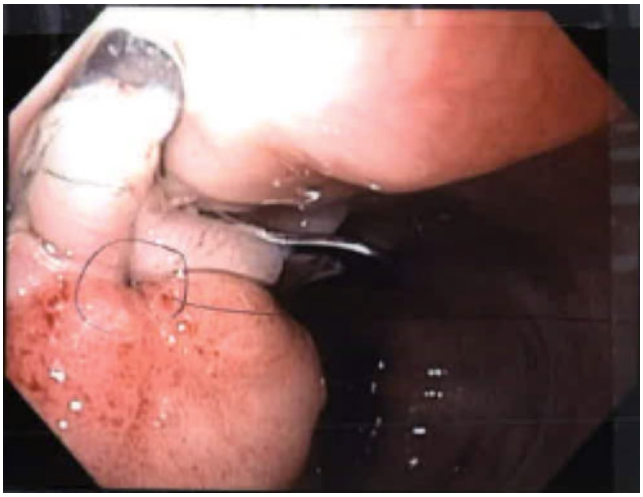

Fig. 3 Two-week endoscopic photograph 2 weeks post-OTSC application

An OTSC was applied in similar manner to the first case. A blue dye test following clipping was negative, and at 6 months post-endoscopic clipping, there has been no evidence of further leak and inflammatory markers remain normal.

Discussion

Gastric staple line fistula following sleeve gastrectomy is infrequent (<1 to 7 %),[1,2] but it is the difficulty of achieving closure that is most notorious. Reasons for this are somewhat speculative but most likely relate to a non-compliant tubular stomach with an intact pylorus creating high intraluminal pressure. Distal stricture, particularly likely at the incisura, is probably a key contributor in some cases although not in the cases reported here.[2]

Spontaneous closure is uncommon and many patients require further complex surgery for definitive closure.[2] As

Fig. 4 OTSC device by Ovesco, Tubingen, Germany. The clip is shown loaded on the "suction cap" ready for deployment. The graspers depicted were not used in this series

reported by others,[2–4] our experience with other means of attempting closure without major surgery have been generally poor.

Whilst the OTSC has been described in a variety of GIT leaks,[5] there are few descriptions of its use after sleeve gastrectomy. Conio and co-workers [4] described a single case with a 2-week follow-up. More recently, Surace and co-workers[6] published the use of the OTSC device in a heterogenous group of patients with gastrointestinal fistula. In their sub-analysis of 19 patients, there were 11 with gastric fistulas following sleeve gastrectomy with a successful closure rate of 91 %.[6]

Feasibility of any endoscopic closure needs to take into the account the narrow working space of a tubular gastro-esophageal junction, the size and orientation of defect and surrounding tissue quality. Both of these cases had internal fistula openings oriented as almost "end on endoscopic views" as compared to "side on views" which would be technically more challenging especially in a narrow working space. We utilised a "suction cup technique" (similar to that of endoscopic mucosal resection) to draw tissue up and around the defect for clipping; however, a number of specialised grasping forceps are also available for pulling tissue up into the cap prior to deployment. We did not use these devices as we were concerned about the potential of the jaws catching fast on the staples within the defect. However, with suitable conditions, these graspers may be ideal in inverting the oesophageal tissue allowing full thickness bites for the clip. Although our technique of suction was aimed at creating mucosal and submucosal flap closure over the defect, it is quite possible that deeper tissue was incorporated. This is perhaps evidenced in the fact that repeat endoscopy in case 1 at 8 months post-clipping demonstrated the clip to still be in situ.

The key difference between this clip device and the more readily available mucosal clips is that this device creates circumferential closure like a "bear trap" whilst mucosal clips rely on being able to bring mucosal edges of a wound together akin to sutures. The tissue at a chronic fistula does not lend itself well to this and such clips are not well secured.

The success of the OTSC technique in these two cases is encouraging. More cases are required to truly determine the range of applicability of this technique in managing sleeve gastrectomy leaks. However, it has the potential to significantly alter the consequences of this feared complication and simplify the paradigm of leak management, perhaps encouraging further the balance of risk in favour of sleeve gastrectomy.

Acknowledgments Photograph (Fig. 4—OTSC device) was kindly provided with written permission by Ovesco Endoscopy AG, Tubingen, Germany.

Conflict of interest Both authors have declared "no conflict of interest" with device usage and publication of manuscript.

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