



A novel silk suture-assisted laparoscopic technique for the repair of a gastrocolic fistula in a pediatric patient



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ABSTRACT

Percutaneous placement of gastrostomy was first described in 1980. Since then it has become widely used in pediatric surgery throughout the world. Inherent in the technique is the possibility of inadvertent damage to adjacent anatomical structures, most commonly the transverse colon. Management previously had involved laparotomy and correction of the gastrocolic fistula. Here we describe a novel laparoscopic approach to the repair of a gastrocolic fistula following percutaneous gastrostomy, avoiding the morbidity of laparotomy in an immunocompromised patient with a rotund abdomen secondary to steroid usage.

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Gastrostomy tube insertion is a common surgical procedure performed in pediatric patients, particularly in those with neurodevelopmental delay, failure to thrive and gastroesophageal reflux disease [1]. Percutaneous endoscopic gastrostomy (PEG) insertion was initially described in 1980 and very rapidly replaced the open approach to gastrostomy placement. In subsequent years, advances in interventional radiology and laparoscopic techniques have enabled image guided gastrostomy (IG), laparoscopic gastrostomy (LAP-G) insertion and laparoscopic-assisted PEG (LAP-PEG), all of which have become widely accepted alternatives [1,2].

Major complications are rare in all the modalities of gastrostomy placement, being lowest in laparoscopic (LAP-G) or laparoscopic-assisted procedures (LAP-PEG) [1]. Complications are lower in PEG than in IG insertion, being 1% and 3% respectively [2]. Gastrocolic fistula is one of the visceral injuries seen in the major complications. It is estimated to be around 1.2–3.5% [2,3]. The meta-analysis published by Baker et al. has highlighted a paucity of literature on the safety of IG in children [1] which creates difficulty in rendering specific risk attribution to this modality.

The mainstay of treatment of a gastrocolic fistula is by laparotomy although endoscopic closure has been reported [4]. To the best

of our knowledge, there have been no reports of a laparoscopic approach to this complication in children. Here we report the successful closure of a gastrocolic fistula using a laparoscopic technique in an immunocompromised patient.

1. Case report

A four year old female, delivered at term with normal birth weight, was admitted to Great Ormond Street Hospital following

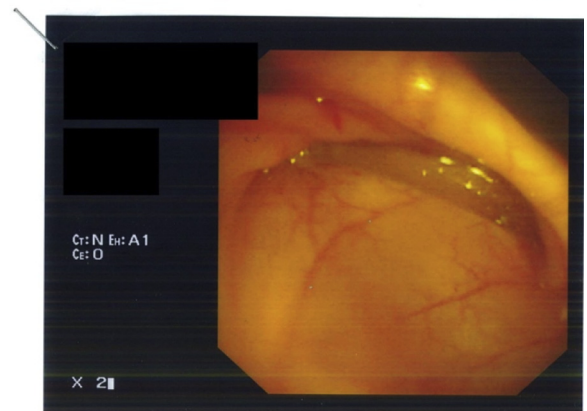


Fig. 1. Endoscopic view of fistula.

Competing interests: None.

Patient consent: Verbal consent was obtained.

Learning points: A laparoscopic approach is an alternative to laparotomy for repair of gastrocolic fistula following IG gastrostomy.

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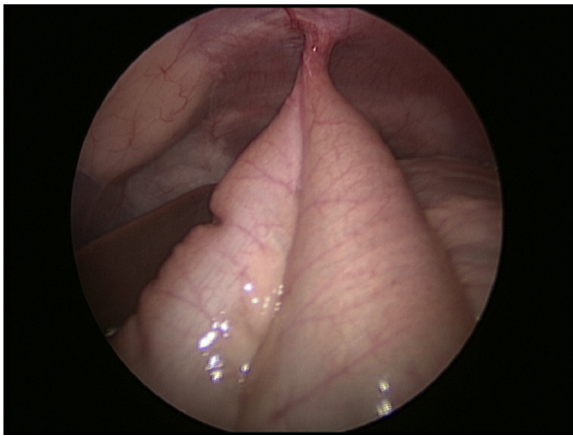


Fig. 2. Laparoscopic view. Splenic flexure attached to abdominal wall.

repeated respiratory illnesses on the background of Major Histocompatibility Complex Class II (MHC class II) deficiency, with a view for bone marrow transplant which she subsequently received. The patient developed feed intolerance and failure to thrive during her time at the hospital and it was decided that a gastrostomy insertion would be the most appropriate route to provide nutritional support.

The gastrostomy insertion was conducted using image guided radiology and no complications at the time of insertion were reported. post-operatively the gastrostomy was being used with no issues. The gastrocolic fistula was an incidental finding identified whilst the patient underwent an upper and lower endoscopy for chronic abdominal distension and constipation (Fig. 1).

The patient was referred to our unit for surgical management; her chronic abdominal distension was noted. Given her stable clinical condition, and a soft abdomen on palpation, the decision was made to attempt a laparoscopic approach to repair of the fistula due to the minimally invasive nature of the procedure as well as the patient suffering from chronic disease.

1.1. Surgical procedure

The surgical procedure was performed under general anesthetic, in a supine position. A size 0/0 silk tie was secured to the outer/external portion of the gastrostomy. An upper endoscopy was performed and the inner portion of the PEG extracted along with the silk suture.

Pneumoperitoneum was achieved at a pressure of 10 mm Hg and the flow 2 l/min.

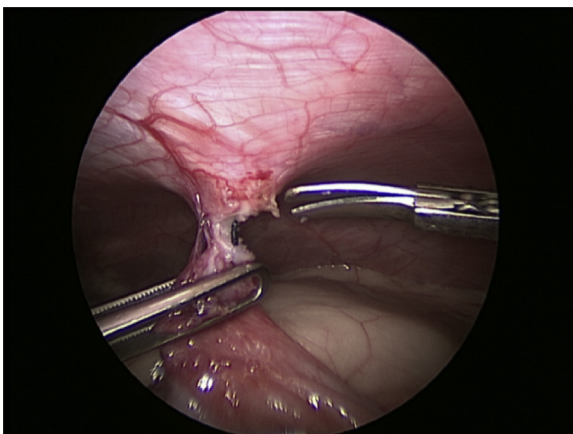


Fig. 3. Laparoscopic view. Splenic flexure being detached from abdominal wall. Silk suture visible.

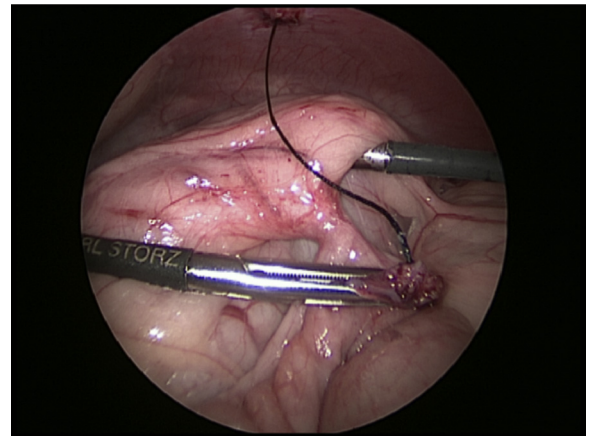


Fig. 4. Laparoscopic view. Gastrocolic fistula now visible. Silk suture passing from abdominal wall via the colon into the stomach.

A 5 mm camera port was inserted via a supraumbilical incision using an open Hassan technique. A 5 mm, 30° scope was then used. Despite the chronic abdominal distension, there was adequate visualization and sufficient working space to proceed with a laparoscopic procedure.

Two further 5 mm working ports were inserted and a third instrument via a stab incision (Fig. 2).

The splenic flexure was seen attached to the posterior surface of the abdominal wall (Fig. 3). It was detached using a combination of sharp dissection and diathermy. The silk suture was preserved to follow the tract of the gastrocolic fistula (see Fig. 4). Once the colon was brought down, the gastrocolic fistula became visible (see Figs. 4 and 5) and was divided.

The gastric perforation was repaired with 4/0 PDS interrupted sutures and covered with omentum. The posterior colonic perforation was repaired followed by the anterior perforation, using 4/0 Prolene (Figs. 6 and 7). A new PEG was inserted into the stomach in the traditional way (Fig. 8).

1.2. Post-operative course/outcome and follow up

The patient was extubated following the completion of the procedure. The gastrostomy was left on free drainage and the patient was kept nil by mouth for 48 h post-operatively. She had an uneventful recovery. The patient was successfully resumed on gastrostomy feeds following laparoscopic surgery.

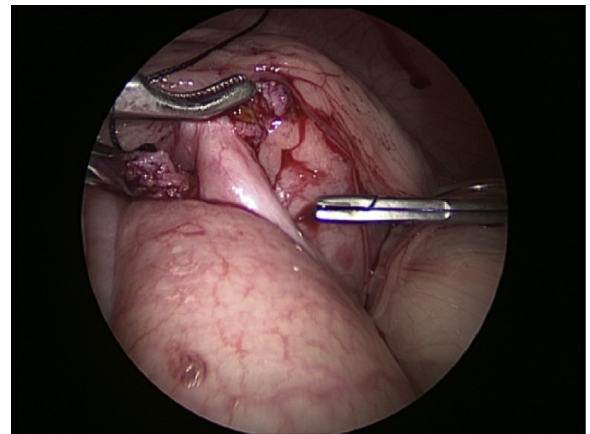


Fig. 5. Laparoscopic view. Gastrocolic fistula after division. Left instruments holding anterior and posterior colonic perforations. Silk suture between colon and stomach now divided.

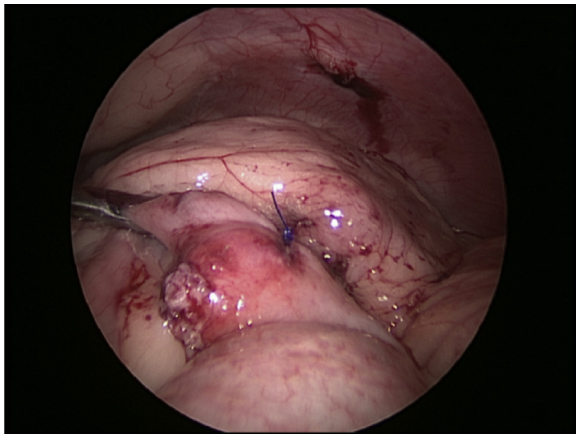


Fig. 6. Laparoscopic view. Gastric perforation repaired and covered with omentum. Remaining silk suture removed. Posterior colonic perforation repaired, anterior colonic perforation visible.

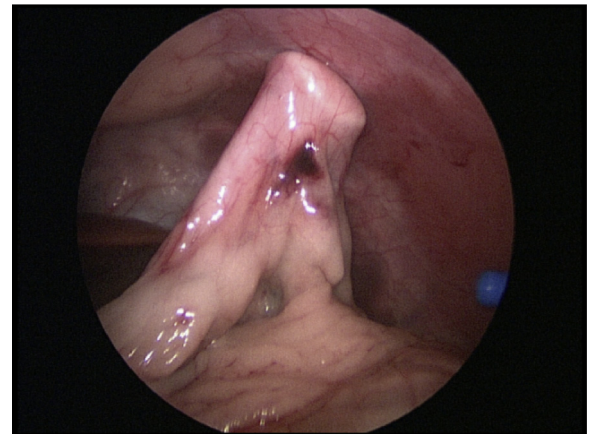


Fig. 8. Laparoscopic view. New PEG inserted in stomach.

2. Discussion

A gastrocolic fistula is an uncommon, but known complication of percutaneous IG gastrostomy insertion. Although there have been a very small number of reports of endoscopic repair in the literature [4,5], standard practice consists of an open laparotomy approach. Furthermore these reports have been on adult patients and there are currently no reports specifying alternative approaches to gastrocolic fistula repair in pediatric patients.

The open laparotomy approach has conventionally consisted of a transverse abdominal incision with evisceration of the bowel to locate and divide the fistula followed by repair of the affected visceral surfaces. The drawbacks of a laparotomy are the incision size, a more prolonged post-operative ileus and a latent lifelong risk of adhesive bowel obstruction.

Laparoscopy is now an established cornerstone in programs aimed at enhanced patient recovery [6]. This approach provides all

the inherent benefits of minimally invasive surgery, namely the smaller incisions, less pain and minimal handling of the bowel. The novel use of a silk suture as discussed, allows easy delineation of the false tract at laparoscopy which facilitates repair. Abdominal distention is a common deterrent for laparoscopy; however it did not impede surgery on this occasion.

3. Conclusion

This report outlines an alternative to repair a gastrocolic fistula secondary to IG gastrostomy insertion. As reported with all laparoscopic procedures, post-operative pain and ileus are reduced compared to open surgery. The latter would enhance recovery and decrease hospital stay. We recommend this laparoscopic approach to be considered, even in the presence of abdominal distension.

Acknowledgment

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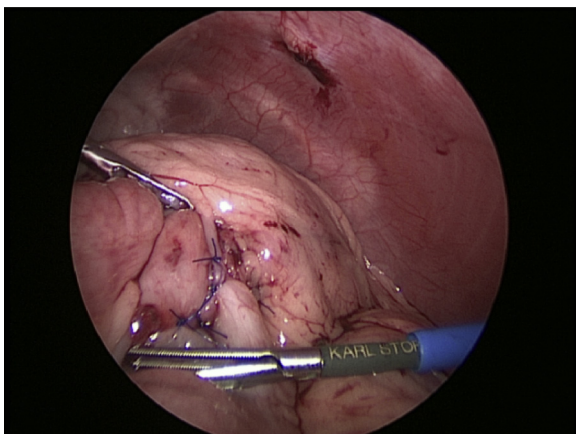


Fig. 7. Laparoscopic view. Anterior perforation repaired.