



Gastro-jejunostomy tube related intestinal perforation in an infant presenting incidentally with a splenic abscess



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ABSTRACT

Introduction: Gastro-jejunostomy tubes (GJT) are commonly used for enteral nutrition in patients with gastric feeding intolerance, gastroesophageal reflux, and those at high risk of aspiration. Complications are generally minor, however highly morbid complications exist, specifically in younger and smaller infants.

Case presentation: A 12 month old male with a history of long gap esophageal atresia presented for management of refractory esophageal stricture and intolerance of enteral feeds. To improve his nutritional status and enteral tolerance, he underwent conversion of his gastrostomy tube to a GJT with fluoroscopic guidance. Eight days later, a computed tomography scan of the chest obtained for preoperative planning incidentally noted a splenic abscess containing the tip of the GJT. The patient was taken to the operating room where diagnostic laparoscopy revealed a small bowel perforation at the ligament of Treitz (LOT), with the tip of the GJT embedded within the spleen. The tube was removed, the abscess was debrided, and the small bowel repaired. He completed a post-operative course of intravenous antibiotics and recovered without further complications.

Conclusion: While complications from GJTs are well described, this case uniquely highlights the risk of intestinal perforation from GJT, with a delayed and subtle presentation. We suggest that patients, specifically those under 12 months of age and weighing under 10 kg, be monitored closely for complications post-operatively, and the use of modified GJTs with jejunal limbs employing smaller/thinner feeding tubes that are placed well beyond LOT be strongly considered.

1. Introduction

Gastrostomy-jejunostomy tubes (GJT) are commonly used to provide enteral nutrition to pediatric patients with gastric feeding intolerance, as well as those with severe gastroesophageal reflux (GER), high risk of aspiration, and for those with either are unsuitable for or have a failed fundoplication. Complications of GJT are predominantly minor, however major complications resulting in significant morbidity and mortality do occur, with an increased prevalence in children under 12 months of age and weighing less than 10 kg [1]. We report a rare complication of small bowel perforation by a GJT with tube migration into the spleen and the formation of a splenic abscess. We review the factors that may have contributed to the perforation and offer recommendations for prevention of small bowel perforation caused by GJT.

2. Case presentation

Our patient is a 12 month old male (birth weight 3309 g, term

pregnancy) with a history of long gap esophageal atresia (LGEA), GER, patent ductus arteriosus, patent foramen ovale, and bilateral hearing loss. He underwent primary esophageal atresia repair with a gastric pull-up at 7 months of age and has a history of gastrostomy tube (GT) and GJT placement, complicated by several dislodged tubes and GJT balloon obstruction of the pylorus.

The patient presented to us from an outside hospital for further management of a refractory esophageal stricture. Shortly after admission, he underwent conversion of his GT to a GJT in Interventional Radiology. A MIC-KEY GJT (16Fr, 1.0 cm stem, 15 cm jejunal limb; Halyard Health, Inc.) was placed with the tip near the ligament of Treitz (LOT) (Fig. 1). Weight on day of GT to GJT conversion was 10.21 kg. Given concerns for GER as a contributing factor to his refractory esophageal stricture, he remained nil per os (NPO) on total parenteral nutrition (TPN) and started slow advancement of enteral feeds through the jejunostomy tube. His GT remained to gravity drainage for gastric decompression. On post-procedure day 4, patient became febrile to 40 degrees Celsius and had a white blood cell count (WBC) of 27,000 cells per microliter with a left shift (neutrophil/band 79.6%). He was

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Fig. 1. Fluoroscopic image post-placement of the gastro-jejunoscopy tube with the tip at the ligament of Treitz (LOT). Note the upward or cephalad direction of the jejunoscopy tip, likely exerting pressure or tenting the LOT.

otherwise asymptomatic with no abdominal pain, was tolerating his jejunal feeds, and had no obvious signs of an infectious source. Given presence of central venous line, blood cultures were drawn and empiric antibiotics (intravenous [IV] vancomycin and piperacillin/tazobactam) were started. Blood cultures remained negative and he completed a 48 h course of antibiotics. No other diagnostic studies were completed and fevers resolved.

On post-procedure day 8, he underwent computed tomography (CT) of his chest to evaluate his airway and mediastinal vasculature for further operative planning of his esophageal stricture. On the upper abdominal images from the CT of the chest, the spleen was incidentally observed to have the GJT tip residing within it along with a small fluid and air collection surrounding the tip (Fig. 2). At this time, the patient was asymptomatic, with vital signs within normal limits and a benign abdominal exam. He had been tolerating jejunal feeds and WBC and electrolytes were unremarkable.

The patient was taken to the operating room on post-procedure day 9. The procedure began with laparoscopic exploration. The splenic flexure of the colon was mobilized to expose the suspected area of perforation at the LOT. The GJT tip was identified entering the spleen. The GJT was removed the splenic abscess was drained and the small bowel perforation site (at the LOT, Fig. 3) was debrided and closed in layers. An intraoperative upper endoscopy was performed to visualize the repair site and perform a leak test which was negative. The GJT was replaced with a MIC-KEY GT (14Fr, 1.2 cm stem), which was left to



Fig. 2. Computed tomography demonstrating tip of the gastro-jejunoscopy tube residing in the midst of the spleen with a small fluid and air collection surrounding the tip.

gravity drainage. A Jackson-Pratt drain was placed to bulb suction with the tip in the left hemiabdomen.

Postoperatively, the patient remained on IV piperacillin/tazobactam for a 10 day course and remained NPO on TPN. The Jackson-Pratt drain was removed on postoperative day (POD) 3. On POD 6 and 23, he underwent evaluation of the repair site via upper gastrointestinal endoscopy, demonstrating an intact repair site (Fig. 4). At the time of the second endoscopy, the GT was replaced with a modified GJT where a 6Fr Corpak® feeding tube was placed via the jejunal limb of an 14Fr AMT GJT after the jejunal limb was cut just beyond the gastric balloon segment [2,3]. The tip of the tube was passed well beyond the LOT (Fig. 5); JT feeds were resumed and the GT remained open to gravity for drainage. The patient remained inpatient for further management of esophageal stricture.

3. Discussion

We present a case that highlights an uncommon, but potentially highly morbid complication from the use of a GJT: intestinal perforation. This case describes GJT placement with jejunal tip at the LOT and the use of a relatively thick, rigid tube in a young infant. More importantly this case provides insight into how such a complication may be prevented by ensuring that the jejunal tip placement is well beyond the LOT and by considering a modified GJT with a thinner and softer jejunal limb in younger infants. Furthermore, we place our case into the context of the existing literature on the topic and highlight additional learning points.

3.1. Indication for GT versus GJT

GT and GJT are widely accepted methods of providing enteral nutrition in patients with failure to thrive, risk of aspiration, inadequate caloric intake, GER, and swallowing dysfunction [4]. Due to the high risk of complications of GJT, GT are often considered the preferred enteral feeding method [5]. However, GJT should be considered when patients require enteral feeding but have gastric feeding intolerance, gastroparesis, microgastria, medically refractive GER, as well as in those in which fundoplication has been unsuccessful or is not an option [6]. The most common indication for GJT placement is for the management of GER for patients with aspiration risk, whereas the GJT is considered an acceptable alternative to fundoplication [1]. Severe GER is seen in a significant number of esophageal atresia patients and is often safely managed with GJT placement for gastric decompression and post-pyloric feeding [7].

3.2. Complications of GT and GJT

Complications of GT and GJT have been widely studied and are categorized into minor and major complications. Minor complications are generally related to mechanical complications, including tube dislodgement, leakage, and balloon rupture, as well as those that often do not require a procedural intervention, such as granulation tissue, stoma site leakage, tube blockage, and stoma site infection or cellulitis [1,4]. Major complications are those potentially resulting in significant morbidity or mortality, including intussusception, gastrointestinal bleeding, and intestinal perforation with potential for peritonitis and sepsis [1,4].

A study of 253 GT and GJT in 208 patients (82% GT, 16% GJT) by Friedman et al. found that 73% of all patients experienced minor complications including tube dislodgement, tube leakage, site infection, tube migration, tube obstruction, and intussusception, while 5% experienced major complications including peritonitis, subcutaneous abscess, septicemia, GI bleed, and death [4]. An additional study of 159 GJT insertion attempts on 48 children by Morse et al. found that patients experienced minor complications, including granulation tissue, luminal block, stoma leak, erythema, and cellulitis, an average of twice per year. Complications requiring tube removal or replacement,

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