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Attention to small details: big deal for gastrostomies

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Gastrostomy tubes are used in the pediatric population when long-term enteral feeding is needed. A common method of placement is percutaneously with endoscopy (PEG, percutaneous endoscopic gastrostomy). Although PEG placement is a straightforward procedure most of the time, it can be associated with a significant rate of minor complications and a smaller but significantly important rate of major complications. Some of these complications may also occur after any type of gastrostomy. We will present representative case studies outlining major complications and discuss how we may be able to prevent them at the time of PEG insertion or during PEG to low-profile button gastrostomy exchange. The proposed guidelines apply to all types of gastrostomies.

First introduced by Gauderer and Ponsky in the 1980s, percutaneous endoscopic gastrostomy (PEG) has become a popular method for placing gastrostomy tubes.[1] It has largely replaced the surgical open gastrostomy for adult and pediatric patients.[2,3] Consensus statements on the indications and contraindications to PEG placement have been outlined by the European Society for Clinical Nutrition and Metabolism guidelines on artificial enteral nutrition, but these mainly target adult patients.[2] There are currently no consensus statements on PEG placement, their perioperative care, as well as the timing of PEG exchange to low-profile gastrostomy button in the pediatric population. Some of the advantages of PEG over open gastrostomy are the absence of laparotomy, less incisional pain, quicker recovery with shorter procedure time, allowing for decreased length of stay, and reduction in costs.[2]

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Whereas minor complications related to PEG placement, such as cellulitis, leakage around the tube, or granulation tissue at the gastrostomy site, are common, these will not be addressed in this article. The following case reports will be used to demonstrate the major complications that we have experienced, and the fact that some of the complications are common to all types of gastrostomy techniques.

Case #1: Gastrocolocutaneous fistula

We present the case of a 12-year-old boy with neurologic impairment. He suffers from Moyamoya disease with swallowing dysfunction, previous strokes, significant constipation, and scoliosis. The PEG insertion was performed without difficulty. One year later, under gastroscopy, the PEG was exchanged for a 20-Fr Mic-Key (Kimberly-Clark Worldwide Inc., www.kchealthcare.com/mic-key) balloon-type gastrostomy button. At the time of retrieval of the PEG and insertion of the new Mic-Key, it was noted that the gastroenterologist needed to use a biopsy forceps as a guidewire from the stomach to the skin level because of a tortuous tract. One

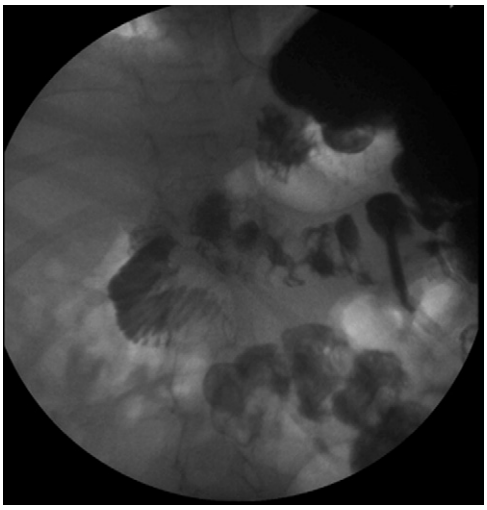

Figure 1 Case 1: Water-soluble contrast through gastrostomy shows gastro-colonic-cutaneous fistula.

month later, the foster parents of the child noticed that his gastrostomy tube had a very foul odor and that it was leaking, requiring them to change it almost every 2 weeks. He had also developed significant diarrhea with weight loss. About 5 months after switching over to the Mic-Key gastrostomy, the patient presented to the emergency room with feculent vomiting and with stool per the gastrostomy. A water-soluble contrast study through the gastrostomy showed prompt opacification of the transverse colon and the rest of the colon distally (Figure 1). A portion of the stomach was also noted to be opacified on later images, as well as the duodenum and part of the small bowel. He underwent laparotomy with division of the gastro-colo-cutaneous fistula by stapler, with creation of a new 16-Fr Stamm gastrostomy. The patient was found to have a very well-epithelized fistula tract from the posterior wall of the stomach on to the top portion of the transverse colon and then out to the skin.

Case #2: Peritonitis

A 13-year-old female was referred to surgery for placement of a gastrostomy tube. She had significant longstanding medical problems, including severe encephalopathy with microcephaly, spastic quadriplegia, scoliosis, mental retardation, epilepsy, and chronic feeding difficulties. Her weight was 26 kg, the same as it had been when she was 10 years old. Oral feeding was difficult and was accompanied by choking, causing a significant risk of aspiration. She underwent placement of a PEG (Entristar 16 Fr, 1.7 cm; Kendall, Mansfield, MA) which was well tolerated. Feedings were progressed, and the child was discharged the following day to her hometown, which was more than 3 hours away.

About 4 months later, there were concerns about a granuloma at the tube site and some leakage around the tube, thought to be caused by a partial tube obstruction from one of the child's anticonvulsant medications. The decision was made that the tube was no longer working well, and the child was brought to clinic for a tube change. The Entristar button was changed to a 16-Fr, 2.5-cm balloon-type skin level tube without difficulty. A gastrostomy feeding was attempted by the mother before discharge; the child cried during the gavage and seemed uncomfortable, but this was not brought to the surgeon's attention and the family returned home. Later that day, she was again gavaged 330 mL of formula and given her anticonvulsants. Around supper time, she was noted to have deterioration in her general status, with peripheral cyanosis, hypotonia, followed by fever. She arrived at the emergency room of the peripheral hospital in the middle of the night in septic shock with peritonitis. She was resuscitated and taken to the operating room for laparotomy. The button was found to be inserted directly into the peritoneal cavity with the stomach at the gastrostomy site still partly adherent to the abdominal wall. The child underwent washout of the peritoneal cavity and was transferred to the intensive care unit. Discussion was held with the family, and the decision was made not to perform cardiopulmonary resuscitation if needed. She died several hours later.

Case #3: Benign pneumoperitoneum

A 7-month-old girl, an ex-premature baby born at 33 weeks gestation, was suffering from swallowing impairment secondary to neurologic problems. She had a 16-Fr PEG insertion during which the anesthetist had requested that the gastroenterologist stop gastric insufflation because of ventilatory compromise that quickly resolved once insufflation of the stomach was stopped. The rest of the placement was without incident. The patient went home the next day tolerating feedings; however, she returned to the emergency room 3 days later with feeding intolerance and a distended abdomen with increasing irritability. She was afebrile but did have a slightly elevated white blood cell count with neutrophilia. On examination, she was noted to be very irritable and her abdomen was distended but soft. Abdominal x-rays were impressive for a large amount of pneumoperitoneum (Figure 2). Water-soluble contrast study through the PEG gastrostomy showed opacification of the stomach with prompt flow into the duodenum and proximal small bowel. There was no obvious extravasation of contrast. An exploratory laparotomy was done, which showed a tense pneumoperitoneum but with no hollow viscus injury. As such, the PEG was tightened. The patient did well postoperatively and tolerated feedings.

Case #4: Enterocutaneous fistula

A baby boy born with congenital diaphragmatic hernia, which was repaired at 12 days of life, underwent fundopli-