VIDEO CASE REPORT

Endoscopic ultrasound-guided gastrojejunostomy with lumen-apposing metal stent in a boy with neurological impairment requiring jejunal feeding

Valerio Balassone, MD, PhD,[1] Francesco Maria Di Matteo, MD,[2] Chiara Imondi, MD,[3] Teresa Capriati, MD,[4] Paola De Angelis, MD[5]

BACKGROUND AND AIMS

Significant undernutrition is reported in 13% to 52% of children with neurodevelopmental disabilities (NPDC).[1,2] Oropharyngeal dysphagia (90%), gastroesophageal reflux (50%-75%), delayed gastric emptying (67%), and/or ineffective esophageal peristalsis (61%) are associated with undernutrition. Moreover, nearly all NPDC have 1 or more comorbidity that negatively affects feeding and worsens GI symptoms such as retching and bloating, requiring prompt gastric decompression.[3-5]

When jejunal feeding is recommended,[3,6] long-term access is represented by jejunal tube introduction through gastrostomy (percutaneous endoscopic gastrojejunostomy [PEGJ]), surgical gastrojejunostomy (SJ), or direct percutaneous endoscopic jejunostomy (DPEJ).[1-8] Because PEGJ allows both gastric decompression via PEG and simultaneous jejunal nutrition via PEGJ, it is the preferred method, especially in NPDC who are unfit for surgery. However, PEGJ is associated with technical adverse events that compromise its long-term durability, such as tube clogging or retrograde dislodgement, necessitating repeated hospitalization: the average duration of PEGJ in NPDC is 39 days.[9,10] Furthermore, the frequent replacement of a jejunal tube is not free from risk: major adverse events are reported in 5% to 12% of cases.[9-11]

SJ (open or laparoscopic) is effective in the management of gastric outlet obstruction (GOO) but is limited by its invasiveness and morbidity, mainly related to an unfriendly anatomy. DPEJ is a tubeless option, but its diffusion is limited by high procedural failure rates (20%-30%)[10-12] and difficult management of the concomitant decompressive gastrostomy.

Endoscopic ultrasound-guided gastrojejunostomy with lumen-apposing metal stents (LAMSs) is a novel, minimally invasive technique for the palliation of malignant GOO. An overall clinical success rate of 80% has also been reported for benign GOO (eg, chronic pancreatitis or pyloric stenosis) but does not support the rerouting of a PEJ-tube.[12-16] To our knowledge, the use of this technique in NPDC to reroute a jejunal tube has not been reported previously, and the technique could be considered in other clinical scenarios to reduce the risk of PEJ tube dislodgement.

METHODS

A 17-year-old boy (weight, 28 kg) with severe neurological impairment and dystonic syndrome resulting from neonatal kernicterus in jejunal feeding was referred to us for repeated PEGJ tube dislodgment. Severe scoliosis and osteopenia, slow gastric emptying, retching, and GERD

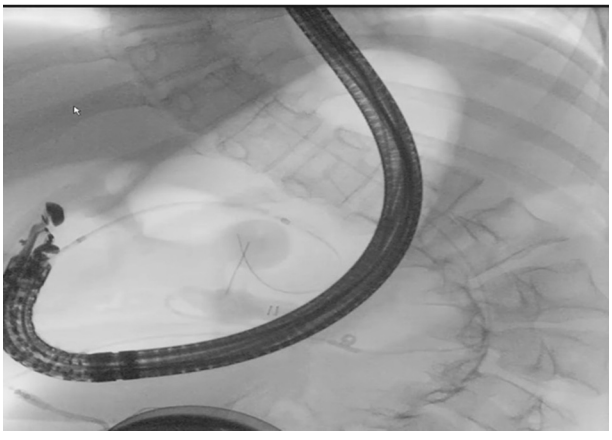

Figure 1. X-ray guided filling-catheter placement. Note the severe scoliosis.

Figure 2. Target bowel loop filling with saline solution, indigo carmine, and hydrosoluble contrast.

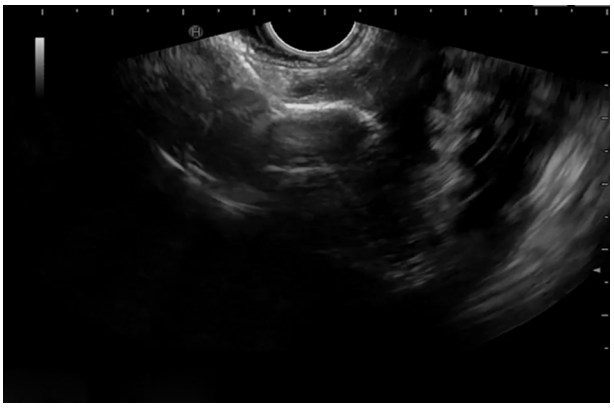

Figure 3. Lumen-apposing metal stent distal flange is opened and the lumen-apposing metal stent is retracted under EUS and x-ray guidance.

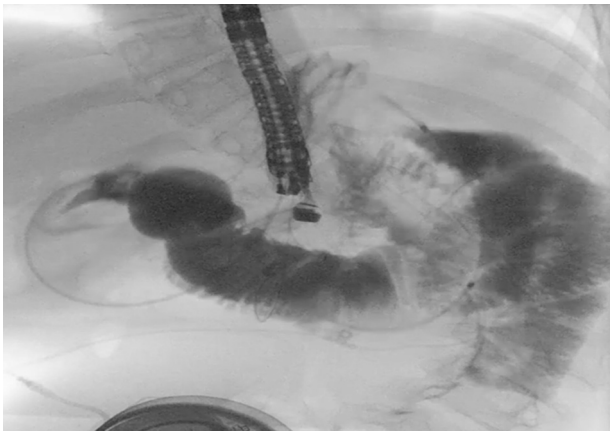

Figure 4. Gastrojejunostomy is completed. Contrast medium passes through the lumen-apposing metal stent.

were associated. In the past 2 years, because of repeated displacement of the gastrojejunal tube, the patient experienced repeated hospitalization, and parenteral nutrition was necessary. On the last endoscopy, a low-profile 16F PEG was placed; however, gastric feeding was not tolerated. SJ and DPEJ were considered as secondary options. Thus, we attempted an EUS-guided LAMS-assisted gastrojejunostomy.

RESULTS

The procedure (Video 1, available online at www.giejournal.org) was performed with fluoroscopy and with the patient under general anesthesia. A linear echoendoscope (Pentax EG38-J10UT, PENTAX Europe GmbH Hamburg, Germany) was used. The target bowel loop was filled with saline solution, indigo carmine, and contrast with a catheter (Figs. 1 and 2). A cautery-tipped 15- × 10-mm LAMS (Hot Axios; Boston Scientific, Marlborough, Mass) was employed to create the gastrojejunostomy under EUS and fluoroscopy guidance (Fig. 3). The

Figure 5. Distal flange of the lumen-apposing metal stent is placed into the stomach.

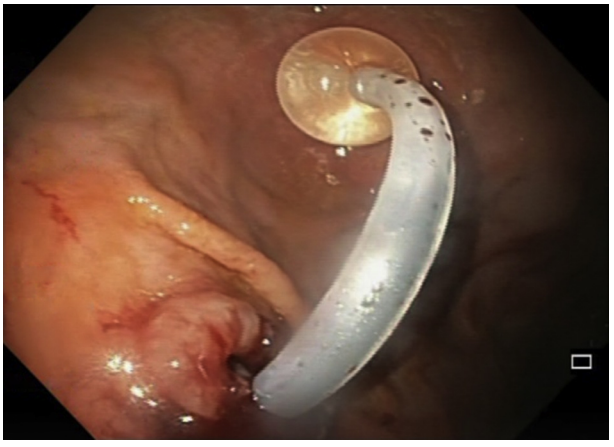

Figure 6. Percutaneous endoscopic jejunostomy tube placed through the gastrojejunostomy after the removal of lumen-apposing metal stent, 6 months after its placement.

correct position of the LAMS was confirmed by fluoroscopy (Fig. 4). The LAMS position in the stomach was 5 cm from the PEG bumper (Fig. 5). Six months later, the LAMS was removed, and the gastrojejunostomy was easily intubated with a standard gastroscope. Both afferent and efferent jejunal loops were explored. The PEJ tube was placed from the stomach into the efferent jejunal loop through the gastrojejunostomy under x-ray guidance (Fig. 6). Three months after rerouting, 55% of caloric intake tolerance by jejunal feeding and a 5-kg improvement in weight were obtained, with a progressive autonomization from parenteral nutrition.

CONCLUSIONS

PEGJ rerouting through an EUS-guided, LAMS-assisted gastrojejunostomy may prevent dislodgement of the PEGJ tube and facilitate jejunal feeding in NPDC. Ethical and cost-effectiveness considerations are awaited.

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviations: DPEJ, direct percutaneous jejunostomy; GOO, gastric outlet obstruction; LAMS, lumen-apposing metal stent; NPDC, children with neurodevelopmental disabilities; PEGJ, percutaneous endoscopic gastrojejunostomy; PEJ, percutaneous endoscopic jejunostomy; SJ, surgical gastrojejunostomy.

REFERENCES

1. Romano C, van Wynckel M, Hulst J, et al. European Society for Paediatric Gastroenterology, Hepatology and Nutrition Guidelines for the Evaluation and Treatment of Gastrointestinal and Nutritional Complications in Children with Neurological Impairment. J Pediatr Gastroenterol Nutr 2017;65:242-64.
2. Sullivan PB, Lambert B, Rose M, et al. Prevalence and severity of feeding and nutritional problems in children with neurological impairment: Oxford feeding study. Dev Med Child Neurol 2000;42:674-80.
3. Dipasquale V, Gottrand F, Sullivan PB, et al. Top-ten tips for managing nutritional issues and gastrointestinal symptoms in children with neurological impairment. Ital J Pediatr 2020;46:35.
4. del Giudice E, Staiano A, Capano G, et al. Gastrointestinal manifestations in children with cerebral palsy. Brain Dev 1999;21:307-11.
5. Penagini F, Mameli C, Fabiano V, et al. Dietary intakes and nutritional issues in neurologically impaired children. Nutrients 2015;7:9400-15.
6. Romano C, Dipasquale V, van Winckel M, et al. Management of gastrointestinal and nutritional problems in children with neurological impairment: a survey of practice. J Pediatr Gastroenterol Nutr 2021;72:e97-101.
7. Marchand V, Motil J. Medical position paper: Nutrition support for neurologically impaired children: A clinical report of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition. Lippincott Williams & Wilkins; 2006.
8. Blumenstein I, Shastri YM, Stein J. Gastroenteric tube feeding: techniques, problems and solutions. World J Gastroenterol 2014;20:8505-24.
9. Zhu Y, Shi L, Tang H, et al. Current considerations in direct percutaneous endoscopic jejunostomy. Can J Gastroenterol 2012;26:92-6.
10. Zheng B, Wang X, Ma B, et al. Endoscopic stenting versus gastrojejunostomy for palliation of malignant gastric outlet obstruction. Dig Endosc 2012;24:71-8.
11. Cravero JP, Blike GT, Beach M, et al. Incidence and nature of adverse events during pediatric sedation/anesthesia for procedures outside the operating room: report from the pediatric sedation research consortium. Pediatrics 2006;118:1087-96.
12. Tyberg A, Perez-Miranda M, Sanchez-Ocaña R, et al. Endoscopic ultrasound-guided gastrojejunostomy with a lumen-apposing metal stent: a multicenter, international experience. Endosc Int Open 2016;4:E276-81.
13. Tringali A, Giannetti A, Adler DG. Endoscopic management of gastric outlet obstruction disease. Ann Gastroenterol 2019;32:330-7.
14. Stefanovic S, Draganov PV, Yang D. Endoscopic ultrasound guided gastrojejunostomy for gastric outlet obstruction. World J Gastrointest Surg 2021;13:620-32.
15. Perez-Miranda M, Tyberg A, Poletto D, et al. EUS-guided gastrojejunostomy versus laparoscopic gastrojejunostomy: an international collaborative study. J Clin Gastroenterol 2017;51:896-9.
16. Yamamoto K, Itoi T. Recent developments in endoscopic ultrasonography-guided gastroenterostomy. Int J Gastrointest Interv 2020;9:177-83.

Digestive Endoscopy and Surgery Unit, Bambino Gesu' Children's Hospital, IRCCS, Rome, Italy (1), Therapeutic Digestive Endoscopy Unit, Campus Biomedico University, Rome, Italy (2), Digestive Endoscopy and Surgery Unit, Bambino Gesu' Children's Hospital, IRCCS, Rome, Italy (3), Nutritional Rehabilitation and Gastroenterology, Bambino Gesù Children's Hospital, IRCCS, Rome, Italy (4), Digestive Endoscopy and Surgery Unit, Bambino Gesu' Children's Hospital, IRCCS, Rome, Italy (5).

If you would like to chat with an author of this article, you may contact Dr Balassone at valerio.balassone@gmail.com.

https://doi.org/10.1016/j.vgie.2022.03.001