

# Endoscopic treatment of a gastrocutaneous fistula in a child

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## ABSTRACT

**Introduction.** Gastric leaks and gastrocutaneous fistulae (GCF) after digestive surgery are unusual in children. Common treatments are based on conservative measures and surgery but endoscopic techniques are not a widespread option in pediatrics.

**Case report.** An underweight child developed a GCF after surgery (esophagocoloplasty with right colon). It was managed endoscopically, placing double J ureteral stents (DJUS) with one tip in the gastric lumen and the other tip exiting through the cutaneous orifice via the fistula. A laminar drain was used to evacuate the intra-abdominal cavity. The patient was fed with a gastro-jejunal tube and the diameter of DJUS was reduced progressively. Ninety-two days after the initial endoscopic therapy the gastric orifice was closed. There were no severe complications or recurrences.

**Discussion.** The relevance of this case lies in the low prevalence of this complication and in the innovative endoscopic approach in children, which was safe and effective.

**KEY WORDS:** Gastric fistula; Child; Endoscopy, gastrointestinal; Therapeutics.

## TRATAMIENTO ENDOSCÓPICO DE UNA FÍSTULA GASTROCUTÁNEA EN UN NIÑO

### RESUMEN

**Introducción.** Las fugas gástricas y las fístulas gastrocutáneas (FGC) tras una cirugía digestiva son poco frecuentes en niños. Los tratamientos habituales consisten en cirugía y medidas conservadoras, pero las técnicas endoscópicas no son una opción extendida en pediatría.

**Caso clínico.** Paciente pediátrico con déficit ponderal que desarrolló una FGC tras una intervención quirúrgica (esofagocoloplastia con colon derecho). La FGC se abordó por vía endoscópica, colocándose catéteres ureterales doble J (CUDJ) con un extremo en la luz gástrica y el otro saliendo por el orificio cutáneo a través de la

fístula. Se empleó un drenaje en tejadillo para evacuar la cavidad intraabdominal. El paciente recibió alimentación a través de una sonda gastroyeyunal y progresivamente se redujo el diámetro de los CUDJ. A los 92 días de la terapia endoscópica inicial se cerró el orificio gástrico. No se registraron complicaciones graves ni recidivas.

**Comentarios.** La relevancia de este caso reside en la baja prevalencia de esta complicación y en lo innovador del abordaje endoscópico en niños, que resultó seguro y eficaz.

**PALABRAS CLAVE:** Fístula gástrica; Niños; Endoscopia digestiva; Terapia.

## INTRODUCTION

Gastric or esophagogastric leaks and fistulae after surgery are severe complications which increase morbidity and mortality significantly. In children, gastrocutaneous fistulae (GCF) are quite common following the removal of a gastrostomy tube but are unusual after other upper gastrointestinal interventions<sup>(1)</sup>. In adults, bariatric surgery procedures entail a considerable risk for these events: the prevalence of leaks is approximately 18% although fistulae are less frequent<sup>(2)</sup>.

Therapeutic endoscopy with double pigtail stents (DPS) has been used increasingly for the treatment of leaks after bariatric surgery<sup>(3,4)</sup>. The main principles of this therapy are reduction of luminal spillage, internal drainage of the fluid collection (into the digestive lumen) and creation of a foreign body reaction which promotes healing<sup>(2,5)</sup>. Considering these principles, Liagre described a modification of this procedure for GCF, in which the drainage of the fluid collection was external and the foreign body reaction was achieved by a Kehr T-tube (KT) which was placed in the gastric lumen, passed through the fistula and came out through the skin<sup>(6,7)</sup>. These types of endoscopic approach are exceptional in children. A case of a pediatric patient with a GCF who was treated using these endoscopic techniques is described herein.

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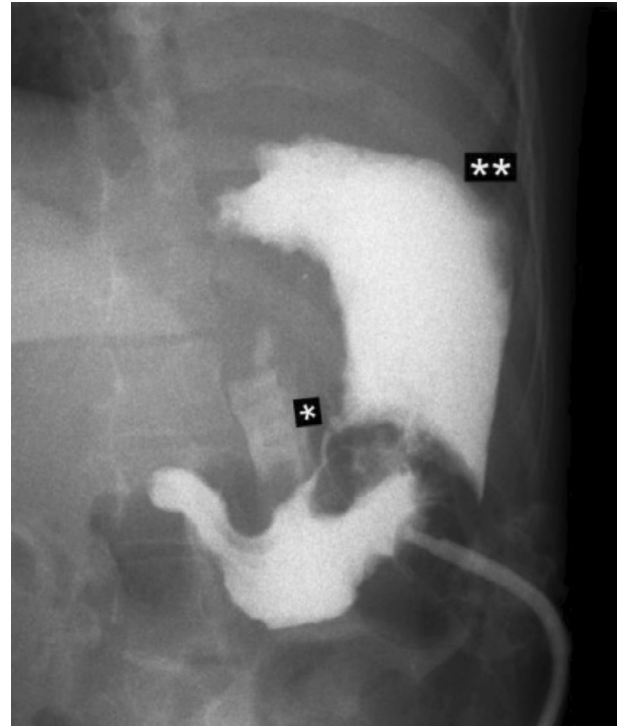
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## CASE REPORT

A thirteen year-old patient with major neurological impairment, underweight (14 kg) and severe gastroesophageal reflux disease (GERD) had undergone three previous surgeries for recurrent GERD: laparoscopic Nissen funduplication plus gastrostomy, laparoscopic Collis-Nissen and open Nissen procedure. The patient was operated on to treat a chronic esophageal stricture, secondary to GERD, which did not respond to dilatations. Surgery consisted of esophageal replacement with interposition of the right colon in a retrosternal tunnel, closure of the previous gastrostomy and creation of a new gastrostomy. Sutures and anastomosis were performed using handsewn techniques.

On the ninth postoperative day, the patient developed a surgical site infection in the laparotomy incision. Four days after, a cutaneous fistula appeared through the scar of the previous gastrostomy, which drained purulent and gastric contents. An upper gastrointestinal contrast study showed a gastric leak and confirmed the diagnosis of GCF (Fig. 1).

Initially, the management was conservative: complete fasting, parenteral nutrition, broad-spectrum antibiotics and a stoma bag over the skin defect; the infection at the laparotomy site was treated using negative pressure wound therapy. However, the GCF persisted with a constant volume of gastric content. Three weeks afterwards, the patient underwent an endoscopy with a 5.9 mm gastroscope (2 mm working channel), via the new gastrostomy. A 5-6 mm diameter orifice was found in the gastric fundus, near the colo-gastric anastomosis. Five days later, another endoscopy was performed. Through the working channel of the gastroscope, a 0.64 mm-260 cm guidewire was inserted in the GCF and exteriorized through the skin defect. The endoscope was removed and a DPS (10 Fr-3 cm) was advanced over the guidewire under fluoroscopic control. One end of the DPS was left in the gastric lumen and the other in the abscess cavity, although this tip could not be completely folded due to the morphology and limited size of the space. A laminar drain was left in the abscess cavity exiting through the cutaneous orifice of the GCF and a gastro-jejunal tube (GJT) was placed. Jejunal enteral feeding was started and the patient was discharged. Two weeks after, the volume of gastric leakage through the laminar drain did not decrease. An endoscopy confirmed the migration of the DPS which was completely in the stomach, so the device was removed. The Liagre method, employing double J ureteral stents (DJUS) instead of Kehr tubes, was applied. A 5.9 mm gastroscope was inserted through the gastrostomy and a 0.64 mm-260 cm guidewire was introduced across the GCF, from the gastric lumen to the skin orifice. Then, two DJUS (4 Fr-24 cm and 3 Fr-12 cm) were pushed over the guidewire from the skin, positioning the inner tip in the gastric lumen under endoscopic control. The external tip of the DJUS was fixed to the skin with sutures to reduce the risk of migration. The

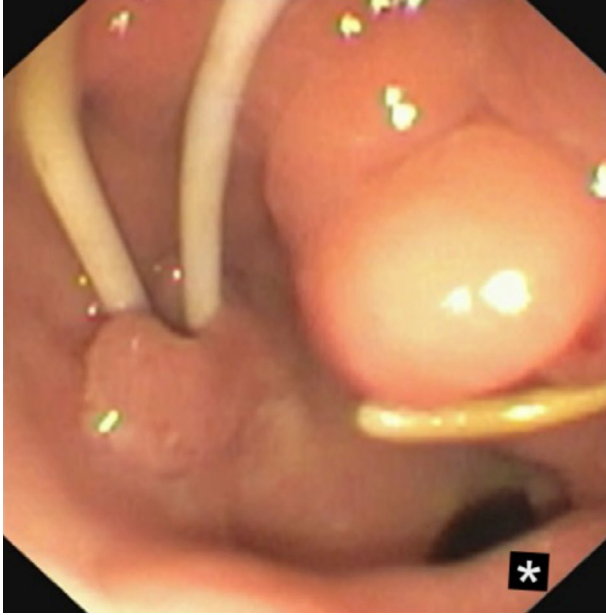


**Figure 1.** Upper gastrointestinal contrast study for the diagnosis of the fistula. Contrast was administered by the gastrostomy tube and showed a gastric leak which filled an intra-abdominal abscess cavity and finally flowed out through the skin defect. \*: Gastric leak. \*\*: Intra-abdominal cavity.

gastric mucosa surrounding the inner part of the GCF was cauterized with monopolar coagulation (spray mode, 25-30 Watts) using a 0.81 mm-150 cm, adapted metal guidewire inserted through the gastroscope channel. Finally, the GJT was repositioned and a laminar drain was put in the intra-abdominal cavity. The external parts of the drain and DJUS were kept in a stoma bag, attached around the skin orifice. The patient was discharged in 24 hours. One week after, the drainage output decreased (Fig. 2).

Two elective endoscopies were performed, 3 and 9 weeks after the placement of the DJUS, to assess de evolution of the GCF. In the second one, the diameter of the fistula in the gastric wall was clearly smaller. Therefore, a single 4.5 Fr-22cm DJUS was placed and the gastric mucosa was cauterized (Fig. 3). Three additional endoscopies were required due to complications of the GJT: one episode of migration and two episodes of obstruction.

Ninety-two days after the initial endoscopic therapy (DPS) and 78 days after the Liagre procedure, the diameter of the fistula was minimal, so the DJUS was retrieved. A transit study showed no gastric leaks and the laminar drain was removed (Fig. 4). The patient started enteral feedings with a gastric tube, there was no output through the previous fistulous tract and the skin orifice healed by second intention.



**Figure 2.** Endoscopic view. Two double J ureteral stents placed through the fistula. \*: *Gastro-colic anastomosis performed in the surgical procedure.*



**Figure 3.** Endoscopic view. One double J ureteral stent placed through the fistula.



**Figure 4.** Upper gastrointestinal contrast study after the endoscopic treatment. Contrast was administered by the gastric channel of a gastro-jejunal tube and filled the stomach and the distal part of the colon used for the esophagocoloplasty. No leaks were observed. \*: *Contrast retained from a previous study in the splenic angle of the colon and the left colon.*

## DISCUSSION

Endoscopic therapies of GCF after major surgery are rare in children. The most common treatments are conservative management or surgery. In this case, early conservative measures were not successful. The endoscopic therapy was justified by several clinical features. Firstly, multiple previous surgeries could have created a “hostile abdomen”, making the abdominal access difficult<sup>(8)</sup>. Secondly, after an eventual open approach, the abdominal wound infection near the GCF would have increased the risk of subsequent infections and failure in the closure of both the fistula and the surgical incision.

Although a DPS was used initially, it turned out to be too big for the patient and could not be placed adequately. Considering the size and consistency of the DPS, the technique described by Liagre appeared to be more suitable in this case. This procedure is based on the placement of a KT from the stomach to the skin, through the gastric disruption. Liagre described an endoscopic approach whereas other authors employed laparoscopy for the placement of the KT<sup>(7,9)</sup>. DJUS were preferred over KT because they could be managed quite easily after the insertion of a guide-wire through the fistula with endoscopic guidance. Besides, their size allowed to leave one of the tips in the gastric lumen while the other tip exited through the skin and their consistency was adequate to minimize internal injuries.

The fact that this was the first case using this technique in children might have influenced a rather cautious approach. The interval of time until stent removal was clearly larger in our patient than in other series describing

the use of DPS (92 days vs. 40-60 days). Also, the number of endoscopies was higher in our patient (8 procedures vs. a median of 3)<sup>(10,11)</sup>. However, when compared with Liagre's patients, these differences were lower (mean of 86.4 days with KT retention)<sup>(7)</sup>.

Three of the endoscopies were performed mainly to solve complications with the GJT. Other works suggest the use of nasojejunal tubes, but this patient had undergone an esophagocoloplasty plus a gastrostomy, so a GJT was employed<sup>(5,11)</sup>. Despite the problems, we believe that the GJT was beneficial because enteral nutrition is paramount to keep a stable nutritional status in these cases.<sup>9</sup> The patient managed to gain weight during the process, avoiding total parenteral nutrition.

Migration of the initial DPS was another complication. Possibly, this was favored by the size of the device in relation to the low weight of the child, although dislodgement of pigtail stents is a common problem in these therapies<sup>(2,7)</sup>.

Several advantages were found with the endoscopic management of this case like low invasiveness and safety for the patient. Endoscopies were performed with deep sedation and no need for endotracheal intubation. Follow-up endoscopic procedures did not require prolonged hospitalization periods and the patient was discharged within 24 hours. The gastrostomy performed in the surgical intervention was used to introduce the endoscope into the stomach straightaway, saving endoscopic time by the avoidance of the colon route (consequence of the esophagocoloplasty). Some disadvantages emerged with this treatment, in addition to the number of endoscopies and total length of the treatment. The difficulty to find age/size suited material was solved by adapting devices used in other common endoscopic therapies like DJUS and metallic adapted guidewires for coagulation. These problems were already described by other authors who also adjusted material for endoscopic treatments in children<sup>(12)</sup>.

The endoscopic treatment was a safe, effective technique for the closure of GCF. We suggest considering this approach especially in children with a hostile abdomen or when conventional surgical treatments are deemed high-risk.

## INFORMED CONSENT

The informed consent for the publication of this work was obtained from the family of the patient, who was a minor child.

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