

Roux-en-Y partial volvulus in biliary-digestive reconstruction in children

Vólvulo segmentario de la Y de Roux en la reconstrucción biliodigestiva en niños

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Abstract

Various complications occur after a biliary-digestive reconstruction. Volvulus of a segment of the biliodigestive loop has not been described. Two patients who underwent biliodigestive bypass, years later, began with sudden and intense abdominal pain, associated with a volvulus with necrosis of a segment of this biliodigestive loop. This complication occurred many years after the initial correction, and manifested with sudden abdominal pain without impaired liver function, as occurred in these patients.

Keywords: Portoenterostomy. Roux-en-Y hepaticojejunostomy. Intestinal volvulus.

Resumen

Diversas complicaciones pueden ocurrir después de una reconstrucción biliodigestiva. El vólvulo de un segmento del asa biliodigestiva no ha sido descrito. Dos pacientes operados de derivación biliodigestiva, años después iniciaron con dolor abdominal súbito e intenso, asociado a un vólvulo con necrosis de un segmento de la asa interpuesta. Se ha descrito el vólvulo de toda el asa interpuesta, pero no el de solo una pequeña porción de esta. La complicación ocurrió muchos años después de la corrección inicial y se manifestó con dolor abdominal súbito sin deterioro de la función hepática, como sucedió en estos pacientes.

Palabras clave: Anastomosis porto-yeyunal. Anastomosis hepático-yeyunal. Vólvulo intestinal.

Introduction

Various complications can occur after biliodigestive reconstruction for choledochal cyst or biliary atresia^{1,2}. These complications can be either medical or surgical. Among the former, cholangitis is undoubtedly the most common, reported in up to 7% of patients³. Other

medical complications include ascites, central venous catheter thrombosis, respiratory failure, and worsening liver failure^{1,4}. Surgical complications are rare⁵. Hemorrhage, originating from portal vein injury, has been reported in up to 5% of cases^{6,7}. Less frequently reported are portal vein thrombosis and bleeding at the biliodigestive anastomosis¹. Among surgical complications, there is a higher incidence rate of inguinal

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hernias in children who have undergone Kasai procedures vs the general population⁷.

Complications related to the Roux-en-Y loop reported so far include intestinal obstruction due to transmesenteric herniation of the intestine⁸, leak at the distal anastomosis reported in up to 3% of case⁷, and even intestinal intussusception at the bilioenteric anastomosis in patients with a choledochal cyst². Volvulus of the entire Roux-en-Y loop has been described for biliodigestive bypasses and bariatric diversion procedures, yet not in a segment of the loop. Additionally, volvulus of the entire loop is an early complication of this type of bypass⁹⁻¹².

The objective of the present manuscript is to report 2 cases of patients who underwent biliodigestive bypass and later presented with an acute, segmental volvulus of the interposed loop, with circulatory compromise but without cholestasis.

Case report #1

An 18-year-old female underwent a Kasai portoenterostomy at 65 days of life for type 3 biliary atresia. She had an adequate postoperative course with normalization of bilirubin levels and liver function tests by 4 months of age and received prophylactic antibiotics and steroids for 4 months after the Kasai surgery. She experienced 2 episodes of cholangitis at 12 and 26 months of age, both of which resolved with IV antibiotics. Eighteen years later, the patient presented with sudden-onset severe abdominal pain (10/10) that had been continuous for 4 hours and worsened with movement, along with nausea and vomiting of gastric contents. On physical examination, she showed signs of pain, mild dehydration, and abdominal tenderness with decreased bowel sounds. Lab test result revealed hemoglobin 14.2 g/dL, hematocrit 42.6%, leukocytes $11.2 \times 10^3/\mu\text{L}$, platelets 185,000, ALT 45 U/L, AST 28 U/L, GGT 45 U/L, total bilirubin 1.2 mg/dL, indirect bilirubin 0.7 mg/dL, direct bilirubin 0.5 mg/dL, and alkaline phosphatase 224 U/L. A plain abdominal X-ray showed small air-fluid levels in the left hypochondrium without signs of intestinal obstruction (Fig. 1). A contrast-enhanced abdominal CT scan with axial views from the lung bases to the pelvic cavity showed a target sign with a cystic image inside and retrograde dilation in the biliodigestive loop (Fig. 2). Diagnostic laparoscopy revealed bloody fluid and evidence of a necrotic loop (Fig. 3). Procedure was converted, and a 5 cm segmental volvulus of the biliodigestive loop caused by an adhesion, with circulatory compromise (Fig. 4) was found 10 cm away from the jejunal



Figure 1. Plain X-ray showing air-fluid levels in the left hypochondrium, normal air distribution, without signs of intestinal obstruction.



Figure 2. Contrast-enhanced abdominal CT scan showing a target sign with a cystic interior and retrograde dilation in the biliodigestive loop.

anastomosis. The damaged loop was resected, and a termino-terminal anastomosis was performed. Oral intake was initiated after 72 hours, and the patient was uneventfully discharged 5 days after surgery. The patient remains asymptomatic at the 1-year follow-up.

Case report #2

A 5-year-old boy, operated on for a type I choledochal cyst at 1 year and 7 months of age, underwent cyst resection and hepatojejunal anastomosis with an



Figure 3. Diagnostic laparoscopy showing a necrotic loop.



Figure 4. Segmental volvulus of the biliodigestive loop caused by an adhesion, with circulatory compromise.

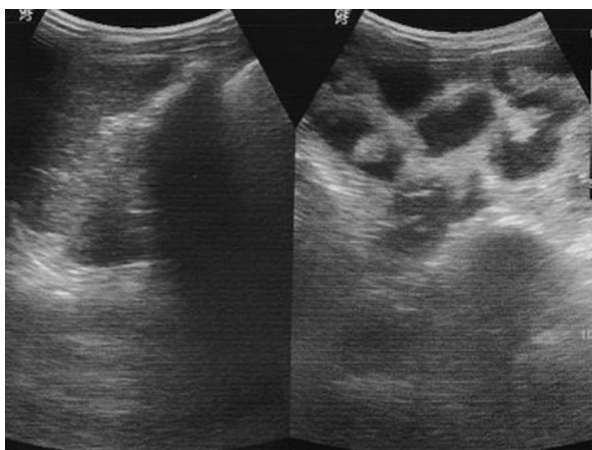


Figure 5. Abdominal ultrasound showing intestinal dilation below the liver, in the interposed loop topography.

adequate postoperative course. Four years later, he exhibited intense, acute colicky abdominal pain, along



Figure 6. Segmental volvulus of the interposed biliodigestive loop.

with nausea and vomiting of gastric contents. Lab test results revealed hemoglobin 15.3 g/dL, hematocrit 46.6%, leukocytes $9.2 \times 10^3/\mu\text{L}$, platelets 285,000, ALT 53 U/L, AST 26 U/L, GGT 49 U/L, total bilirubin 1.0 mg/dL, indirect bilirubin 0.5 mg/dL, direct bilirubin 0.5 mg/dL, and alkaline phosphatase 275 U/L. An abdominal ultrasound revealed intestinal dilation below the liver, corresponding to the interposed loop (Fig. 5). During laparotomy, a 5 cm segmental volvulus of the interposed loop was found (Fig. 6), which was resected, and a termino-terminal anastomosis was performed 10 cm from the jejunum. Oral intake was initiated on postoperative day 5, with good tolerance, being the patient uneventfully discharged on day 6. The patient remains asymptomatic at the 2-year follow-up.

Discussion

After a biliodigestive bypass, various complications can occur^{1,4,6}. These can be medical or surgical, with the former being more common.¹ The most frequent is cholangitis^{9,13}. Early surgical complications include hemorrhage from the portal vein, intussusception at the base of the interposed loop, portal vein thrombosis, and bleeding at the Roux-en-Y anastomosis. Late obstruction of the biliodigestive loop due to a transmesenteric hernia manifesting as cholestasis with elevated bilirubin levels has been reported in some liver transplant recipients⁸. In long-term survivors of the Kasai procedure who have obstruction of the Roux-en-Y, it shows as sudden deterioration of liver function^{14,15}. The reported cases correspond to patients who had a good postoperative course—one case of biliary atresia and another choledochal cyst—with normalization of liver function tests. In both cases, the condition had a sudden onset, with the main symptom being intense abdominal pain and signs of peritoneal

irritation, but without laboratory changes. In one patient, the CT scan showed a dilated loop in the mesogastrium, which was later found to be the dilated biliodigestive loop, and in the other, the ultrasound also revealed a dilated loop below the liver. Laparoscopic exploration was chosen initially, as it was not possible to rule out other causes of acute abdomen, and a volvulus with circulatory compromise of a short segment of the Roux-en-Y loop was found. Volvulus of the entire interposed loop has been reported in both biliodigestive reconstruction and bariatric surgery^{11,12}, but volvulus of just one segment of the loop with circulatory compromise and late onset has not been reported, as occurred in the cases described here. This complication should be considered in patients who have undergone biliodigestive reconstruction and present with sudden and intense pain. They should be treated as soon as possible to avoid peritoneal or hepatic complications.

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Conflicts of interest

None declared.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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