

## Transplanted liver graft ischemia caused by pediatric ERCP in the prone position

Endoscopic retrograde cholangiopancreatography (ERCP) for biliary complications after liver transplant is safe and useful in children and adults [1–3]. Here, we report a very rare case of a child in whom liver graft ischemia developed after therapeutic post-transplant ERCP.

A 5-year-old boy, who had received a living donor liver transplant with a reduced left lateral segment graft [4] for Alagille syndrome at 1 year of age, was admitted for cholangitis. Magnetic resonance imaging revealed a bilioenteric anastomotic stricture and hepatolithiasis. ERCP with a short double-balloon enteroscope (EI-530B; Fujifilm, Tokyo, Japan) was performed while the patient was under general anesthesia and in the standard prone

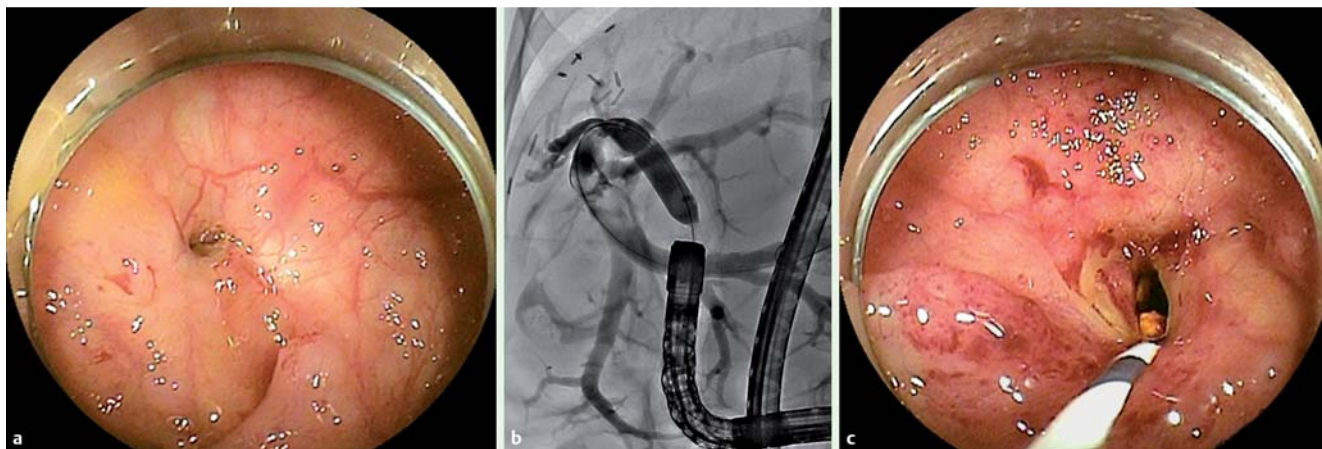
position. After the anastomosis had been reached, balloon dilation, stone removal, and the placement of three plastic stents were completed without complications within 2 hours (Fig. 1). However, 2 hours after ERCP, abdominal pain and acutely elevated liver enzymes (aspartate aminotransferase, 5433 IU/L; alanine aminotransferase, 2161 IU/L; lactate dehydrogenase, 2018 IU/L) occurred. Computed tomography revealed a lesion with delayed enhancement and a nonenhanced geographic lesion in the liver graft; the lesions had the appearance of a cylinder whose center axis passed through the top, ventral part of the graft, irrespective of the hepatic segment (Fig. 2), suggestive of hepatic ischemia with partial

infarction. Fortunately, the liver dysfunction decreased with infusion therapy (Fig. 3), so that another transplant was avoided. However, 3 months later, the patient's liver volume had slightly decreased (Fig. 4).

Hepatic ischemia has been described after prolonged surgery in the prone position [5] but not after ERCP, to the best of our knowledge. In this case, the distribution of a lesion with delayed enhancement on computed tomography suggested that this hemodynamic change had been induced by prolonged, excessive pressure on the liver graft, which protruded ventrally, when it was compressed between the spine and operating table while the patient was in the prone position. Therefore, it is important to note the size and location of a liver graft before a post-transplant patient undergoes ERCP.

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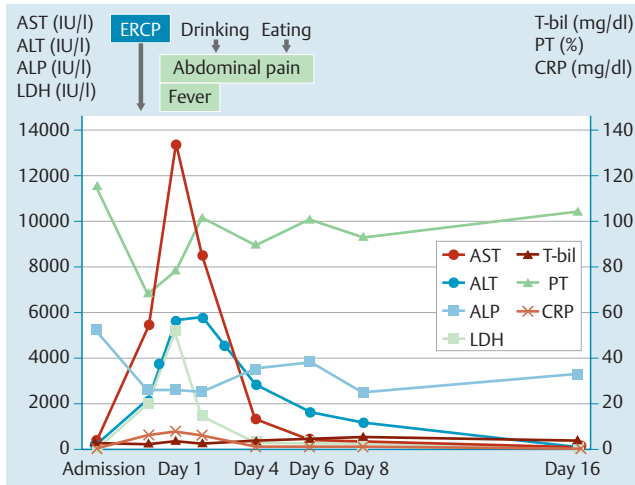
Competing interests: None



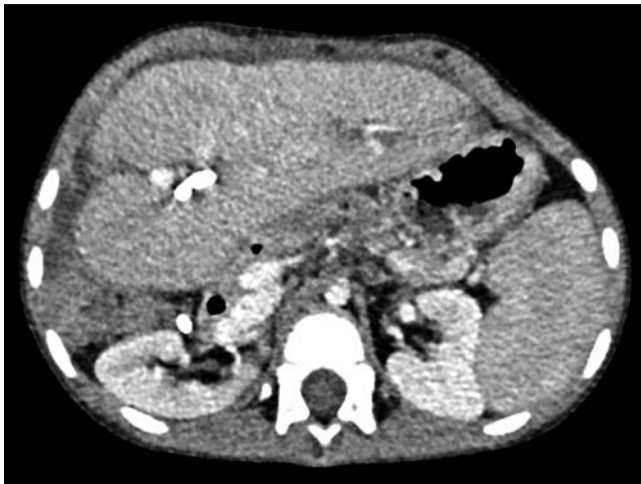
**Fig. 1** Therapeutic post-transplant endoscopic retrograde cholangiopancreatography. Endoscopic and cholangiographic views obtained with a short double-balloon enteroscope showing: **a** a bilioenteric anastomotic stricture; **b** a balloon dilation (8-mm diameter) of the anastomotic stricture; and **c** a widely patulous anastomosis.



**Fig. 2** Computed tomography at 1 day after endoscopic retrograde cholangiopancreatography. **a** Coronal image. **b** Axial image. **c** Three-dimensional image of a lesion with delayed enhancement.



**Fig. 3** Course of clinical symptoms and hematologic test results. AST, aspartate aminotransferase; ALT, alanine aminotransferase; ALP, alkaline phosphatase; LDH, lactate dehydrogenase; ERCP, endoscopic retrograde cholangiopancreatography; T-bil, total bilirubin; PT, prothrombin time; CRP, C-reactive protein.



**Fig. 4** Computed tomography at 3 months after endoscopic retrograde cholangiopancreatography.

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