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CASE REPORT

Intraductal deployment of two fully covered metallic stents for anastomotic strictures following living donor liver transplantation

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Introduction

Biliary complications are common following liver transplantation. Anastomotic strictures occur in 4—9% of patients and are more common with living donor liver transplant (LDLT) due to interruption of the donor and recipient blood supply from high hilar dissection [1]. Historically, plastic stents have been inserted to resolve strictures, although they are at risk of migration and stent occlusion, and their efficacy at resolving strictures is low, leaving patients often requiring multiple ERCPs or the need for biliary reconstruction [2]. Standard fully covered self-expandable metal stents (FCSEMS) obstruct the contralateral hepatic duct as anastomotic strictures occur above the hilum in LDLT [3].

Case report

We describe a case of a 41-year-old male with a history of alcohol related cirrhosis, complicated by recurrent ascites and encephalopathy. His past medical history included diabetes mellitus only. He underwent an LDLT with a 780 g modified right lobe graft with a cold ischaemic time (CIT) of 3 hours and 41 minutes. The graft had its segment V and segment VIII hepatic veins reconstructed with a Y-shaped cadaveric iliac vein graft anastomosed to the joined orifice of the recipients' middle and left hepatic vein. There was a portal vein trifurcation in the donor liver resulting in 2 separate portal veins for the right anterior and right posterior sectors. This was reconstructed using the recipient's portal vein and its bifurcation. There were 2 separate donor liver bile ducts; one was anastomosed to the recipient's right hepatic duct and the other to the recipient's cystic duct. There was a single right hepatic artery, which was anastomosed to the recipient's right hepatic artery.

Six months post-transplant, liver graft function became more cholestatic with mild jaundice (ALP 723 IU/L, AST 51 IU/L, ALT 115 IU/L, GGT 175 IU/L, Bili 42 μmol/L). An MRI scan demonstrated intrahepatic biliary dilatation and a patent hepatic artery. He underwent an ERCP, which demonstrated strictures of both biliary anastomoses with upstream duct dilatan. A small sphincterotomy was performed and the strictures were both dilated to 6 mm with a Hurricane balloon (Boston Scientific). Two 12 cm plastic stents (Boston Scientific) were inserted across the anastomoses — a 10 French gauge stent via the cystic duct and 7 French gauge stent via the right recipient bile duct. There were no

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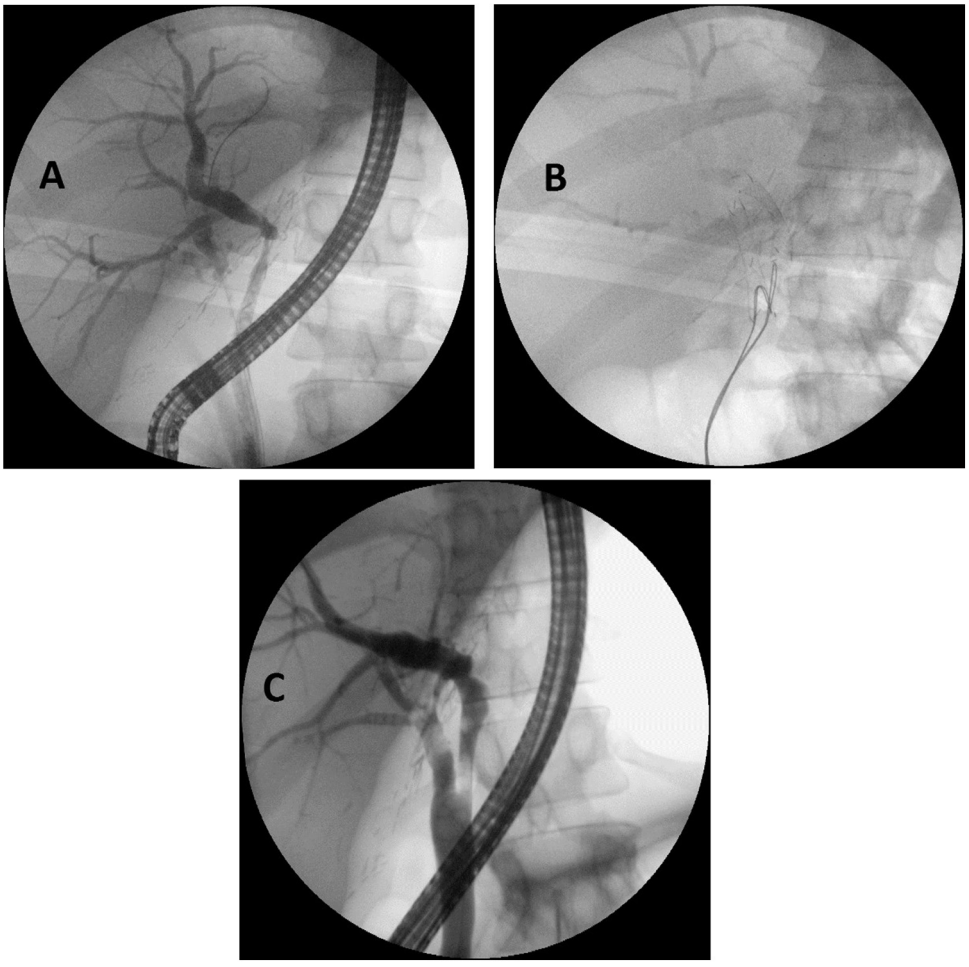

Figure 1 Cholangiograms showing residual bilateral anastomotic hepatic duct strictures after the removal of previously inserted plastic stents (A). 8 mm × 40 mm Kaffes stents were inserted across both anastomotic strictures (B). The stents were then removed with complete resolution of both strictures (C).

early or late complications post procedure. Following plastic stent insertions, liver function improved (ALP 369 IU/L, ALT 27 IU/L, GGT 189 IU/L, Bili 24 μmol/L). Two months later he underwent a further ERCP to assess the strictures. After both stents were removed, a cholangiogram showed persistent strictures of both anastomoses (Fig. 1A). Therefore, a modified FCSEMS (8 mm × 40 mm Kaffes®, Taewoong Medical) was inserted across each stricture (Fig. 1B). Again, there were no early or late complications post procedure. These modified FCSEMS were removed using stent grabbers at a repeat ERCP 12 weeks later. 12 mm balloons were easily trawled through each main duct demonstrating complete resolution of the strictures (Fig. 1C) and improvement in liver biochemistry followed (ALP 199 IU/L, ALT 16 IU/L, GGT 84 IU/L, Bili 6 μmol/L). At the time of submission of this manuscript (11 months after Kaffes stent removal), there has been no recurrence of strictures and LFTs have remained stable.

Discussion

LDLT with a split liver graft was developed in the 1980's as a result of a shortage of cadaveric grafts, with additional benefits including reduced CIT and costs [4]. However, live-donor split grafts are more likely to develop biliary complications than whole cadaveric grafts [3,4]. Various studies have reported an incidence of biliary complications to be 6%—18% [3,4]. The donor bile duct is divided above the confluence, in order to avoid biliary complications in the donor, and this results in a higher incidence of multiple ducts in the right liver grafts. Two or more bile duct anastomoses are a further risk factor for biliary complications [5]. This is because the anastomosed ducts are thinner and more sutures used. Additionally, the blood supply is impaired when the bile ducts are transected above the hilum, making the ducts more prone to ischaemia.

The treatment of anastomotic strictures has historically been with plastic stents. However, their efficacy at resolving strictures is low and patients often require multiple ERCPs [2]. In those with persistent strictures, the stents are replaced every 3 months as they are prone to blocking and subsequent cholangitis. This modified FCSEMS is a short-length stent, which is deployed across the anastomotic stricture and, unlike other types of FCSEMS, do not need to be positioned across the papilla. It also has an anti-migration waist as a result of a gradual tapering from the ends of the

stent to its centre, and long retrieval wires deployed within the duodenum to facilitate subsequent easy removal. A previous randomised controlled trial in deceased-donor liver transplants (DDLT) has demonstrated their success at resolving anastomotic strictures in the majority of patients after a single insertion [6]. Similarly, this modified FCSEMS has been shown to result in a high stricture resolution of 82.5% in a cohort of 35 patients post LDLT who had previously failed plastic stenting [7].

The uniquely modified FCSEMS offers significant advantages over other types of stent for the treatment of anastomotic strictures. From our experience of their use in cadaveric liver transplants, the only downside of this stent is that sludge can build up within it and therefore both main ducts should be trawled after their removal with a low threshold at giving antibiotics to prevent cholangitis; this downside was also found in other studies [7]. We also found deployment of the retrieval wires from within the scope initially difficult, but then found that this could easily be overcome by pushing them out with standard stent retrieval forceps. In conclusion, the unique design of this stent is ideal to overcome the biliary complications associated with the LDLT graft.

Disclosure of interest

The authors declare that they have no competing interest.

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