



## The Success of Endoscopic Stenting for Anastomotic Stricture of Hepaticojejunostomy after Pancreaticoduodenectomy in a Child with Pancreatic Injury

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### Abstract

The management of pancreaticoduodenectomy (PD) complications for pancreatic injuries in children is rarely reported. We performed PD for an 8-year-old boy with severe pancreatic injury due to a traffic accident. However, the patient suffered from anastomotic stricture of hepaticojejunostomy. We performed repeated double balloon endoscopy (DBE) dilation and stenting for the anastomotic stricture. There was no cholangitis from endoscopic stenting for 11 months following the procedures. Balloon dilation and stenting using DBE for children with anastomotic stricture of hepaticojejunostomy can be safely and usefully performed.

**Keywords:** Double balloon endoscopy; Anastomotic stricture; Pancreaticoduodenectomy; Pediatric; Pancreatic injury

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### Introduction

Management of pancreatic injury remains controversial. However, pancreatic injury with pancreatic duct disruption sometimes requires surgical treatment [1,2].

There are a few reports of pancreaticoduodenectomy (PD) in children with pancreatic injury, followed by the management of complications [3,4]. We report the efficacy of endoscopic stenting for the anastomotic stricture of hepaticojejunostomy after PD in a child.

### Case Presentation

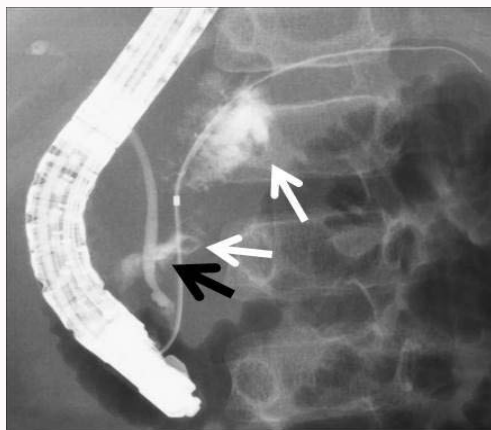
An 8-year-old boy was in a traffic accident in his family car in which he sat in the passenger seat with his seat belt fastened. At admission, a contrast-enhanced CT revealed injury of the pancreas head and transection of the pancreas body with peripancreatic fluid collection (Figure 1A). Subsequent endoscopic retrograde cholangiopancreatography (ERCP) revealed pancreatic duct disruption not only at the pancreas head with fistula to intrapancreatic bile duct, but also at pancreas body (Figure 2). We diagnosed the patient with grade V pancreatic trauma according to the American Association for the Surgery of Trauma classification [5]. We decided to perform a life-saving laparotomy, as endoscopic pancreatic stenting across the duct disruption failed. We performed subtotal stomach preserving pancreaticoduodenectomy with modified Child's reconstruction.

The early postoperative course was uneventful. However, 8 months later, he was readmitted to our hospital with cholangitis demonstrated by his symptoms and laboratory data. Magnetic resonance cholangiopancreatography (MRCP) showed intrahepatic bile duct dilation (Figure 3), suspecting anastomotic stricture related to hepaticojejunostomy.

Double-balloon endoscopy (DBE) showed a stricture of the hepaticojejunostomy, followed by a cholangiography that showed filling defects in the distal biliary tree and dilation of the intrahepatic bile duct (Figure 4). The anastomotic stricture region was dilated using a balloon catheter and his postoperative course was uneventful. Nevertheless, he had repeated cholangitis due to recurrence



**Figure 1:** (a) Enhanced abdominal CT scan revealed transection of the pancreas body. (b) This image shows damage of the pancreas head with fluid collection in the Morison pouch and cavity of pelvis.



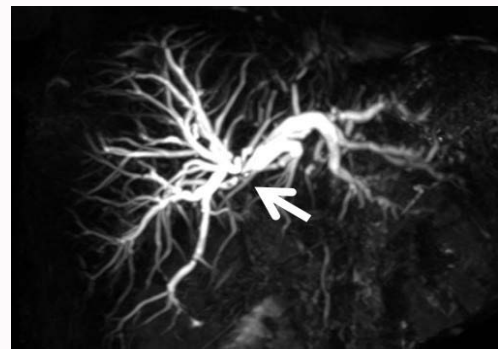
**Figure 2:** ERCP revealed pancreatic duct disruption at the pancreas head and body (white arrow). It also revealed fistula between intrapancreatic bile duct and pancreatic duct (black arrow).

of the anastomotic stricture in spite of the dilation of the anastomosis twice. At the third dilation, two 7-Fr biliary stents were introduced through the DBE into the right and left hepatic branch to avoid recurrent stenosis (left lobe of liver: 3 cm, right lobe of liver: 5 cm). Four months later, we were scheduled to exchange the biliary stents. There was no cholangitis from endoscopic stenting for 11 months.

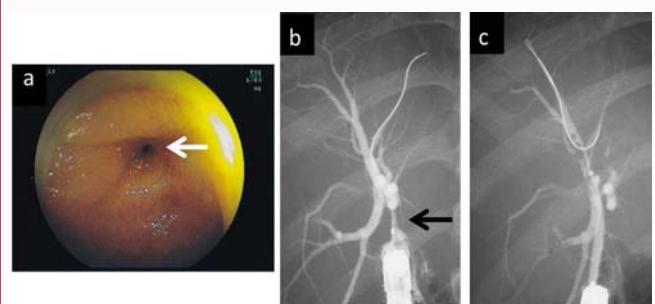
## Discussion

Pancreatic injury itself is generally rare in children; moreover, it accounts for less than 10% of blunt abdominal injuries [6]. Nonsurgical management is commonly selected for minor pancreatic injury. However, some authors have suggested that operative management reduces complications and reduces the length of hospital admission in cases where the main pancreatic duct has also been damaged [1,2]. Therefore, it is important to assess the status of the pancreatic duct in determining the management of pancreatic injuries. Moreover, complex pancreatic head injury sometimes requires PD [7].

The complication rate of after PD in adult cases has been reported as 40% or more, while the incidence of postoperative biliary strictures after PD in adult cases is reported as 2.6% [8,9]. However even in adult cases, surgical intervention for patients with bilio-enteric anastomotic strictures is difficult and it has a high morbidity rate of 25%, and a mortality rate of 2–13% [10,11]. On the other hand, balloon dilation and stent insertion for patients with bilio-enteric anastomotic strictures were considered effective and less invasive compared with surgical intervention [12].



**Figure 3:** MRCP image revealed intrahepatic bile duct dilation and anastomotic stricture of hepaticojejunostomy (white arrow).



**Figure 4:** (a) Anastomotic stricture of hepaticojejunostomy looked like a pinhole. (b) Narrowed area (black arrow). (c) After balloon dilation.

There are two access routes to anastomotic strictures: DBE and the percutaneous trans-hepatic approach. The success rates of percutaneous trans-hepatic biliary intervention (PTBI) are reported to be 52.3%–81%, with morbidity rates of 4%–38.1%, including conditions such as hemorrhage, cholangitis, and cholestasis [12–14]. In contrast, the success rates of DBE are reported to be 80%–94%, with morbidity rates of 0%–0.7%, including conditions such as pancreatitis and periprocedural bacteremia [15,16]. Consequently, DBE is preferred to PTBI because of its less invasive nature, better success rates, and reduced morbidity.

Recently, along with advances of endoscopic techniques, DBE has become possible to be performed safely, even for small children. Sanada et al. proposed that DBE should be performed to the patients over 15.0 kg of body weight [17], although there is a report that DBE was safely performed on a 1-year-old patient [18]. In conclusion, balloon dilation and stenting using DBE for children with anastomotic stricture of hepaticojejunostomy can be safely and usefully performed.

## References

1. Beres AL, Wales PW, Christison-Lagay ER, McClure ME, Fallat ME, Brindle ME. Non-operative management of high-grade pancreatic trauma: is it worth the wait? *J Pediatr Surg*. 2013; 48: 1060–1064.
2. Iqbal CW, St Peter SD, Tsao K, Cullinane DC, Gourlay DM, Ponsky TA, et al. Operative vs nonoperative management for blunt pancreatic transection in children: multi-institutional outcomes. *J Am Coll Surg*. 2014; 218: 157–162.
3. Thatte MD, Vaze D. Pancreaticoduodenectomy for paediatric pancreatic trauma with a decade of follow-up. *Afr J Paediatr Surg*. 2014; 11: 62–64.
4. Salman FT, Emre A, Abbaso-ÄŸlu L, Carilli S. Post-traumatic duodenopancreatectomy in a child. *Eur J Pediatr Surg*. 2004; 14: 287–289.

5. Moore EE, Cogbill TH, Malangoni MA, Jurkovich GJ, Champion HR, Gennarelli TA, et al. Organ injury scaling, II: Pancreas, duodenum, small bowel, colon, and rectum. *J Trauma*. 1990; 30: 1427-1429.
6. Mattix KD, Tataria M, Holmes J, Kristoffersen K, Brown R, Groner J, et al. Pediatric pancreatic trauma: predictors of nonoperative management failure and associated outcomes. *J Pediatr Surg*. 2007; 42: 340-344.
7. Vasquez JC, Coimbra R, Hoyt DB, Fortlage D. Management of penetrating pancreatic trauma: an 11-year experience of a level-1 trauma center. *Injury*. 2001; 32: 753-759.
8. Yeo CJ, Cameron JL, Sohn TA, Lillemoe KD, Pitt HA, Talamini MA, et al. Six hundred fifty consecutive pancreaticoduodenectomies in the 1990s: pathology, complications, and outcomes. *Ann Surg*. 1997; 226: 248-257.
9. House MG, Cameron JL, Schulick RD, Campbell KA, Sauter PK, Coleman J, et al. Incidence and outcome of biliary strictures after pancreaticoduodenectomy. *Ann Surg*. 2006; 243: 571-576.
10. Röthlin MA, Löpfe M, Schlumpf R, Largiadèr F. Long-term results of hepaticojejunostomy for benign lesions of the bile ducts. *Am J Surg*. 1998; 175: 22-26.
11. Tocchi A, Costa G, Lepre L, Liotta G, Mazzoni G, Sita A. The long-term outcome of hepaticojejunostomy in the treatment of benign bile duct strictures. *Ann Surg*. 1996; 224: 162-167.
12. Kim JH, Lee SK, Kim MH, Song MH, Park DH, Kim SY, et al. Percutaneous transhepatic cholangioscopic treatment of patients with benign bilioenteric anastomotic structures. *Gastrointest Endosc*. 2003; 58: 733-738.
13. Piardi T, Greget M, Audet M, Calandra G, Gheza F, Ellero B, et al. Biliary strictures after liver transplantation: is percutaneous treatment indicated?. *Ann Transplant*. 2011; 16: 5-13.
14. Giampalma E, Renzulli M, Mosconi C, Ercolani G, Pinna AD, Golfieri R. Outcome of post-liver transplant ischemic and nonischemic biliary stenoses treated with percutaneous interventions: the Bologna experience. *Liver Transpl*. 2012; 18: 177-187.
15. Pasha SF, Harrison ME, Das A, Nguyen CC, Vargas HE, Balan V, et al. Endoscopic treatment of anastomotic biliary strictures after deceased donor liver transplantation: outcomes after maximal stent therapy. *Gastrointest Endosc*. 2007; 66: 44-51.
16. Tabibian JH, Asham EH, Han S, Saab S, Tong MJ, Goldstein L, et al. Endoscopic treatment of postorthotopic liver transplantation anastomotic biliary strictures with maximal stent therapy (with video). *Gastrointest Endosc*. 2010; 71: 505-512.
17. Sanada Y, Mizuta K, Yano T, Hatanaka W, Okada N, Wakiya T, et al. Double-balloon enteroscopy for bilioenteric anastomotic stricture after pediatric living donor liver transplantation. *Transpl Int*. 2011; 24: 85-90.
18. Urs AN, Martinelli M, Rao P, Thomson MA. Diagnostic and therapeutic utility of double-balloon enteroscopy in children. *J Pediatr Gastroenterol Nutr*. 2014; 58: 204-212.