

## Traumatic pancreatic fistula with sinistral portal hypertension: Surgical management

Shoukat Ahmad Bojal, Kam Fung Leung, Abdul-Wahed Nasir Meshikhes

Shoukat Ahmad Bojal, Kam Fung Leung, Abdul-Wahed Nasir Meshikhes, Department of Surgery, King Fahad Specialist Hospital, Dammam 31444, Saudi Arabia

Author contributions: Bojal SA, Leung KF and Meshikhes AWN contributed equally to this work.

Correspondence to: Abdul-Wahed Nasir Meshikhes, FRCS, Chairman and Consultant Surgeon, Department of Surgery, King Fahad Specialist Hospital, PO Box 15215, Dammam 31444, Saudi Arabia. meshikhes@gmail.com

Telephone: +966-3-8431111 Fax: 966-3-855 1019

Received: March 1, 2010 Revised: March 15, 2010

Accepted: March 22, 2010

Published online: July 27, 2010

URL: <http://www.wjgnet.com/1948-9366/full/v2/i7/251.htm>

DOI: <http://dx.doi.org/10.4240/wjgs.v2.i7.251>

### Abstract

Combined ductal and vascular injuries are awesome complications of pancreatic injury. We report on a 29-year-old male unrestrained driver who sustained a blunt abdominal injury from the steering wheel in a high velocity head-on car collision. He developed a pancreatic fistula, portosplenic venous thrombosis and sinistral portal hypertension as a result of complete duct disruption at the pancreatic neck. We describe a safe surgical strategy of spleen-preserving distal pancreatectomy after failed medical and endoscopic management.

© 2010 Baishideng. All rights reserved.

**Key words:** Spleen-preserving distal pancreatectomy; Pancreatic fistula; Portosplenic venous thrombosis; Sinistral portal hypertension

**Peer reviewer:** Sonshin Takao, MD, PhD, Professor, Division of Advanced Medicine, Kagoshima University, Frontier Science Research Center, 8-35-1 Sakuragaoka, Kagoshima 890-8544, Japan

Bojal SA, Leung KF, Meshikhes AWN. Traumatic pancreatic fistula with sinistral portal hypertension: Surgical management. *World J Gastrointest Surg* 2010; 2(7): 251-254 Available from:

### INTRODUCTION

Pancreatic injury is uncommon but can be lethal when associated with adjacent organ injury<sup>[1,2]</sup>. The victim can develop awesome sequelae such as pseudocyst or fistula when the pancreatic ductal injury escapes initial diagnosis<sup>[3-5]</sup>. Portosplenic venous thrombosis can also develop from direct injury or the inflammatory process and can cause sinistral (left-sided) portal hypertension<sup>[6]</sup>. We describe a formidable pancreatic injury with ductal and vascular complications and our successful multimodality management.

### CASE REPORT

A 29-year-old male unrestrained driver sustained a blunt abdominal injury from the steering wheel in a high velocity head-on car collision 12 mo ago. He had a trauma laparotomy in a community hospital and a retroperitoneal hematoma was discovered but not explored as it was stable and not pulsating. He developed a persistent serous discharge at the tube drain wound site in the right upper abdomen after removal of the drain 10 d after the operation. This was treated as a fistula but was not resolved by total parental nutrition and octreotide. By the time of referral (8 mo after injury), there was a high output (400 mL/d) serous discharge rich in amylase (13647 U/L) and lipase (119348 U/L). He had intractable pain and had lost 24 kg. Magnetic resonant (MR) and endoscopic retrograde cholangiopancreatography showed a complete ductal disruption at the neck with a 1cm missing segment, dilated distal duct and complete thrombosis of the portosplenic venous confluence posterior to the pancreatic neck (Figure 1). The distal hepatic portal vein was re-constituted by pancreatoduodenal collaterals around the pancreatic head. He was diagnosed

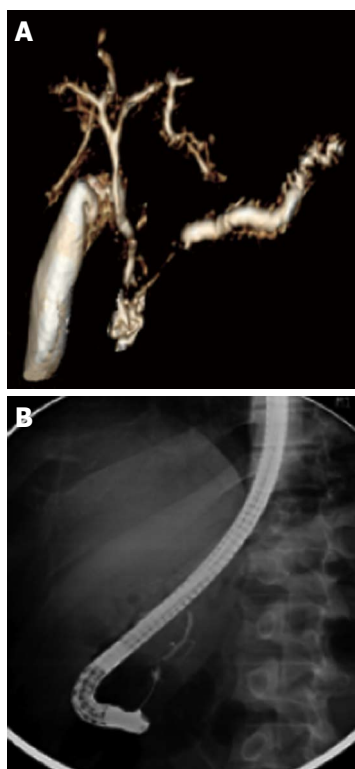


Figure 1 A magnetic resonant (A) and endoscopic retrograde cholangio-pancreatography (B) showing complete ductal disruption.

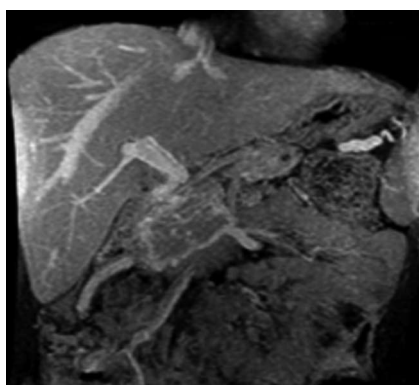


Figure 2 Magnetic resonance imaging film showing portosplenic thrombosis, gastric varices and pancreatoduodenal collaterals.

with sinistral portal hypertension because of the presence of short gastric varices in MR (Figure 2) although he had no clinical or endoscopic evidence of bleeding varices. Endoscopic stenting was not successful as a guide wire could not pass through the disruption. The patient was explored using a bilateral subcostal incision including the cutaneous fistula orifice and the fistula tract was excised down to the pancreatic neck in the lesser sac after incising the gastrocolic ligament (Figure 3). The self-truncated distal pancreas was found tethered to the neck by fibrous tissue. The distal pancreas was resected en bloc with the densely adherent and obliterated splenic artery and vein. The splenic artery was ligated near the celiac origin and the vein at the confluence with the portal vein. The inferior mesenteric vein was

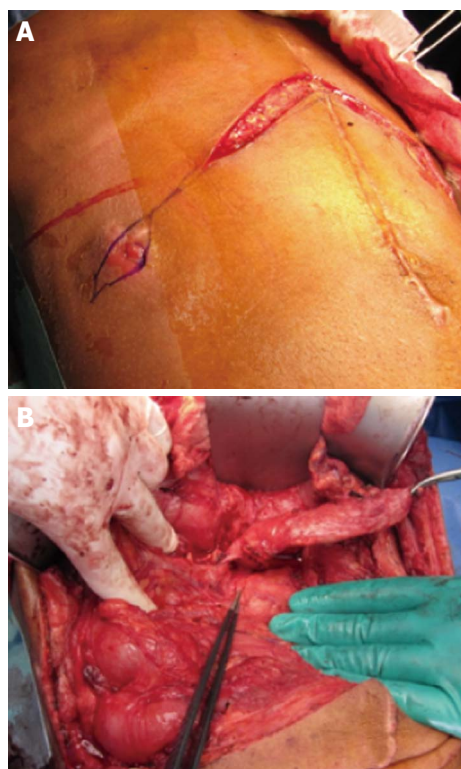


Figure 3 Cutaneous orifice of the pancreatic fistula is circled (A) and the operative view of the inner orifice at the injured neck of pancreas (B).

identified and ligated. The other end of the splenic vessel was transected with linear stapler just at the tip of the pancreatic tail, preserving the splenic hilum. The pancreatic head stump was oversewn with continuous polypropylene suture. The patient recovered uneventfully, gained 5 kg and resumed work 1 mo later. He did not have steatorrhea or diabetes. His blood smear showed normal platelets and absence of Howell-Jolly bodies and Doppler ultrasound of the spleen showed normal size and intact perfusion of all zones at 4 mo follow up.

## DISCUSSION

Steering wheel injury in high velocity traffic accidents is a common mechanism for a blunt pancreatic injury when the abdominal organs compress the soft gland on to the rigid and fixed spine. Initial pancreatic injury is difficult to diagnose as the gland is embedded by a retroperitoneal hematoma<sup>[5]</sup>. Low output fistula from a partial duct transection can be successfully managed by conservative treatment (total parental nutrition and octreotide)<sup>[7,8]</sup> and endoscopic stenting<sup>[9,10]</sup>. However, these lengthy and costly conservative treatments proved unsuccessful in our patient with complete duct abruption and high output fistula. The injury also resulted in inflammatory thrombosis of the portosplenic venous confluence and sinistral portal hypertension. We described our rationale of a safe and successful surgical strategy to deal with this complex injury in an inflammatory peritoneum.

The first controversy was the mandatory splenecto-

my for uncomplicated sinistral portal hypertension in a difficult inflammatory peritoneum. Preservation of the spleen is worthwhile as it avoids the 3.2% sepsis, 1.3% sepsis-related mortality and the bleeding complication in re-operation for chronic inflammatory peritoneum<sup>[11]</sup>. While splenectomy is the treatment of choice for variceal bleeding, there is no consensus about the treatment of asymptomatic patients<sup>[5]</sup>. Previous studies may have overestimated the incident of variceal bleeding in splenic vein thrombosis and have suggested prophylactic splenectomy<sup>[12,13]</sup>. However, two recent studies with advanced imaging identified more asymptomatic sinistral portal hypertension and found that the true variceal bleeding risk was as low as 4%. Heider *et al*<sup>[14]</sup> could incidentally identify 40 splenic vein thrombosis and varices among chronic pancreatitis patients by computed tomography (CT) and they did not have prior bleeding. By adopting an expectant approach, only 4% eventually bled and required splenectomy in a mean follow up of 40 mo. This expectant approach had better survival rates than the historical control of routine splenectomy which carried more complications. Similarly, Koklu *et al*<sup>[15]</sup> reported 4% life-time risk of variceal bleeding in a mean follow up of 20 mo among the 24 patients who had concomitant diagnosis of sinistral portal hypertension by CT. Likewise, a low bleeding incident was confirmed by two prospective longitudinal studies of chronic pancreatitis. Bernades *et al*<sup>[16]</sup> reported 2 bleeding incidents among 35 patients with portal hypertension in a median follow up of 22 mo. Izbicki *et al*<sup>[17]</sup> reported no bleeding incidents in 36 patients with extrahepatic portal hypertension in median follow up of 51 mo. Loftus *et al*<sup>[18]</sup>, in his retrospective comparative study, justified an expectant treatment for 12 sinistral portal hypertension patients without prior history of bleeding as their 3 year survival and bleeding rates were the same as the 25 patients requiring splenectomy for variceal bleeding. These 5 studies also found higher morbidity for the difficult operation for portal hypertension and concluded that variceal bleeding was rare in extrahepatic portal hypertension and did not justify prophylactic surgery. These studies justify our spleen preservation surgery in order to avoid potential bleeding and sepsis complication.

The second controversy following spleen preservation was the splenic viability when the main splenic vessels could not be dissected from the pancreas due to chronic inflammation and scar tissue. There were studies showing that distal pancreatectomy with en bloc resection of splenic vessels can be safely done. In these cases, the splenic vessels were ligated just at the tip of the pancreatic tail. The splenic hilar pedicle is preserved to allow circulation to the short gastric vessel in the gastrosplenic ligament and to the gastroepiploic vessel if the gastrolinal ligaments can be preserved. Warshaw<sup>[19]</sup> reported 22 successful operations and only one abscess formation in a splenomegaly. The splenic viability was confirmed by normal peripheral blood smear, normal platelet count and normal isotope scan. White *et al*<sup>[20]</sup> performed 10 spleen-preserving pancreatectomies with en bloc resection of splenic vessel. Splenic

viability was confirmed by Doppler ultrasound. The operative outcome did not differ from the other 19 operations with preservation of splenic vessel. Alexakis *et al*<sup>[21]</sup> found this splenic vessel ligation technique useful to facilitate 19 patients with difficult spleen- and duodenal-preserving pancreatectomy for chronic pancreatitis with dense inflammatory adhesions and there were no splenic infarcts. These 3 series concluded that the normal-sized spleen can survive on intact short gastric vessels. By using this technique, we resected the inflammatory distal pancreas with the adherent splenic vessel without the need for a blood transfusion. The patient's splenic function and perfusion were proven intact.

In summary, high output pancreatic fistula, porto-splenic thrombosis and sinistral portal hypertension can be the sequelae of severe traumatic complete pancreatic duct disruption. In the presence of chronic inflammation and adhesion, these complex injuries can be safely managed by distal pancreatectomy after failure of conservative management. Without prior history of variceal bleeding, the normal-sized spleen can be preserved even when the thrombosed splenic vessel are sacrificed as long as the splenic hilar vasculature can be preserved.

## REFERENCES

- 1 **Beckingham IJ**, Krige JE. ABC of diseases of liver, pancreas, and biliary system: Liver and pancreatic trauma. *BMJ* 2001; **322**: 783-785
- 2 **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
- 3 **Cogbill TH**, Moore EE, Kashuk JL. Changing trends in the management of pancreatic trauma. *Arch Surg* 1982; **117**: 722-728
- 4 **Campbell R**, Kennedy T. The management of pancreatic and pancreaticoduodenal injuries. *Br J Surg* 1980; **67**: 845-850
- 5 **Boffard KD**, Brooks AJ. Pancreatic trauma--injuries to the pancreas and pancreatic duct. *Eur J Surg* 2000; **166**: 4-12
- 6 **Köklü S**, Coban S, Yüksel O, Arhan M. Left-sided portal hypertension. *Dig Dis Sci* 2007; **52**: 1141-1149
- 7 **Parekh D**, Segal I. Pancreatic ascites and effusion. Risk factors for failure of conservative therapy and the role of octreotide. *Arch Surg* 1992; **127**: 707-712
- 8 **Bassi C**, Falconi M, Caldiron E, Bonora A, Salvia R, Pederzoli P. Somatostatin analogues and pancreatic fistulas. *Digestion* 1996; **57** Suppl 1: 94-96
- 9 **Kim HS**, Lee DK, Kim IW, Baik SK, Kwon SO, Park JW, Cho NC, Rhoe BS. The role of endoscopic retrograde pancreatography in the treatment of traumatic pancreatic duct injury. *Gastrointest Endosc* 2001; **54**: 49-55
- 10 **Halttunen J**, Weckman L, Kempainen E, Kylänpää ML. The endoscopic management of pancreatic fistulas. *Surg Endosc* 2005; **19**: 559-562
- 11 **Bisharat N**, Omari H, Lavi I, Raz R. Risk of infection and death among post-splenectomy patients. *J Infect* 2001; **43**: 182-186
- 12 **Evans GR**, Yellin AE, Weaver FA, Stain SC. Sinistral (left-sided) portal hypertension. *Am Surg* 1990; **56**: 758-763
- 13 **Sakorafas GH**, Sarr MG, Farley DR, Farnell MB. The significance of sinistral portal hypertension complicating chronic pancreatitis. *Am J Surg* 2000; **179**: 129-133
- 14 **Heider TR**, Azeem S, Galanko JA, Behrns KE. The natural history of pancreatitis-induced splenic vein thrombosis. *Ann*

- Surg* 2004; **239**: 876-880; discussion 880-882
- 15 **Köklü S**, Yüksel O, Arhan M, Coban S, Başar O, Yolcu OF, Uçar E, Ibiş M, Ertugrul I, Sahin B. Report of 24 left-sided portal hypertension cases: a single-center prospective cohort study. *Dig Dis Sci* 2005; **50**: 976-982
- 16 **Bernades P**, Baetz A, Lévy P, Belghiti J, Menu Y, Fékété F. Splenic and portal venous obstruction in chronic pancreatitis. A prospective longitudinal study of a medical-surgical series of 266 patients. *Dig Dis Sci* 1992; **37**: 340-346
- 17 **Izbicki JR**, Yekebas EF, Strate T, Eisenberger CF, Hosch SB, Steffani K, Knoefel WT. Extrahepatic portal hypertension in chronic pancreatitis: an old problem revisited. *Ann Surg* 2002; **236**: 82-89
- 18 **Loftus JP**, Nagorney DM, Ilstrup D, Kunselman AR. Sinistral portal hypertension. Splenectomy or expectant management. *Ann Surg* 1993; **217**: 35-40
- 19 **Warshaw AL**. Conservation of the spleen with distal pancreatectomy. *Arch Surg* 1988; **123**: 550-553
- 20 **White SA**, Sutton CD, Weymss-Holden S, Berry DP, Pollard C, Rees Y, Dennison AR. The feasibility of spleen-preserving pancreatectomy for end-stage chronic pancreatitis. *Am J Surg* 2000; **179**: 294-297
- 21 **Alexakis N**, Ghaneh P, Connor S, Raraty M, Sutton R, Neoptolemos JP. Duodenum- and spleen-preserving total pancreatectomy for end-stage chronic pancreatitis. *Br J Surg* 2003; **90**: 1401-1408

**S- Editor** Li LF **L- Editor** Roemmele A **E- Editor** Yang C