Emergent Endoscopic Retrograde Cholangiopancreatography with Placement of Biliary Double Stents to Salvage Endoscopic Retrograde Cholangiopancreatography-Induced Stapfer's Type II Perforation

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To the Editor: Endoscopic retrograde cholangiopancreatography (ERCP) plays a vital role in the management of pancreaticobiliary diseases in recent years and it concomitantly carries a risk of complications including post-ERCP pancreatitis, cholangitis, bleeding, and perforation. The incidence of primary post-ERCP complications ranges from 5.4% to 23.0%, and ERCP-induced perforation can occur in 0.3–1.0% of cases, but the associated mortality is high ranging from 8% to 23%.[1] Because of the confluence of the bile duct and pancreatic duct meet at the papilla in proximity to the site of perforation in the duodenum, there is a potential risk of leakage of bile and pancreatic juice into the retroperitoneal space or peritoneum. Patients with Stapfer's Type II perforation (perivaterian perforation) generally suffered from systemic inflammatory response syndrome, which could progress rapidly to acute lung injury and acute renal insufficiency and even multiple organ failure. All of these contribute to the significantly high mortality. A timely recognition and appropriate treatment are crucial to the management of ERCP-induced perforation to reduce the overall mortality. Conventionally, surgery remains the primary treatment for iatrogenic perforations. With the improvement in endoscopic technique and development of new accessories, nonsurgical management with endoscopic treatment of perforation is increasingly being reported.[2] We report a retrospective analysis of ERCP-induced Stapfer's Type II perforations over a 5-year period managed with nonsurgical approach combined with salvage ERCP.

Totally, 5872 patients underwent ERCP for pancreaticobiliary diseases at the endoscopy center of our hospital, and six Type II perforations were analyzed retrospectively between December 2010 and November 2015.

Six patients (4 females and 2 males) with an average age of 52.5 ± 13.9 years were hospitalized with choledocholithiasis and underwent ERCP. After the initial ERCP, the six patients developed severe abdominal pain with fever and signs of peritonitis including muscle guarding and rebound tenderness in the abdomen and pain radiating to the right flank and back. In addition, some patients developed shortness of breath with decrease in blood oxygen saturation and urine output. Computer tomography (CT) scan abdomen revealed retroperitoneal air and fluid collection which is the typical imaging features of Stapfer's Type II perforation [Figure 1a]. All of the perforations were diagnosed within 24 h (range 13–23 h), and patients underwent salvage ERCP in an attempt to seal the perforation. ERCP procedure included placement of two biliary plastic stents combined with a nasoduodenal tube for decompression. A 5 Fr-5 cm single pigtail stent will be placed simultaneously if the guidewire is cannulated into pancreatic duct unintentionally [Figure 1b]. In addition, a nasoduodenal decompression tube was placed in the descending part of the duodenum and a nasojejunal feeding tube was placed at least 10 cm beyond the ligament of Treitz [Figure 1c]. CT-guided percutaneous drainage of the retroperitoneal fluid collection was performed in five patients [Figure 1d]. Fortunately, all of the six Type II perforations were successfully cured by salvage ERCP. The average post-ERCP hospital stay was 21.33 ± 7.53 days.

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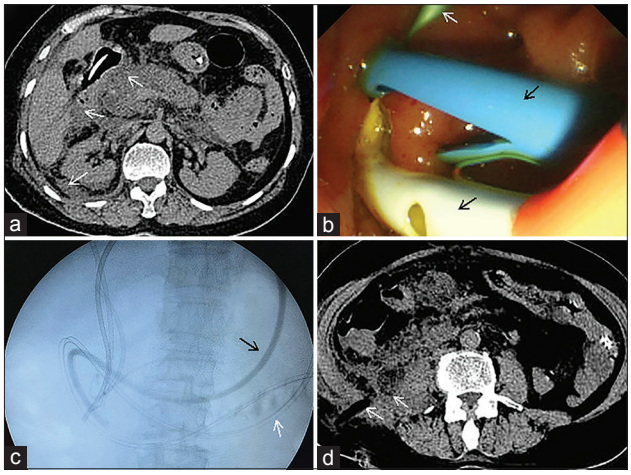

Figure 1: (a) CT scan revealed retroperitoneal air and fluid collection (white arrows); (b) two biliary stents (black arrows) and one pancreatic stent (white arrow) were placed during salvage ERCP; (c) nasoduodenal decompression tube (black arrow) and a nasojejunal feeding tube (white arrow); (d) CT-guided percutaneous drainage of the retroperitoneal fluid collection (white arrows). CT: Computer tomography; ERCP: Endoscopic retrograde cholangiopancreatography.

ERCP-related perforations can be diagnosed during the endoscopic procedure occasionally because of an abnormal abdominal X-ray showing retroperitoneal air around the bile duct and especially around the right kidney. The injection of contrast may show leakage at the sphincterotomy site as in the case of a Type II perforation. Contrast CT scan is the most sensitive test to detect the presence of retroperitoneal air and leakage of contrast. It is sometimes difficult to distinguish pain occurring as a result of perforation versus post-ERCP pancreatitis. A mild elevation of serum amylase levels can be seen in patients with post-ERCP perforation as a result of absorption of pancreatic juice in the retroperitoneal space. Common risk factors included a clinical diagnosis of sphincter of Oddi dysfunction, precut sphincterotomy, and endoscopic papillary balloon dilation which could predispose to Stapfer's Type II perforations. This may be secondary to a small papilla, a large sphincterotomy or a deviated cut, presence of juxtapapillary diverticula, and less commonly in patients with a Billroth II subtotal gastrectomy.[3]

The management of Stapfer's Type II perforations after ERCP remains controversial as the clinical outcome can be variable. Conventionally, they are managed by surgical intervention in order to control the inflammation and prevent infection by draining the retroperitoneal and intraperitoneal fluid collection, as well as the diversion of the biliopancreatic system. Surgical closure of the perforation site will be performed if identified at operation, with or without a bypass procedure.[3] Recent development has led to a more selective approach based on the mechanism of injury, site of perforation, and degree of leakage as well as patient's condition and CT findings.[4] At present, nonoperative treatment is considered the first choice for Type II perforation. Most cases can be cured, and only a few conservative failures need surgery. The downside is if conservative management of the perforation fails, this could result in serious consequences and increased mortality secondary to bile and pancreatic leakage. The patients are supposed to be recommended with surgery which includes transduodenal operative approach repaired, sphincteroplasty, T-tube drainage, and even hepaticojejunostomy within 24 h when initial endoscopic and conservative management did not yield good results. Indications for surgical treatment of periampullary perforations included hemodynamic instability, septicemia, signs of peritonitis, and a large perforation with continuing leakage. In the absence of a surgical indication, crucial nonsurgical management should include duodenal diversion and biliary and/or pancreatic drainage.[4] Other reports have suggested the use of fully covered self-expandable metallic stents (fcSEMSs) which could cover the laceration in ERCP-related perivaterian perforation.[2] However, this procedure was not widely used because of the expensive cost of the stent and it is also prone to migration.

During our practice, we found that Type II perforation cases have a smaller diameter of the biliary tract. Two biliary stents were placed to achieve better drainage than only one stent because the amount of biliary drainage per unit time within two stents is more and more bile can be drained into the duodenum and drawn out through the nasoduodenal decompression tube to reduce retroperitoneal leakage of digestive juice. At the same time, two stents may ensure longer patency and no stent blockage until the fistula heals. In China, the price of a fcSEMS is 20 times as high as a plastic stent. Due to some patients' financial limit, our current method has the ability to achieve the similar effect as fcSEMS, so the use of a biliary plastic "bracket" two-stent implant would reduce the medical cost effectively. Duodenal decompression can be achieved with a nasoduodenal tube. The insertion of a nasojejunal tube provides enteral feeding and nutritional support, and its front end is placed far from more than 10 cm of the Treitz ligament to prevent the reflux of the nutrient solution to the duodenum. Enteral nutrition is more economical than total parenteral nutrition (TPN) and could avoid intestinal bacterial translocation caused by prolonged fasting and atrophy of the intestinal mucosa.[5] This also reduces the need for TPN and minimizes potential TPN-induced complications and hospital expenses. In view of the fact that most Type II perforation patients can be recovered without laparotomy, interventional surgery should always be considered as a primary minimally invasive method which should be performed after the failure of conservative treatment. Therefore, close monitoring of the patient's general condition after savage ERCP is crucial, and surgical operations need to carry out in time if deterioration.

In conclusion, ERCP-induced perforation is an uncommon complication, but it is associated with a significantly high overall mortality. The decision for surgical treatment versus conservative endoscopic therapy will depend on the cause of the perforation, the site, and extent of the injury. All of the six Stapfer's Type II perforation patients in our center were successfully treated with conservative management with no deaths. However, the number of cases in our series is small, and a more extensive study is needed to confirm the effectiveness and success rate of nonsurgical management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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