

Progress in endoscopic management of pancreas diseases

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Endoscopy has been widely used in the treatment of many biliary tract disorders and as an alternative to many surgical procedures. The remarkable advances achieved in the performance of therapeutic endoscopic retrograde cholangio-pancreatography (ERCP) have placed endoscopy in the forefront for treating pancreato-biliary diseases^[1]. It has established itself as a valuable tool. However, it is only recently that these techniques have been applied and adopted to disorders of the pancreas for their frequent and potentially serious complications and technical problems, etc. Generally, therapeutic ERCP of the pancreas is still in its infancy.

Recently, endoscopic treatment, especially therapeutic ERCP for pancreas diseases has developed rapidly, such as acute pancreatitis, chronic pancreatitis, pancreatic pseudocysts or pancreas divisum. These will be reviewed as follows.

ACUTE PANCREATITIS

Acute gallstone pancreatitis

Gallstones are one of the major etiological factors of acute pancreatitis. 60% of the patients with acute pancreatitis are found to have gallstones, and 68% of the severe cases have^[2,3] gallstones in common bile duct. Conservative medical management alone for gallstone pancreatitis fails in 20% - 30% of patients, with more complications and higher mortality. In 1974, Cotton and Beales showed that acute pancreatitis could not be considered contraindicated for ERCP^[4]. Recently, urgent (within 24-72 hours) ERCP and endoscopic sphincterotomy ES have been performed in those patients with suspected acute gallstone pancreatitis. Urgent ERCP usually shows normal pancreatic duct, and being less helpful to the diagnosis of mild pancreatitis and surgical indications. However, it does not prolong hospital stays or increase morbidity. Controlled study showed that patients benefited from early ERCP and ES as demonstrated by lower morbidity (24%

vs 64%), shorter hospitalization (9.5% days vs 17 days), and lower mortality (2% vs 8%). No serious procedure-induced complications were observed in the studies^[2]. It suggested that urgent ERCP and ES are safe and effective for patients with acute biliary pancreatitis.

Fan *et al*^[5] reported their results with early ERCP and ES in 195 patients with suspected acute gallstone pancreatitis, among whom 127 (65%) had gallstones in common bile duct or gall bladder. Those who underwent ERCP had nobiliary sepsis, and the mortality was also low. Patients with a mild attack of pancreatitis should be closely observed and an immediate intervention is not necessary. Urgent ERCP and ES should be reserved for patients with an attack of pancreatitis predicted to be severe, those whose pancreatitis does not subside with conservative measures over 72 hours.

Acute recurrent pancreatitis

Acute recurrent pancreatitis is defined as two or more attacks of pancreatitis associated with at least twice normal serum amylase levels^[6]. Those patients are always without a positive history of alcohol abuse or gallstone. ERCP can disclose an etiological factor such as bile duct stones, choledochocoles, papillary tumors, duodenal duplication cysts, intraductal strictures, pancreas divisum, or papillary stenosis in 40%-50% of cases. In about a half of those, ERCP can reveal a motor abnormality of Oddi sphincter (normal $\frac{1}{4}$ 30mmHg) or dysfunction of Oddi sphincter. The management of acute recurrent pancreatitis includes balloon dilatation of the stricture and endoprosthesis. If the recurrent attacks of pancreatitis relate closely to Oddi sphincter dysfunction, endoscopic sphincterotomy of pancreatic duct sphincter should be performed as a routine. This procedure can decrease the pressure of the pancreatic duct, and relieve symptoms of pancreatitis. At present, pancreatic sphincterotomy is not recommended for patients without sphincteric dysfunction and a normal pancreatic duct^[2].

CHRONIC PANCREATITIS

Chronic pancreatitis is a disease that is difficult to manage. It has three types of clinical presentations, including abdominal pain (70% of cases may be related to the increased pancreatic duct pressure), diarrhea (20%-30%), endocrine failure in the form of diabetes (3%-37%). ERCP can reveal pancreatic duct stricture, stones in pancreatic duct or pan-

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creatic pseudocysts. So the endoscopic management includes pancreatic sphincterotomy, balloon dilatation of strictures, pancreatic stent and pseudocyst drainage.

To those patients with pancreatic duct stricture, a stiff nylon catheter or a Soehendra dilating catheter is introduced over a guidewire to dilate the stricture up to 7-Fr. The catheter is then removed, and over the guidewire an endoprosthesis (5- or 7-Fr) is inserted. Most strictures will recur soon after dilation alone. Improvement of pain was seen in 54% - 90% of cases after pancreatic stenting. Pancreatic stenting might occlude side branches and subsequently cause formation of cystic lesion in the side branches. The stent can also induce inflammatory changes of the duct which mimics chronic pancreatitis^[7]. There is a tendency to leave the endoprosthesis in place for as short a period as possible (about 6 w). Recurrence of abdominal pain often indicates stent blockage and the necessity to replace or remove the stent. Additional side flaps outside the papilla may prevent the stent from migrating into the pancreatic duct^[8]. The migrated stent can be extracted by endoscope immediately or surgical intervention if necessary. Endoscopic stenting is a useful alternative to surgical treatment and has lower morbidity and mortality. It does not impair the remaining pancreatic function, and surgery is still possible, if necessary.

It is not clear whether pancreatic stones are the cause or the results of recurrent attacks of pancreatitis. They can be extracted by balloon catheter or baskets. If stones can not be removed completely during the first endoscopic session, a stent can be inserted beyond the stones for adequate drainage until the second attempt. Larger stones above a stricture can be fragmented within the pancreatic duct by using extracorporeal shock wave lithotripsy (ESWL). In series of 123 patients, stones were fragmented successfully in 99% cases with the main pancreatic duct being completely cleared in 59%. After a mean follow-up of 14 months, complete or partial pain-relief could be obtained for 85% of the patients^[12]. Electromagnetic lithotripsy (EML) can also be applied. Smith reported 15 cases, and complete clearance of pancreatic duct was seen in 60% of patients.

PANCREATIC PSEUDOCYSTS OR PANCREATIC ABSCESSSES^[2,9-11]

Patients with pancreatic pseudocysts have clinical features as chronic pancreatitis, they also have obstruction of biliary and upper gastrointestinal tract. Endoscopic treatment includes nasopancreatic drainage, cystogastrostomy or cystoduodenostomy and endoprosthesis with lower morbidity and mortality in comparing with surgical procedures. Chronic pseudocysts more than 4cm-6cm should be drained soon after the diagnosis was made. Na-

sopancreatic drainage is always used to perform cystogastrostomy or cystoduodenostomy if the pseudocyst is closely in contact with the gastric or duodenal wall, as evidenced by CT or endosonography. Endoscopic cystoduodenostomy (ECD) is the first choice for treatment of paraduodenal cysts, whereas endoscopic cystogastrostomy (ECG) is an alternative procedure for the drainage of retrogastric cysts. Binmoeller *et al* reported their results of 53 patients who had undergone transpapillary drainage of ECD and/or ECG, cysts disappeared in 95% of them. Cremer *et al* reported 33 cases, and no recurrence of pseudocysts or complications was seen. Symptoms were relieved completely in 90% of the patients.

Endoscopic drainage is also safe and effective in pancreatic abscesses. Binmoeller *et al* reported 10 cases. Abscesses completely resolved in 8 patients. During a mean follow-up of 10 months, none of the patients had recurrence.

PANCREAS DIVISUM

Pancreas divisum is a congenital abnormality found in 5%-7% of patients^[6]. Most investigators believe that the relatively small size of the minor papilla, which drains the largest part of the pancreas, could cause pancreatic congestion, leading to pain or pancreatitis. Endoscopic sphincterotomy of the minor papilla and endoprosthesis are always performed, and symptoms improve significantly in 83%-90% of cases.

Endoscopic sphincterotomy of the minor papilla can enlarge outflow of the pancreatic duct, but stricture recurs quickly and causes attacks of pancreatitis, so a stent (5- or 7-Fr) is always inserted after the sphincterotomy. Lehman *et al* reported that patients with recurrent pancreatitis benefited from endoscopic therapy more often than those with chronic pancreatitis or chronic pain during the mean follow-up of 1.7 years^[12]. In patients with pancreas divisum and pancreatitis, stenting of the minor papilla was associated with a 49% complication rate, and was always moderate or severe. Endoscopic stent was not effective but associated with 80% of complications in those cases with pain only and a normal ERCP^[13].

The long-term success of stent treatment is unknown. Stenting may cause dilation of the minor papilla sphincter. The results of this study suggest that impairment of pancreatic drainage by the minor papilla is probably an etiological factor for recurrent pancreatitis in patients with pancreas divisum.

PERIPHERIC TUMORS OF VATER'S AMPULLA

ERCP is mainly used for the diagnosis of peripheral tumors of Vater's ampulla. Endoscopic appearance, radiography, forceps biopsy, collection of pancreatic cells and pancreatic secretion can afford evidences of pathology and pathology. To those benign tumors such as adenomas and malignant ones that

cannot be removed, complete removal and conservative medical treatment should be performed, respectively. Binmoeller *et al*^[14] reported 25 cases of removal of benign adenomas with standard polypectomy snare, all were successful. Its criteria were: size less than 4 cm; and benign histologic findings on forceps biopsy (minimum of six biopsies). It is dangerous with more complications, so its indications are those who refused to undergo surgical treatment and those at high surgical risk.

COMPLICATIONS

The complications of endoscopic management of pancreatic disorders are much higher than those of biliary tract diseases (about 25%).

The common complications of endoscopic treatment are pancreatitis, hemorrhage, perforation and infection. Abdominal discomfort and sepsis are frequent in the management of endoscopic sphincterotomy and stone extraction. Complications of cystogastrostomy and cystoduodenostomy are mainly hemorrhage and perforation, and technique-related infection, for example, the infection of cysts. Stent dysfunction, inducing clogging migration of the stent and erosion of the opposite wall of the duodenum, appear to be frequent and major long-term problem. Stent clogging is reduced through self-expandable metal stents, but experience in the pancreatic duct is limited and these stents are not easy to be removed. Most complications of endoscopic therapy can be successfully treated conserva-

tively or endoscopically, and surgical procedure is also needed if necessary.

In summary, selection of patients for the various treatment options should be strict and is probably important for optimum results of therapy because of their technique and complications, especially in children^[15].

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