

Treatment of Pancreatic Fistulas

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Abstract

Pancreatic fistula is usually a complication of acute and chronic pancreatitis but can also occur postoperatively or after abdominal trauma. Conservative treatment of pancreatic fistula is time-consuming and often fails. Endoscopic treatment has become the preferred first-line treatment in many centres. Surgery is necessary in few cases when endoscopy fails or is not technically possible.

Key Words

Pancreatic fistula · Endoscopic treatment · Pancreatic injuries

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Introduction

Pancreatic fistula is usually a complication of acute or chronic pancreatitis. It can also occur postoperatively, especially after pancreatic resections, after percutaneous drainage for a pseudocyst and after abdominal trauma. Ductal rupture and leakage may lead to pancreatic ascites, to a fluid collection, or mediastinal or pancreatico-pleural fistula. In larger series, acute or chronic pancreatitis is the main etiological factor in two thirds of the patients, the rest being postoperative fistulas [1]. Traumatic pancreatic injury is very uncommon due to the organ's protected retroperitoneal location and the diagnosis is often delayed [2]. For example, there were only 18 recognised major pancreatic duct injuries amongst over 14,000 admissions to a pediatric trauma centre in San Diego over a 14-year period [3]. Immediate detection of pancreatic trauma is essential while delayed diagnosis and treatment may increase the risk of complications [4, 5]. The American Association

of Surgical Trauma has determined how to scale the degree of pancreatic injury in their classification [6].

Diagnosis

A long patient history and CT findings with pancreatic calcifications and ductal dilatations are typical for chronic pancreatitis. Stricture and obstruction of the pancreatic duct leads five times more often to a pseudocyst than to a pancreatic fistula, which is a rare complication of pancreatitis [1, 7]. In cases with pancreatico-pleural fistula or pancreatic ascites, amylase level is elevated in the pleural fluid or in the intra-abdominal fluid and confirms the diagnosis. Similarly, pancreaticocutaneous fistulas after operations or percutaneous drainage are relatively easy to recognise because of clear amylase-rich fistula fluid. After abdominal trauma, an elevated serum amylase raises suspicion of pancreatic injury.

A pancreatic duct disruption may be viewed using by magnetic resonance cholangiopancreatography (MRCP). MRCP is a safe and non-invasive method [8, 9]. In uncertain cases, a secretin stimulation can be used in MRCP to enhance the pancreatic secretion and filling of the pancreatic duct. A leakage through a fistula is easier to define. Also, computed tomography (CT) may show the fistula tract and improve the chances of detection of a pancreatic fistula. In trauma patients, CT has been shown to be disappointing in assessing the disruption of pancreatic duct [4]. However, when pancreatic injury is suspected and the first CT of the pancreas is normal, a repeat CT may lead to a correct diagnosis [10]. However, in patients with severe acute pancreatitis or multitrauma, contrast media cannot be used for CT in order to avoid kidney problems. Obviously, in such cases, an MRCP is preferred.

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Endoscopic retrograde pancreaticocholangiography (ERCP) provides detailed images of the pancreatic duct and helps to assess whether there is a total or partial dissection of the duct [4]. However, there are fistulas that cannot be visualised by ERCP. The leak may be in a minor side branch. Due to risk of post-ERCP pancreatitis, high injection pressures of contrast are avoided and the fistula may remain unrecognised. If the diagnosis has already been confirmed by other means, a pancreatic sphincterotomy may still be a curative solution. In case of a total occlusion of the pancreatic duct, the fistula obviously cannot be demonstrated as it lies behind the stricture. This situation occurs only in the context of chronic pancreatitis. For postoperative and traumatic fistulas the ERCP is an accurate technique for assessing pancreatic ductal anatomy, and it also permits simultaneous therapeutic intervention.

Conservative Treatment

Traditionally, pancreatic fistulas have been managed primarily by conservative treatment with pancreatic rest, i.e., no oral intake with total parenteral nutrition and pancreatic secretory inhibitor octreotide administration. The treatment requires lengthy admission and is costly [11, 12]. The rationale for pancreatic rest is that if pancreatic secretion is reduced, flow through the fistula will decrease, and result in closure of the fistula. The results of octreotide therapy in various reports have been controversial [13]. However, conservative treatment fails in many patients [9]. The major obstacle, especially in chronic pancreatitis, is the offending stricture causing outflow obstruction and preventing fistula closure. Interventional therapies and even surgery have been the next option [14].

Endoscopic Interventions

Many pancreatic fistulas develop after operations such as pancreatic resections or necrosectomies in the context of necrotising pancreatitis. A later surgery for fistula is technically demanding and is associated with major morbidity and mortality. The role of therapeutic endoscopy in the treatment of pancreatic diseases has been expanding in the past 15 years [15–20]. There has been a trend towards a more active and earlier endoscopic approach, as it has seemed beneficial and a worthy replacement to longer-term conservative treatment.

The aim of endoscopic treatment of pancreatic fistulas is to reduce the pancreatic duct pressure by

pancreatic sphincterotomy, and by placement of a stent or nasopancreatic drain into the pancreatic duct. A stricture in the pancreatic duct can be treated endoscopically with a balloon dilatation and stenting. If there is a stone in the duct, extracorporeal shockwave lithotripsy can be used before ERCP, following removal of the stone fragments. The results of the endoscopic studies in the treatment of pancreaticocutaneous fistulas, postoperative fistulas, pancreaticopleural fistulas, peripancreatic fluid collections, and pancreatic ascites have been encouraging [1, 15–19, 21]. Up to 90% of the patients with pancreatic fistulas can be successfully treated endoscopically with minimal complications and no procedure-related mortality.

Internal fistulas, either with pancreatic ascites or with pleural or mediastinal collections, respond well to endoscopic therapy. The fistula tract will close spontaneously as soon as the sphincter pressure and the obstruction are relieved by a papillotomy, and by stricture dilatation and stenting when necessary. These patients have usually experienced long-term disease due to chronic pancreatitis. A postoperative fistula is often located in the cut end of the pancreas after a pancreatic resection, with an otherwise normal duct. An effective endoscopic therapy to ensure no damage to the duct is a papillotomy only, possibly with a short stent across the papilla for a short period of time.

Pancreatic Trauma and ERCP

Traumatic pancreatic duct injury has shown recovery with ERCP and pancreatic stent insertion. Surgery may be totally avoided [4, 22, 23]. Because of the rarity of posttraumatic duct disruption, the series are small. ERCP and stenting of the pancreatic duct has been effective also for treatment of children after traumatic pancreatic ductal leakage [24, 25]. If there is a total disruption of the pancreatic duct, the results of endoscopic therapy may be limited. Even in such cases as these, there is a rationale to start with endoscopic treatment by a short stent in the pancreatic duct. This procedure alone might be enough to ensure healing of the leak. It at least prevents the potential backflow of the pancreatic juice from the head of the pancreas through the injury by abolishing the sphincter pressure. The ensuing posttraumatic pancreatitis might be avoided. At least the reports of early endoscopic interventions seem to favour the procedure. A fluid collection or later a pseudocyst can be treated operatively by a permanent cystogastrostomy, or preferably endoscopically [19]. In children, a conservatively treated traumatic complete pancreatic transection may

lead to distal pancreatic atrophy, but seldom causes endocrine or exocrine dysfunction [26].

The duration of pancreatic stenting in the treatment of pancreatic fistula is not standardised. In pancreatic ductal injury where the duct is otherwise normal (postoperative or traumatic fistula) lengthening the duration of stenting may cause epithelial injury and result in stricture. As soon as the healing of the fistula can be confirmed, e.g., by CT, the pancreatic stent can be removed. In pediatric trauma patients, the stent is often removed as early as 11 days to 12 days after treatment [24]. In postoperative fistulas, a stenting period of 2 months or less has been sufficient. However, in patients with chronic pancreatitis it is customary keep the stent for at least 2 months, with possible stent exchanges later to dilate and treat the stricture.

There are some morphological ductal changes mimicking chronic pancreatitis after endoprosthesis placement in most patients [23, 27, 28]. However, most of the lesions disappear during follow-up, and seldom cause any clinical problems. In cases where the fistula is situated in the head of the pancreas, a short stent, or in some cases only pancreatic sphincterotomy, is effective and ductal irregularities caused by a stent can thus be avoided. It is not clear whether it is necessary to insert an endoprosthesis beyond the ductal leakage where there is no stricture preventing the fistula closure. If there is a stricture to the downstream of the leakage in the duct, the stricture should be dilated and the obstruction relieved by a pancreatic stent.

Surgical Treatment

Major causes of endoscopic failure are the location, if the fistula in the tail of the pancreas, or there is a total obstruction of the pancreatic duct. Where endoscopic therapy fails or is not possible, an ERCP, together with a CT and an MRCP, is still useful to demonstrate the ductal anatomy and to help in planning surgical therapy. If the fistula is in the tail of the pancreas but the pancreatic duct is otherwise normal, deep access into the pancreatic duct is difficult and dangerous. Should a papillotomy with or without a short stent to relieve the sphincter pressure prove insufficient, the problem can be treated more effectively by a distal pancreatectomy than by endoscopic means, without damaging the duct with dilatations and stent insertion. Tail resection has been the preferred solution, especially in trauma patients, adults and children alike. On the other hand, with a fistula in the head of the pancreas, the situation might require a pancreaticoduodenectomy, if treated operatively. For these patients, the therapeutic endos-

copy is obviously the treatment of choice, as it is successful in 90% of cases. Furthermore, a resection of the pancreas increases the risk of endocrine and exocrine dysfunction. This favours endoscopic therapy whenever possible or, if that fails, an operative drainage without resection. For cases with total duct obstruction and a dilated duct, a lateral pancreaticojejunostomy is the method of choice.

In patients with traumatic pancreatic fistula, immediate surgery is sometimes needed for concomitant serious injuries to other organs, allowing no time for a preoperative MRI and/or ERCP [29]. If there is a strong suspicion of pancreatic duct rupture, it should be remembered that a preoperative ERCP is feasible, and can help in the decision of the treatment modality (possible resection or stenting) of pancreatic trauma. Without the ERCP, an intra-operative assessment of pancreatic duct integrity can be difficult. In most cases, inserting a surgical drain will be sufficient, as traumatic fistulas have a proven tendency to heal without endoscopic or surgical intervention. A drain will confine the problem and allow time for further therapeutic consideration.

Conclusion

The ERCP is a safe method for diagnosing pancreatic fistulas and offers a possibility of definite treatment in most cases, with a high success rate and low morbidity. The endoscopic intervention has become the preferred first-line treatment for pancreatic fistulas and has replaced the prolonged conservative treatment in postoperative complications and chronic pancreatitis. In traumatic pancreatic ductal injuries, early endoscopic intervention has proven its value, although it has only been used in limited cases so far. Surgery is necessary only when endoscopy fails or is technically impossible. Surgery is also sometimes preferable in caudal pancreatic duct leakage to avoid ductal damage in the major part of the pancreas.

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