

Diagnosis and Management of Pancreatic Duct Leak

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EXTRACT

Patients who suffered from PL can present as many ways such pseudocyst, ascites or pleural effusion. Identifying the cause is not as important as detailing pancreatic duct anatomy and disrupted site. Patient with low output leak usually has side branch disruption. They also respond well to conventional therapy. Generally, octreotide will speed up healing process of PL and work as a good adjunct to conventional therapy. Patient with partial duct disruption may not heal by conventional therapy alone. Recently endoscopic therapy along with ERP has become a standard of care in a group who fail conventional therapy. Unfortunately patients with duct disconnection and/or leakage at the time will not respond to non-surgical management. Therefore, surgery is the main salvage therapy in this group of patients.

Key words : pancreatic duct, leak, ERP

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INTRODUCTION

Pancreatic duct leak (PL) is an important complication of many pancreatic conditions. The main causes of PL are acute pancreatitis, chronic pancreatitis, post pancreatic surgery and procedure that involved pancreatic duct puncture such as pancreatic fine needle aspiration. Patients who suffered from PL may manifest with pancreatic pseudocyst, pancreatic ascites or pancreatic pleural effusion. The natural course of patients with PL can be spontaneously subsided or requiring intervention including surgery. This course is depended up on variety of factors but the most important factor is duct anatomy.-

Diagnosis of pancreatic duct leak

Fluid analysis is the gold standard to diagnose patient with PL. Apart from clinical manifestations of the above conditions, fluid amylase greater than 3 times of serum level can be helpful to diagnose this condition⁽¹⁾. Generally, the amylase level above 10,000 IU/ml is the definite⁽²⁾. In patient with lower level of amylase from fluid analysis, other cause of fluid collection near the pancreas such as infected cyst or neoplasm has to be ruled out. Moreover, some patients may have blood or WBC contained in the fluid. Generally, ultrasonography, CT scan and MRI are the mainstay to localize the site of collection. However, these imaging

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study do not give any information regarding pancreatic duct anatomy and site of duct disruption. Therefore, additional test that can give information on pancreatic duct anatomy is very helpful. Over the last decade, endoscopic retrograde pancreatography (ERP) is the gold standard for diagnosis of the leakage site⁽³⁾. Over a few years, there are many reports on successful endoscopic treatment of PL in patients who underwent ERP. Generally, ERP can confirm the site and size of PL. However, patient with complete duct obstruction, ERP can not demonstrate duct anatomy beyond the obstructed duct. In this case, magnetic resonance pancreatogram (MRP) can be helpful. With MRP the upstream duct can be identified and the leakage site may be located⁽⁴⁾.

Conventional management of PL

Decreasing pancreatic output is the main strategy to keep low pressure in the pancreatic duct. This in turn, may result in spontaneous duct closure. Traditionally, NPO and intravenous hyperalimentation are common practices to support this concept. Unfortunately, the closure rate of PL is quite low by doing this traditional treatment alone^(5,6). Octreotide has been reported to speed up the healing time for PL. It helps PL healing by reducing pancreatic juice out put. Unfortunately, the percentage of complete sealing is not significantly different between patient with or without octreotide^(7,8). However many experts recommended octreotide administration for patients with PL since it will shorten hospital course and help them making decision to perform intervention sooner⁽⁹⁾.

Pancreatic duct anatomy and management of PL

Determining pancreatic duct anatomy is not only important for classification of high or low output leakage, but it will guide the endoscopist to offer the type of treatment for different patients. Currently, there is no standard classification on variety of leakage. In author's opinion the classification that predict the prognosis and guide physicians on how aggressive they need to intervene to their patients may be the most suitable one.

There are many techniques to obtain pancreatogram but the most popular one is by ERP. The main advantage of ERP is it can give a chance for therapeutic endoscopy apart from diagnostic pancreatogram. The only limitation for ERP is patient with complete

duct obstruction. In this situation, the upstream duct that can not be seen during ERP can be demonstrated by MRP instead.

In this article, we categorized PL into 3 types.

1. Side branch leak (Figure1) This leak usually give a lowest out put. Therefore the chance of PL sealing from conventional management is very high. We reported a success rate of over 90% of patients whom we found to have this type of leak⁽¹⁰⁾.

2. Partial duct disruption (Figure 2,3) This is the most challenging PL since many of them may not be responded to conventional therapy. The pancreatogram is this PL will demonstrate that one side of the main pancreatic has no boundary. There is some extravasation of the contrast trough this defect and the rest of the contrast will go beyond this area into the upstream duct. Many times, the endoscopist may observe some resistant of the contrast flow distally. This is usually secondary to downstream stricture blocking the pancreatic flow forwarding to the papilla. The recommended treatment for this type of PL is to put a plastic stent into the upstream duct to bridge the site of disruption. This may need an additional treatment by plastic dilating catheter. Our recent series has shown a very successful outcome of patients who underwent this mode of treatment⁽¹⁰⁾

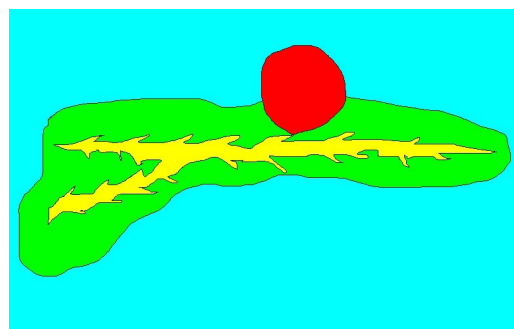


Figure 1 Side branch leak

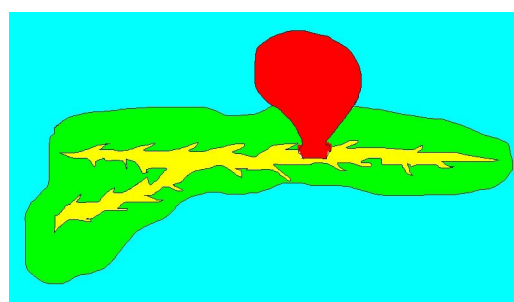


Figure 2 Partial duct disruption

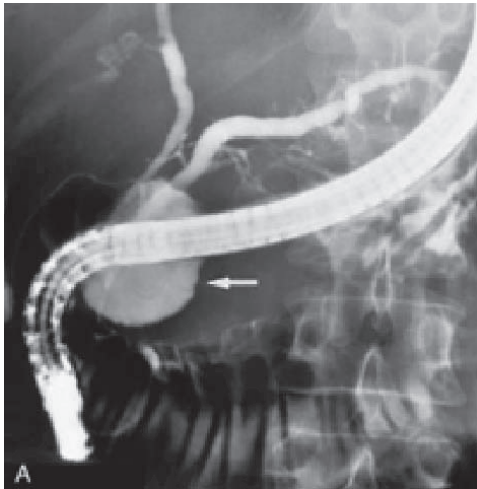


Figure 3 Pancreatogram demonstrated side branch disruption at the head of pancreas

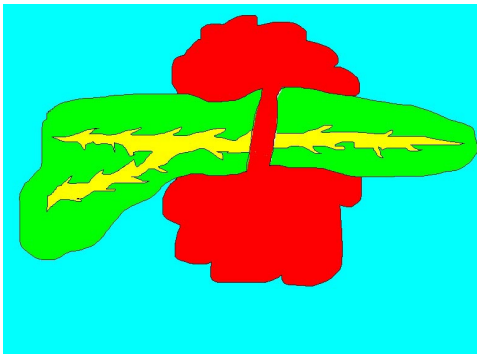


Figure 4 Complete duct disruption



Figure 5 Complete obstruction of the main pancreatic duct. Arrow points to the obstructed site

3. Complete duct disruption or disconnected duct syndrome (Figure 4) Unfortunately, this PL type is the most difficult one to control. Majority of patients presented with a large volume pancreatic output. As mentioned earlier, ERP can demonstrate only the down stream duct but the upstream duct and leakage site can not be demonstrated (Figure 5). MRP can provide this picture but unfortunately it can not offer any therapeutic chance. These patients are rarely respond to conventional therapy⁽¹⁰⁾. The standard treatment is still surgery. The surgical techniques may include pancreatectomy or pancreatic duct drainage. This is depended upon the size of the upstream duct whether that there is any dilation. Patient who will respond to endoscopic therapy is the one who had a very short gap between these two disconnected ducts and the endoscopist is able to traverse the guidewire and put the plastic stent to bridge the ducts

Prognosis of patient with pancreatic tail leakage

This is a special circumstance, since this PL is acting like complete duct disruption. There is no upstream duct in this situation; the next part upstream to the disrupted duct is mainly free space. This is why endoscopic stenting is not working. In addition, the free space usually has a lower pressure than the downstream duct, there fore the main direction of pancreatic juice flow is going away from the ampulla. Endoscopic therapy for these patients has been reported to have a lower rate of healing than others⁽¹¹⁾. Traditionally, this PL requires distal pancreatectomy. Recently

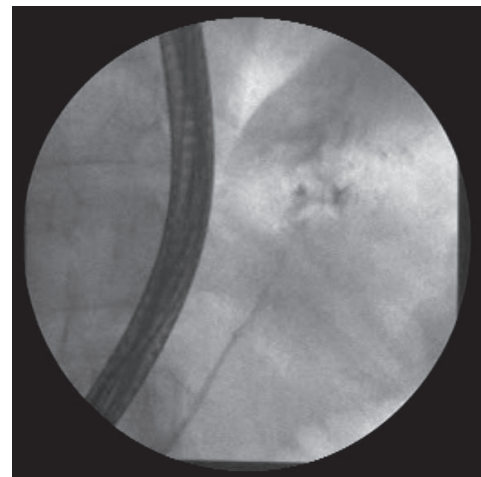


Figure 6 Pancreatic glue injection for tail leakage (N-butyl-2-cyanoacrylate)

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there have been many reports of cyanoacrylate (tissue glue) injected during ERP to seal the leak⁽¹²⁻¹⁴⁾ (Figure 6).

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