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Symposium

Management options in chronic pancreatitis

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Introduction

Chronic pancreatitis (CP) is a progressive and often irreversible inflammatory and fibrotic disease of the pancreas. In moderate to severe forms, CP can have a debilitating clinical course due to chronic abdominal pain, attacks of acute pancreatitis, malnutrition and related complications including pancreatic malignancies. Pain in CP is multifactorial in origin and can result from increased pressure in the main pancreatic duct (MPD) leading to intraparenchymal hypertension, and from peripancreatic/cealic neural inflammation. Management aims at relieving pain and preventing further damage.

Etiology

1. Alcohol: ethanol appears to have direct toxic effects on the pancreas and accounts for 70%–80% of all cases.
2. Autoimmune: autoimmune pancreatitis is treatable with steroids and may not require surgery.
3. Pancreas divisum: an anatomic variation which may result in increased ductal pressure and recurrent episodes of acute pancreatitis.
4. Genetic predisposition:
 - a mutation in the trypsinogen gene
 - b mutation in the serine protease inhibitor Kazal type 1 gene
 - c mutations in the cystic fibrosis transmembrane conductance regulator

Diagnosis

The diagnosis of chronic pancreatitis is based on a history of abdominal pain and radiologic confirmation

of fibrosis and calcification of the gland. The goals of imaging are to:

- (1) Gather anatomic evidence for the presence of chronic pancreatitis
- (2) Assess the diameter of the duct
- (3) Determine the presence of any associated disease (e.g., cysts, bile duct obstruction)
- (4) Search for an unsuspected pancreatic malignancy.
 - (a) ERCP: this was considered the gold standard for the morphologic diagnosis of the chronic pancreatitis. Multifocal dilations, strictures, and irregular contours of the main duct along with calcifications and stones are hallmarks of the disease.
 - (b) MRCP: it provides similar information about duct anatomy and has the advantage of being noninvasive. It has replaced ERCP in evaluating patients of CP and in assessing bile duct strictures.
 - (c) CECT scan: the sensitivity of CECT is as high as 95% in advanced disease, but the pancreas can appear normal in patients with early disease. CECT scan is especially useful to evaluate the complications of chronic pancreatitis.
 - (d) Pancreatic function tests: these are of limited value in diagnosis of CP.

Treatment

Aim

1. Relieve intractable pain
2. Preserve pancreatic endocrine and exocrine function as much as possible

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Indications

1. Intractable pain
2. Suspicion of malignancy
3. Biliary/duodenal/colonic stenosis
4. Pancreatic cyst/pseudocyst
5. Pancreatic ascitis/pleural effusion
6. Portal venous obstruction

Medical

1. Stop alcohol intake
2. Oral analgesic agents as per WHO ladder
3. Narcotics.
4. Tricyclic antidepressants.
5. Celiac plexus nerve block and transcutaneous electrical nerve stimulation (TENS) generally are unsatisfactory.
6. Endocrine dysfunction. Diabetes mellitus requires insulin and dietary restrictions.
7. Exocrine or malabsorption is treated with pancreatic enzyme replacement of at least 30,000 units of lipase with each meal.

Endoscopic

65% of the patients can be expected to be completely or nearly free of pain after 5 years without needing surgery.¹

Procedures available are

1. pancreatic sphincterotomy (efficacy is unknown)²
2. pancreatic ductal stenting
3. extracorporeal shock wave lithotripsy (ESWL) of pancreatic stones (relief of pain in 80%)
4. endoscopic drainage of pancreatic pseudocysts
5. endoscopic celiac nerve block.

Surgical

Principles & rationale

1. Relieve pancreatic duct pressure & interstitial pressure
2. Relief of ductal stenosis &/or obstruction
3. Preserve as much parenchyma as possible
4. Preferably have dilated duct 6–7 mm in diameter.

Timing of surgery

Nealon et al concluded that early operative drainage should be performed before irreversible functional or morphological damage of the pancreas has happened.³ Ihse et al have also recommended that surgical drainage should be performed before pancreatic insufficiency develops.⁴ Complications of adjacent organs should be treated surgically as soon as they are diagnosed.⁵

Surgical procedures

These procedures have historically been classified into:

1. Decompression procedures
2. Resection procedures of the proximal, distal or total pancreas
3. Denervation procedures of pancreas
4. Hybrid procedures.

Surgical denervation has been reported to be ineffective as a first line treatment.⁶ Hybrid procedure combining resections of pancreatic head and decompressions have been proved to be safe and effective as decompression or resection alone.⁵

Decompression procedures

Duval's procedure: resection of distal pancreas with dunking of remaining pancreas

Puestow and Gillesby – 1958

- Longitudinal decompression of the body and tail

Lateral pancreatico-jejunostomy (Partington–Rochelle operation)– 1960

- Unroofing of major and minor pancreatic ducts
- Side to side Pancreatico-jejunostomy with Roux loop of jejunum
- Good short term pain relief in 61–91% patients.^{7,8} However pain recurred within 3–5 years in upto 30% patients.^{7,8} The principal cause of failure of this operation was lack of adequate decompression of proximal ducts in HOP and presence of head mass.⁹

Resection procedures

Whipple's procedure

- Indication
 - ^ Chronic inflammatory mass involving the uncinate process and ventral pancreas
 - ^ Failure of LPJ with undrained uncinate process & HOP
 - ^ Mass in HOP with CBD &/or duodenal stenosis
 - ^ Multiple pseudocysts in HOP esp. associated with CBD or duodenal stenosis.

Short term pain relief is achieved in 71–89% patients.¹⁰ The morbidity rate however remains at about 40% and the mortality rate less than 5% at high volume centers.¹¹

Distal pancreatectomy

- Indication
 - ^ Predominantly distal pancreatic disease with small duct diameter
 - ^ Failed LPJ
 - ^ Pseudocyst with pseudoaneurysm in tail pancreas
 - ^ Small duct disease with sinistral portal HTN
 - ^ Suspicious of malignancy in tail of pancreas

The procedure is associated with significant risk of symptomatic recurrence. Long term pain relief is achieved in only 60% patient, and completion pancreatectomy is needed in 13% patients,¹² in addition endocrine and exocrine insufficiency develops in half of the patients.⁶

Total pancreatoduodenectomy

1. Last resort procedure
2. Apply strict criteria for this procedure.
3. Severe morbidity with TP is brittle DM, and lethal episodes of hypoglycaemia⁶

4. Total pancreatectomy has been increasingly performed with islet cell transplantation.

Hybrid procedures

Beger's procedure – duodenal preserving pancreatic head resection –1980

- Indication
 - ^ inflammatory mass in HOP especially associated with CBD/duodenal stenosis
 - ^ portal HTN due to portal vein compression
- Advantages
 - ^ Avoids major surgical resection of CBD, duodenum, PV and need to restore bile flow, food passage, portal blood flow
 - ^ Preservation of endocrine function of the gland

As per Beger et al,¹³ 50% of patients required decompression of CBD, and longitudinal pancreatico-jejunostomy was performed in 10–15% patients. 80% of patients had adequate pain relief and endocrine and exocrine function was also preserved. The incidence of new onset DM ranges from 8 to 21%.¹⁴

Frey's procedure-1987

- Is an organ preserving surgery
- Modification of Beger's procedure and Partington–Rochelle procedure
- The operation addresses the disease associated with a head mass.
- It is also effective in management of pseudocyst, internal pancreatic fistula, CBD obstruction and at times duodenal obstruction
- Simpler than Beger's procedure
- Inability to rule out malignancy is an absolute contraindication
- Pancreatic duct should be more than 3.5 mm in diameter

Hamburg modification – Longitudinal V shaped excision of ventral aspect of pancreas (Izbicki)

- Is done for small duct disease chronic pancreatitis, duct diameter less than or equal to 3 mm
- Mortality and morbidity rate were 0 and 19.6%, and 89% patient are free of pain.¹⁵

Comparative results of hybrid procedures versus resection procedures

(a) Beger's vs Whipple's

Klempa et al¹⁶ demonstrated in a study of 43 patients with a follow up period of 3–5 years that those receiving DPPHR had better pain relief, a shorter hospital stay and less post operative pancreatic dysfunction than those who underwent PD.

Buchler et al¹⁷ have found that after 6 months patients undergoing DPPHR have better pain relief and better post operative pancreatic dysfunction than do patients undergoing PPPD and have a similar morbidity rate.

A study by Aspelund et al¹⁸ has shown that the rate of major complications is 25% after DPPHR and 40% after PD.

(b) Frey's vs Whipple's

Izbicki et al¹⁹ study of 61 patients found that patients who underwent Frey's procedure had a lower morbidity rate of 19% and better quality of life score of 71% than those who underwent PPPD who had morbidity rate of 53% and quality of life score of 43%, both groups though had similar degree of pain relief.

Starate et al²⁰ have recently found that rates of pain relief, pancreatic function and survival rates were similar for both procedures after an average follow up period of 7 years. However the rate of new diabetes was 61% after Frey's procedure and 65% after PPPD, both of which were twice as high as before surgery.

(c) Berner modification versus PPPD

Farkas et al²¹ found that the Berner modification produced pain relief equal to that of PPPD but was also associated with shorter operative time, less intraoperative blood loss, lower rate of post operative morbidity, a shorter hospital stay and a better quality of life than was PPPD.

(d) Beger's vs Frey's

Izbicki et al²² examined 74 patients randomly assigned to Beger's and Frey's procedure with an average follow up period of 8.5 years and found no significant difference between the procedures in terms of pain intensity, mortality rate, exocrine or endocrine insufficiency and global quality of life.

Aspelund et al¹⁸ have found a lower incidence of new diabetes (85%) for both Beger's and Frey procedure compared with PD (25%). However there was no significant difference in pain relief between DPPHR and Frey procedure.

Berner modification vs DPPHR

Koninger et al²³ have found that long term pain relief and quality of life score did not differ significantly between the two procedures.

Surgery for complications

1. Pseudocyst : endoscopic/open internal drainage.
2. Portal hypertension: Splenectomy and devascularisation.
3. Pancreatic duct strictures: Roux en Y LPJ with Hepatico-jejunostomy.

Conclusion

The surgical technique must be adjusted for the pathomorphologic changes of the pancreas. Both PD and PPPD, once the standard operation for the patients with CP, have been replaced by Hybrid procedures such as DPPHR, Frey procedure and their variants. These procedures are safe and effective in providing long term pain relief and in treating CP related complications. the

hybrid procedures should be the operations of choice for patients with CP. Although surgical treatment provides effective long term pain relief and improves quality of life, it does not stop decrease in endocrine or exocrine function. Therefore, strategies to improve or maintain pancreatic endocrine and exocrine function remain an important field of research.

Conflicts of interest

None identified.

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