

Surgical management of intractable pain in chronic pancreatitis: past and present

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Abstract The surgical management of pain in patients with chronic pancreatitis continues to provide a formidable challenge. Despite recent advances in the area of the pathophysiological cause of the symptoms of chronic pancreatitis there is still controversy as to the exact mechanisms that result in pain in both large and small duct disease. In addition, the surgical community has very polarized views as to the correct management of these patients. In this review we have set out to summarize the treatment options available and provide comparative data where available. Data were found following a computer search of the Medline database from 1966 to the present. The information extracted comprises mainly level two and level three data. There is a continuing lack of a “gold standard” in the surgical management of pancreatic pain. This is mainly due to the paucity of randomized controlled trials in the field of pancreatic surgery. With only four randomized controlled trials reported in the world literature it is difficult to state categorically what is the optimal treatment for this difficult group of patients. Until there is increased standardization in the reporting of both the physiological outcomes and quality-of-life issues in the surgical management of chronic pancreatitis this will continue to be the situation.

Key words Chronic pancreatitis · Pain · Surgical management

Introduction

The management of patients with chronic pancreatitis continues to be a formidable challenge to the surgical community. The large volume of published work on the matter offers a broad spectrum of opinion, advocating interventions ranging from minimal to major, and which surgical procedure should be the treatment of choice.

Despite extensive investigation the surgical management of this condition is still hampered by the lack of detailed understanding of the natural history of the disease process and how the initiating pathologies affect the progression of the disease in its chronic form.

The vast majority of patients with chronic pancreatitis (CP) are managed conservatively and never require operative intervention,¹ although about 20% of patients with chronic pancreatitis require frequent opioid analgesia. However, in those patients that eventually come to surgery the primary symptom (>90% of cases) is usually intractable abdominal or back pain.^{2,3} Indeed, no surgical procedure has been shown to improve endocrine or exocrine function, although some appear to reduce the rate of deterioration.^{4,5} The main indication for operative intervention is intolerable pain, and the aim of surgery is the relief of this symptom. However, there are other local complications of chronic pancreatitis that can be most successfully managed by operative intervention. These include pseudocysts, common bile duct obstruction, duodenal obstruction, portal vein obstruction with ensuing portal hypertension, and exclusion of malignancy.^{6,7}

The initial step in the management of a CP patient with intractable pain is to rule out the presence of complications of CP that may be the cause of the pain. The two most common such complications are pseudocysts and compression of adjacent viscera. Both these complications are best managed by surgery.

Surgical procedures for the management of pain in chronic pancreatitis can be broadly divided into two groups: ductal decompression with drainage procedures and pancreatic resection. The rationale behind which type of procedure is performed is based not only on the pancreatic anatomy, primarily dilatation and stricturing of the duct of Wirsung, as seen at endoscopic retrograde cholangiopancreatography (ERCP), ultrasound scan, and computerized tomography^{3,8,9} but also the preference of the surgeon.

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Methodology

A computer search of the Medline and PubMed databases was undertaken by the first author. The time constraints for this search were from 1966 to the present. The authors initially analyzed randomized controlled trials (level two data); however, due to the paucity of this quality of data, reported series and reviews (level three data) were then analyzed. The lack of quality data from randomized controlled trials means that it is impossible to state with absolute conviction the optimal management plan for patients with intractable pain from CP.

Pathophysiology of pain in chronic pancreatitis

The root cause of the debilitating pain that plagues many patients with CP remains an area of controversy. It is generally accepted that the pain of large duct and small duct disease can be attributed, in the main, to different pathological processes.

Large duct CP is characterized by a macroscopically dilated main pancreatic duct, as visualized at ERCP or CT. The principal pathological cause of pain in these patients is pancreatic ductal hypertension, resulting from the proximal stricturing of the duct.^{10,11} There is also evidence that the blood flow through the fibrosed chronic pancreatitis gland is significantly reduced when compared with the normal pancreas, especially when actively secreting, and that ischemia may contribute to the pain of CP.¹²

The pain associated with CP in which the main pancreatic duct is essentially normal in diameter and morphology (small duct CP) is thought to have a different pathological basis. The chronic inflammatory process has been shown to involve the pancreatic nerves, not only resulting in fibrosis around nerves and injury to the perineurium¹³ but also resulting in an actual increase in the number of nerve fibers present. Also, it has been shown that substance P and calcitonin gene-related peptide (both pain neurotransmitters) are found in higher than normal concentrations within CP pancreata.¹⁴ Many authors feel that this combination of inflamed nerves, raised concentrations of neurotransmitters, and, more recently, increased levels of inflammatory mediators (interleukin [IL]-8),¹⁵ results in a "neuroimmune interaction" that, in turn, causes the pain associated with CP.¹⁵⁻¹⁸

Non-pancreatic management of pain

The main indication for surgical intervention in CP is pain. Therefore attempts have been made to manage

this symptom without submitting the patient to a major abdominal procedure and the associated potential complications. Two techniques that have been used in this area are celiac plexus blockade and splanchnicectomy.

Celiac plexus blockade has successfully been used in the management of abdominal pain secondary to pancreatic carcinoma.¹⁹ However, these results have not been reproduced in patients with CP. Although good pain relief can be achieved, it is only transient in nature, lasting up to 4 months in the most successful cases and is therefore of limited use for long-term pain management in CP.^{20,21}

Left splanchnicectomy was first described in the 1950s by Mallet-Guy; and although 85% of patients in his series had good results at 5 years, these findings have not been repeated by other investigators.^{22,23} In the past few years thoracoscopic splanchnicectomy, both unilateral and bilateral, has been evaluated. The potential benefit of this minimally invasive approach is the reduced mortality and morbidity compared with an open procedure, which had a mortality of 5% in Mallet-Guy's series.²² Results from limited follow-up suggest that this procedure has a role to play in the management of pain from CP, whether as a long-term solution or an interim measure is yet to be established.²⁴⁻²⁶

Drainage procedures

Ductal decompression and drainage are the basis for surgical treatment of a dilated and strictured main pancreatic duct, with or without additional calculi. The argument supporting the use of these procedures is that ductal hypertension (25 mm Hg in CP compared with 7 mm Hg in normal population), resulting from the proximal obstruction of the duct, is the root cause of the pain and that this may be relieved by decompression of the system.^{10,11} As mentioned previously, there is also evidence that ischemia may contribute to the pain of CP.¹² Longitudinal decompression of the main pancreatic duct, in CP, has been shown to improve pancreatic blood flow in an animal model;⁹ this may have a beneficial effect on the ischemic element of CP pain.

The first attempts at pancreatic duct decompression involved distal pancreatic resection with anastomosis of the proximal portion of the gland into a jejunal loop.²⁷ The reported results of this technique were disappointing, as only about half the patients benefited in terms of pain relief. The failure of this technique to adequately decompress the pancreatic duct is attributable to the morphological changes that occur with CP. The classical "chain of lakes" appearance with areas of both ductal stricturing and dilatation is not amenable to drainage with simple distal resection.