“Puestow modified procedure in the era of advanced endoscopic interventions for the management of chronic lithiasic pancreatitis. A two cases report”

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ABSTRACT

INTRODUCTION: Pancreatic duct calculi in chronic pancreatitis (CP) patients are the main cause of intractable pain which is their main symptom. Decompression options for the main pancreatic duct are both surgical and advanced endoscopic procedures.

PRESENTATION OF CASES: A 64-year-old male with known CP due to alcohol consumption and a 36-year-old female with known idiopathic CP and pancreatic duct calculi were managed recently in our hospital where endoscopic procedures were unsuccessful. A surgical therapy was considered and a longitudinal pancreaticojejunostomy (modified Puestow procedure) in both patients was performed with excellent results.

DISCUSSION: Over the last 30 years, endoscopic procedures are developed to manage pancreatic duct strictures and calculi of the main pancreatic duct in CP patients. In both of our cases endoscopic therapy was first attempted but failed to extract the pancreatic duct stones, due to their size and speculations. Modified Puestow procedure was performed for both and it was successful for long term pain relief.

CONCLUSION: Despite advancement in endoscopic interventions and less invasive therapies for the management of chronic lithiasic pancreatitis we consider that classic surgical management can be appropriate in certain cases.

1. Introduction

Chronic pancreatitis (CP) is a chronic inflammatory disease of the pancreatic parenchyma and is commonly caused by alcohol consumption. Up to 90% of CP patients develop calcifications of the pancreatic duct during long-term follow-up [1]. Pancreatic duct calculi cause upstream obstructive phenomena and result in increased pressure of the pancreatic parenchyma, ischemia and can lead to abdominal pain [2]. Both surgical drainage and endoscopic procedures are options in the multidisciplinary treatment plan. With the opportunity of two patients with Chronic Lithiasic Pancreatitis (CLP) treated in our hospital where endoscopic procedures failed and were finally surgically managed, the main considerations in patients with CLP are highlighted.

2. Methods – surgical approach

A modified Puestow procedure (lateral pancreaticojejunostomy) was performed in both patients. Partington and Rochelle introduced the modification of Puestow procedure in 1960 [3]. The following modification is the elimination of the resection of the pancreatic tail and therefore did not require distal pancreatectomy, splenectomy, or mobilization of the pancreas from its retroperitoneal attachments. Briefly, after a bilateral subcostal incision, the gastrocolic ligament is dissected and divided for the exposure of the entire anterior surface of the pancreas and to trace the pancreatic duct. A needle-tip electrocautery and a tonsil clamp are used to make a long longitudinal opening of the duct to ensure full decompression. After the removal of ductal calculi and concretions, resected or cored out pancreatic parenchyma should be sent for frozen section to rule out occult malignancy. Next, a 50 cm Roux-en-Y limb is constructed and the jejenum is divided 20–30 cm distal to the ligament of Tretz. Subsequently, a side-to-side jejuno-jejunostomy is performed between the proximal jejenum and the distal part of the Roux limb. Then the proximal Roux-en-Y limb is passed retrocolic and positioned next to the lateral opening of the
pancreatic duct. An enterotomy is made along the antimesenteric border of the jejunal loop, slightly shorter than the length of the duct incision as the intestine will stretch. We performed the pancreaticojejunal anastomosis with a single layer of a running 4–0 absorbable suture between full thickness small bowel and pancreatic duct, though that the pancreatic stitch might include a small portion of the transected parenchymal edge. Yet, if the pancreatic parenchyma is indurated the pancreatic stitches can be attained directly to the pancreas.

3. Presentation of case #1

A 64-year-old male with known CP due to alcohol consumption was admitted to our hospital complaining of intractable pain after meals. MRCP showed a dilated pancreatic duct measuring 9 mm in diameter and multiple large pancreatic calculi (Fig. 1). Attempts for stone extraction via ERCP failed twice due to the size of the stone and the inability to catheterize proximal to that obliterating calculi. Patient underwent a lateral pancreaticojejunal anastomosis after stone extraction and confirmation of pancreatic duct clearance of calculi duct up to Vater’s ampulla (Fig. 2a and b). The patient had an uneventful postoperative course and twelve months post surgery he remains pain free avoiding also alcohol consumption after psychiatric consultation.

4. Presentation of case #2

A 36-year-old female with known idiopathic chronic pancreatitis was admitted for the management of main and secondary pancreatic duct enlargement due to multiple pancreatic duct stones. Multiple pancreatic duct calculi were known for the last three years (Fig. 3) managed unsuccessfully with ERCP and multiple stenting of the main pancreatic duct with 5F plastic stents (Fig. 4). She underwent lateral pancreaticojejunal anastomosis after pancreatic duct clearance of calculi and cholecystectomy (Fig. 5). The patient had an uneventful course and remains symptom free for the last three years.

Fig. 1. MRCP showing dilated pancreatic duct (arrow) and multiple large pancreatic calculi.

Fig. 3. Abdominal c/t scan showing multiple calculi into the pancreatic duct.

Fig. 4. A plastic 5F stent placed into the main pancreatic duct on a plain abdominal X-ray.

Fig. 2. (a) Intraoperative view of a longitudinally open pancreatic duct after removal of the intraductal calculi, and (b) of the pancreaticojejunal anastomosis.
5. Discussion

The formations of stones in CP are caused by the crystallization and deposition of calcium carbonate as long as alcohol and CP cause hypersaturation of pancreatic juice with calcium with stones formation. Over the last 30 years, endoscopic procedures are developed to manage pancreatic duct strictures and calculi of the main pancreatic duct in CP patients. Small stones can be extracted using various endoscopic techniques such as balloon or basket sweeping. Larger and impacted stones typically require lithotripsy or surgery.

The diagnosis of CP is set by clinical means and imaging modalities. On plain X-ray pancreatic calcifications are detected in 30% of CP patients [4]. Abdominal ultrasound has limited value, but computed tomography (CT) scan provides detailed imaging of pancreatic stones. Endoscopic retrograde cholangiopancreatography (ERCP) and magnetic resonance cholangiopancreatography (MRCP) are valuable adjunct to the evaluation of the exact location of the calculi and duct system anatomy. Moreover, ERCP may be therapeutic, if the stones are extracted.

Initial conservative measures for CP patient’s management are low fat diet, oral pancreatic enzymes supplementation, and simple analgesics, and of course alcohol usage cessation. By these means stones are not resolved but at least stop increasing in size, while cholecystokinin stimulation is reduced, and as a result the pain is controlled as well. Trimethadione is reported to cause stone dissolution, but hepatotoxicity issues make that option not applicable in most cases.

In older randomized trials is demonstrated that surgical therapy turns to have more durable results and results in pain relief for longer intervals [5]. Today, due to further development of endoscopic techniques, endoscopic therapy is usually the first preferred option because of less invasiveness. Balloon or basket sweeping, pancreatic sphincterotomy, pancreatic stricture dilation and intraductal lithotripsy are the various endoscopic techniques that are implemented in such cases. Positive response to endoscopic treatment is a predictor of good surgical results when operative approach is administered in the course of the disease [6]. Endoscopic stone removal is attempted when upstream pancreatic duct dilatation is present. However, pancreatic stones are harder and speculated in comparison to bile duct stones and these features explain why pancreatic stones imply difficulties for extraction. Endoscopic stone removal is successful in 50% of cases with standard techniques [7].

Extracorporeal shock wave lithotripsy (ESWL) points to fragmentation of large stones in smaller pieces in order to be removed with standard ERCP techniques afterwards. With the adjunct of ESWL, endoscopic therapy is reported successful in up to 90% of cases. In a retrospective study by Tandan et al., the authors conclude that ESWL should be offered as the first-line therapy in patients who have duct stones confined to the head, genu, and body regions of the pancreas and those who do not have concomitant multiple pancreatic duct strictures especially in young patients with chronic CP [8].

On the other hand, proponents of surgical therapy highlight that surgery results in opening of the pancreatic capsule, which alleviates interstitial pressure, whereas longitudinal anastomosis ensures full drainage of the whole pancreatic duct length. Moreover, endoscopic stenting of the main pancreatic duct may interfere with secondary ducts clearance, or even make things worse [9]. The decision for surgical therapy depends on many factors: pancreatic duct diameter, duct strictures, pain severity indexes, malignancy concerns, associated biliary duct obstruction and operative risk. Resection, drainage and decompression, or derenerative and combination procedures have been described. Regarding surgical treatment, lateral pancreaticojejunostomy or modified Puestow procedure is the most common and well-studied surgical technique for such cases [10]. It is successful in CLP without an inflammatory mass in the head of the pancreas for pain relief in 90% of patients and is suited for pancreatic ducts > 8 mm [11]. Pancreatic leak is low (0.03–5%) in appropriate selected patients with a fibrotic gland [10]. Postoperative mortality rate and disease incidence of patients who underwent the Partington–Rochelle procedure were lower than among those who had the original Puestow procedure, at approximately 3% and 20%, respectively [12,13].

Nevertheless, this is a debatable issue and there are data to support all the various procedures for surgical drainage for chronic lithiasic pancreatitis. Pancreatic head resections with drainage procedures (Beger, Berne, and Frey) have all been proven to be equally effective in terms of morbidity, mortality, and improvement of pain symptoms in small, randomized controlled trials [10].

Two RCTs have addressed the controversy whether endoscopic or surgical treatment is superior in patients with obstructive chronic pancreatitis [14]. Dite et al. reported for the first time that surgery is superior to endotherapy for long-term pain reduction and gain in body weight [5]. Cahan and colleagues showed that compared with endoscopic drainage, lateral pancreaticojejunostomy has the advantage of providing improvement of quality of life and pain relief, while patients receiving endoscopic treatment required additionally procedures [9]. Furthermore, at long-term follow-up of up to 7 years, the authors also reported that 47% of endoscopically treated patients eventually underwent surgery and confirm that surgery is the preferred treatment in symptomatic patients with advanced chronic pancreatitis [15]. Nevertheless, a subgroup of patients in both RCTs representing about 30% of the study population do seem to profit, even in long term, from endoscopic treatment alone [14]. Endoscopic therapy was first attempted in both of our cases but failed to extract the pancreatic duct stones due to their size and speculations. Modified Puestow procedure was performed for both and it was successful for long-term pain relief.

6. Conclusion

Patients with CLP are difficult to manage and multidisciplinary approach should be introduced. Endoscopic therapy is always the
first choice, but despite advances and expertise, surgical options are invaluable and maybe more advantageous in time.

Conflict of interest

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Consent

Patient consent has been obtained.

Author contributions

G.P. Fragulidis: study concept and design, drafted the manuscript writing the paper, revised the manuscript.
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References


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