# CHAPTER 55

# Major resection for chronic pancreatitis

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## Introduction

Chronic pancreatitis (CP) is an inflammatory disorder of the pancreas characterized by progressive glandular fibrosis leading to permanent and progressive structural and functional changes producing unrelenting pain with exocrine and eventually endocrine insufficiency (1). The pathophysiology of pain related to the disease remains shrouded. Various hypotheses suggest the pain of CP is due to pancreatic compartment syndrome from duct obstruction, ischemia or claudication, hypersensitivity of sensory nerves due to myelin sheath disruption, or increased nerve endings within the diseased pancreas (2–4). Regardless of the etiology, patients present typically with pain requiring narcotic treatment. Symptoms and signs of pancreatic insufficiency evolve over 3–10 years after initial presentation and include steatorrhea from protein malabsorption, malnutrition, and hyperglycemia or diabetes from β-cell destruction.

No standard of therapy exists, and outcome measures are not universal in the literature (5). The patient refractory to medical and endoscopic management is evaluated for operative intervention with the primary goal of improving quality of life by relieving pain. Strict patient selection is a prerequisite to achieve good outcomes in the context of invasive interventions. In short, the patient's history and pancreatic anatomy must fit a pattern, CP must be confirmed with its severity quantified, and duct abnormalities should be imaged. Otherwise, misdiagnosis and limited patient satisfaction will likely limit patient benefit.

Notably, many patients during the natural course of CP, after resection or after drainage, become "brittle" diabetics (6). During the late 1970s, islet-cell autotransplantation (IAT) was developed in order to decrease the incidence of poorly controlled diabetes after resection (7). Several select groups have published their individual experience with IAT (8–10). These series show that IAT is a safe adjunct to resection, with an overall improvement in quality of life with prevention of "brittle" diabetes.

## Surgery for chronic pancreatitis

Controversy remains regarding the timing of operative intervention (11,12). Most surgeons suggest operative intervention as treatment for complications and then only once medical and endoscopic methods are exhausted.

The anatomy of the pancreas and the main duct involved with the inflammatory mass of CP is paramount to surgical planning. The head of the pancreas is felt to be the "pacemaker of chronic pancreatitis," and resection is indicated for those patients with head-dominant or small-duct disease (13). For those with isolated, pancreatic head-dominant CP, resection is indicated. The Beger procedure (duodenum-preserving pancreatic head resection) and anatomic pancreatoduodenectomy (PD) are used and have been shown to have equivalent efficacy (14). In those patients with large-duct disease (>7 mm), decompression has

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evolved and includes the historic though now no longer performed DuVal and Puestow procedures, the Partington–Rochelle modification (lateral pancreaticojejunostomy), and more recently the Frey procedure. For tail-dominant disease or diffuse small-duct disease, distal and total pancreatectomy are performed, respectively. Which procedure to perform is based on surgeon preference, experience, pancreatic parenchyma, and ductal anatomy.

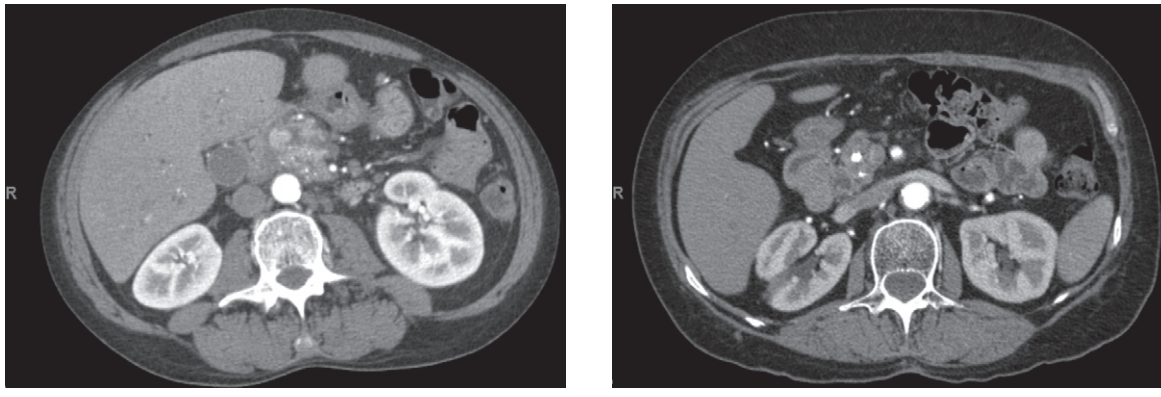
Those patients with an inflammatory mass require a resection. We will discuss pancreatoduodenectomy (PD; the Whipple procedure), distal pancreatectomy (DP), and total pancreatectomy (TP) with IAT.

## Pancreatoduodenectomy

Pancreatoduodenectomy (PD) is a combined procedure for the treatment of CP. The procedure combines a resection of the head and uncinate process along with drainage of the main duct. This procedure is indicated for patients with an inflammatory mass involving the head of the pancreas (Fig. 55.1). Determination of the parenchymal and ductal anatomy is best evaluated by triple-phase computed tomography. Malignancy must be ruled out by endoscopic-guided biopsy.

Our preferred procedure is a pylorus-preserving PD. Lymphadenectomy is not indicated and has not been shown to improve outcomes. The procedure is initiated through a bilateral subcostal incision. The viscera are inspected for occult malignancy. The lesser sac is entered widely through the avascular plane superior to the mesocolon. The gastrocolic trunk is identified, ligated, and divided. An extended Kocher maneuver releasing the lateral duodenal ligament to expose the superior mesenteric vein is performed, being cautious not to avulse venous attachments during retraction. The hepatic flexure of the colon is mobilized medially and inferiorly, and the duodenum is mobilized superiorly to the foramen of Winslow. The distal duodenum is skeletonized and divided with a stapler. Next, the hepatoduodenal ligament is dissected, and a cholecystectomy is performed. The common hepatic duct is divided. The gastroduodenal artery is identified, stapled, and divided. Dissection of the plane underneath the pancreas overlying the portal vein is completed, and the pancreatic neck is divided. The uncinate process is divided from attachments to the superior mesenteric vessels with a harmonic scalpel and a stapler. The jejunum is mobilized and passed through the transverse mesocolon to construct the duct-to-mucosa, end-to-side pancreaticojejunostomy over a free-floating stent. An end-to-side hepaticojejunostomy and duodenojejunostomy are constructed. The pancreatic and bile duct anastomoses are retrocolic, while the enteric anastomosis (duodenojejunostomy or gastrojejunostomy) is antecolic. One silastic drain is placed near the pancreatic anastomosis.

Patient education and appropriate postoperative expectations are required prior to major resection procedures. At high-volume institutions, mortality is low (<3%) after PD for CP, but morbidity is high. At the University of Alabama–Birmingham, we have performed 65 PDs for CP in the past 6 years, with a 90-day overall mortality of 0% and a complication rate of 46%




(a) (b)

**Figure 55.1** Chronic pancreatitis with inflammatory mass involving the head of the gland; note multiple calcifications.

(8% severe). The most common complication after PD is pancreatic fistula. In our experience, 14% of patients develop a pancreatic fistula after PD for CP compared with 25% for pancreatic cancer. These differences are likely related to pancreatic firmness and duct size, both of which tend to be greater in patients with CP compared with pancreatic cancer (15). Up to 90% of patients have improvement in pain after PD for CP (16). In contrast, pancreatic insufficiency can be worsened by resection.

Specialized centers are now gaining experience in laparoscopic and robot-assisted PD with outcomes comparable to those for open resection (17). These reports are encouraging but in their infancy. Subset analysis evaluating primary outcomes for CP are lacking.

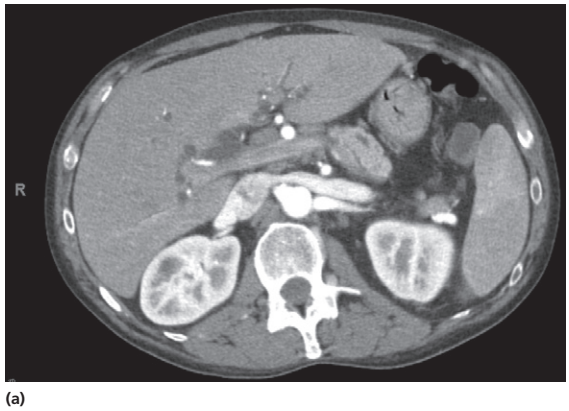
## Distal pancreatectomy

Distal pancreatectomy is indicated for a select few patients with CP. In our experience, 15% of CP patients have been candidates for DP in the past 6 years. This procedure is indicated for the tail-specific disease that can occur after trauma secondary to ductal disruption or with ductal obstructions and subsequent tail-localized pancreatitis (Fig. 55.2). DP provides resection of the diseased pancreas but not drainage of the duct. Abnormally dilated ducts of the pancreatic body, neck, and head suggest disease extending beyond the tail. In these cases, DP may not be the procedure of choice. Tailoring resection must take into account the entire duct and parenchyma to achieve expectations.

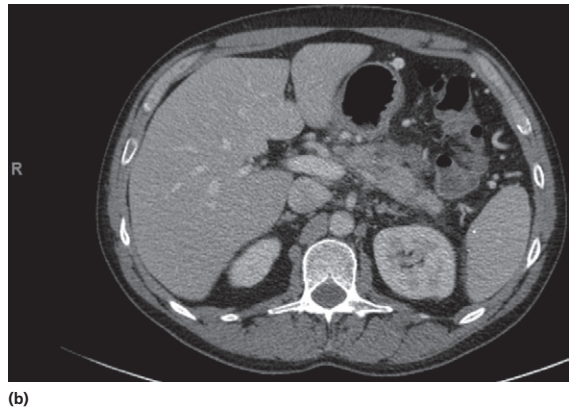
Distal pancreatectomy can be performed using open or laparoscopic techniques (18,19). Both are feasible, a recent meta-analysis, however, has shown that the laparoscopic technique affords improved morbidity and shortens the duration of stay without sacrificing operative time (20,21). Of note, these studies reviewed resections for cancer. There remains a paucity of information related to resection for CP.

In contrast to resection for adenocarcinoma, splenic preservation can be entertained in these selected patients with CP. Techniques to preserve the spleen by dissecting the pancreas off the splenic vessels or ligating the vessels and preserving the short gastric vessels have been described (22,23). The inflammatory process of the pancreas may obliterate the surgical plane between the splenic vessels, making their preservation impossible. Preservation of the spleen typically is more challenging and time-consuming but affords the patient protection from encapsulated bacteria (24,25).

In our practice, splenic preservation is optimal, and we attempt the laparoscopic technique for all patients with left-sided CP. The patient is positioned supine with a nasogastric tube inserted. The left arm is tucked, and a bump is placed under the left flank. A 3-cm transverse, left paramedian supraumbilical incision is made to accommodate a 12-cm port. We place three additional 5-mm trochars in the left lower quadrant at the left anterior axillary line, in the upper midline, and in the left midclavicular line. The lesser sac is entered with a harmonic scalpel. If *en bloc* resection of the spleen is planned, dissection commences up the greater curve of the stomach to the left crus taking the short gastric




(a)




(b)

**Figure 55.2** Chronic pancreatitis limited to body and tail; note moderately dilated pancreatic duct. The proximal head parenchyma was normal, and the pancreatic duct was not dilated.

vesels with the harmonic scalpel. Attention is then directed to the inferior border of pancreas and division of the peritoneal attachments there. A plane is developed to expose the splenic vessels with the inferior pancreas. Once the pancreas is mobilized, the splenic vessels are dissected free from the pancreas and divided individually with a vascular load stapler. The pancreas is divided with an endo stapler. The dissection moves laterally by mobilizing the distal pancreas and spleen from their ligamentous attachments. The specimen is delivered with an endo-catch bag, while the spleen is morselized. A Jackson–Pratt drain is placed in the operative bed.

Our expected duration of hospital stay is 5 days, with an expected rate of postoperative pancreatic fistula of 40% with only 20% being clinically significant.

## Total pancreatectomy

With delay in cure or definitive therapy of CP, pancreatic function continues to fail. Importantly, diabetes occurs in about 60% of patients with CP, with up to 30% occurring *de novo* after operation (26,27). The literature on operative treatment of CP shows consistently a 35% rate of reoperation or salvage pancreatectomy due to progressive recurrent pain or pancreatitis (8,10,28). An alternative to multiple operations and interventions is initial TP, which has been shown to be beneficial and safe (29). Yet, the apancreatic state carries a heavy burden and is a "disease" itself. We do not recommend TP alone for the treatment of CP. Using IAT as an adjunct to TP has shown considerable promise.

Previous studies of TP with IAT have reported up to an 85% improvement in pain with up to 30% of patients being insulin free (9,30,31). For patients with diffuse pancreatic disease and a small duct, we recommend TP with IAT (Fig. 55.3). Those with large-duct disease typically have atrophic glands, islet yield is poor, and most patients do not benefit from IAT. We do not recommend TP for large-duct disease.

Through a bilateral subcostal incision, the lesser sac is opened widely and a Kocher maneuver performed. The superior and inferior borders of the pancreas are mobilized and splenic vessels are considered for preservation. The tail and body of the pancreas are mobilized completely, and the gastrocolic trunk is isolated and ligated along with the epiploic vessels from the gastroduodenal artery. The neck of the pancreas is divided.

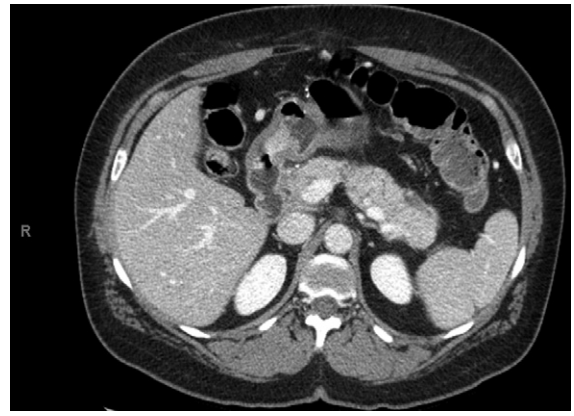



**Figure 55.3** Chronic pancreatitis with diffusely enlarged pancreas with no ductal dilatation.

The specimen is passed off to the transplant team for islet preparation. The remaining specimen is removed as in PD. A retrocolic, end-to-side duodenojejunostomy is performed with running 3-0 PDS suture. After this, an end-to-side hepaticojejunostomy with interrupted 5-0 PDS sutures is fashioned.

After about 1.5 hours, the islets are returned for injection. These are delivered directly into the portal vein over about a 30-minute period. The venipuncture site is closed with a suture. A Jackson–Pratt drain is placed near the hepaticoduodenostomy.

## Conclusion

Management of chronic pancreatitis requires a multidisciplinary approach. In properly selected patients, operative intervention provides a safe and beneficial result at high volume institutions. Fundamentally, interventions must be planned based on pancreatic duct and paranchymal anatomy and pathology to realize optimal results.

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