Commentary

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We would agree with the authors that there are two options in terms of surgery for chronic pancreatitis – *vis.* Resection or drainage procedures, however, most of our patients presenting with symptomatic chronic pancreatitis and requiring operative therapy do so with parenchymal disease rather than predominantly main duct obstruction, and, therefore, resection is the mainstay of our practice in the operative management of chronic pancreatitis. Drainage procedures are confined largely to drainage of pancreatic pseudocysts with a Roux-en-Y pseudocyst-jejunostomy. We prefer this option to pseudocyst-gastrostomy in order to minimise the influx of gastric content into the pseudocyst cavity. In many cases, patients present with enlargement of the pancreatic head simulating neoplasia and, therefore, are treated as we would for any suspicious pancreatic head mass and undergo a pancreatoduodenectomy. As many as 20 % of patients undergoing pancreatoduodenectomy for a pancreatic head mass prove subsequently to have chronic pancreatitis or intraductal papillary mucinous neoplasms on histologic examination of the specimen.

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14.1 Preoperative Assessment

Patients with established chronic pancreatitis may be considered for operative treatment because of intractable pain or complications associated with the disease. These complications include extrinsic compression of the bile duct, duodenum, or portal/superior mesenteric vein. We prefer to operate before the patient is opiate-dependent, although even patients on high doses of morphine may be weaned off opiates after resection. We require patients with alcohol-related chronic pancreatitis to demonstrate that they have stopped drinking before any operative therapy.

All patients are assessed using a high-quality, multi-phase contrast-enhanced CT as the principal modality of imaging. CT is particularly helpful in assessing involvement of the superior mesenteric, portal, and splenic veins and the development of varices. Cavernous transformation of the portal vein with extensive varices around the head of the pancreas is a relative contra-indication to resection of the pancreatic head. The presence of clinically relevant liver disease/cirrhosis is also a relative contra-indication to operative intervention because these patients have a very poor outcome after major surgery.

14.2 Duodenum-Preserving Pancreatic Head Resection

As long as there is no suspicion of cancer, our preferred operative approach is the duodenum-preserving pancreatic head resection, with or without transection of the pancreatic neck (Beger or Frey procedures). The principal aim of this procedure is to remove any inflammatory mass within the pancreatic head and decompress the bile duct, duodenum, and portal vein, whilst retaining normal enteric and biliary anatomy and preserving as much functioning pancreatic tissue as possible. Initial exposure proceeds as for a standard pancreatoduodenectomy with a Kocher maneuver of the duodenum and separation of the greater omentum from the transverse colon. The lesser sac is thus exposed, although in patients with chronic pancreatitis, this space may be largely obliterated by inflammatory adhesions between the anterior surface of the pancreas and the posterior surface of the stomach and transverse mesocolon. The superior mesenteric vein is identified and the inferior border of the pancreas defined, allowing initial assessment of the degree of involvement of the superior mesenteric vein. The gastro-hepatic omentum is then opened to expose the superior border of the pancreas and the portal vein above the pancreatic neck. The stomach and proximal duodenum are lifted away from the neck of the pancreas in order to allow full access to the pancreatic neck from the inferior compartment. We prefer not to ligate the main trunk of the gastroduodenal artery in order to preserve the blood supply to the superior pancreatoduodenal arterial arcades, although some of its lesser branches will be ligated at a later stage in the procedure. The key decision is to determine whether it is possible to safely divide the neck of the pancreas along the line of the SMV/portal vein and perform a classic Beger-type resection. If the neck cannot be separated from the vein, then we would proceed with the Berne modification of the Frey procedure; *i.e.* non-anatomic resection of the pancreatic head alone without formal division of the neck of the pancreas. If the neck can be separated from the portal vein, then it is divided between stays using diathermy in the same way as for a

pancreatoduodenectomy. We do not send samples routinely for frozen section analysis; however, if the surgeon is suspicious of the presence of tumour tissue, then core biopsies from the pancreatic head may be sent for frozen section analysis and a formal pancreatoduodenectomy considered.

After transection of the pancreatic neck, the head and uncinate process of the pancreas are outlined with a series of stay sutures running along the edge of the superior mesenteric/portal vein, around the tip of the uncinate process, along the groove between the pancreatic head and duodenum, and across the superior border of the pancreatic head adjacent to the gastroduodenal artery. These stays are placed using 3-0 PDS and abut each other in a contiguous row around the tissue to be resected. They act both for haemostasis and as an aid in reconstruction; where the residual pancreatic tissue is quite soft, these sutures supply added reinforcement for the later anastomosis. Using the left hand placed behind the head of the pancreas, the pancreatic head tissue is cored out using diathermy to cut just inside the row of stay sutures and extending as far as the posterior margin of the pancreatic head – the aim being to remove the full depth of pancreatic tissue whilst retaining a layer of connective tissue posteriorly and to leave only a thin rim of pancreatic tissue around the edges of the cavity. As much diseased tissue as possible is removed. Haemostasis of small vessels is performed with 4-0 sutures as the dissection continues. During dissection of this cavity, the main bile duct is often exposed posteriorly; this intrapancreatic portion of the bile duct is not opened deliberately into the cavity, but if it is or if there is ongoing obstruction, the edges are marsupialised with 4-0 PDS sutures.

For reconstruction, a Roux-en-Y loop of jejunum is fashioned and passed posterior to the colon. The end of this loop is anastomosed to the previously divided pancreatic neck. This pancreatic anastomosis is performed using either the Cattell-Warren technique, or the Blumgart technique, using four 3-0 PDS mattress sutures through the pancreatic body approximately 1 cm away from the cut margin, and taking the jejunum both anteriorly and posteriorly to buttress the sutures. The pancreatic duct is treated in the same way as for the Cattell-Warren technique,

using 4-0 PDS. In both techniques, we utilise a fine-bore paediatric feeding tube as a pancreatic duct stent. This stent is cut to a length of approximately 10 cm and placed across the pancreatic anastomosis to discourage stricture formation.

The jejunal loop is then opened longitudinally along the anti-mesenteric border approximately 3 cm away from the pancreatico-jejunostomy. A hole is made sufficiently large to cover the open cavity where the head of the pancreas has been removed and the jejunum sutured around the edges of this cavity, taking sutures through the residual rim of pancreatic tissue. We have found that a continuous suture technique using a double-ended suture of 3-0 PDS or monocryl is the most convenient way of doing this.

Finally, the gallbladder is removed as a prophylactic measure.

We place two simple, corrugated, "passive" drains adjacent to the anastomosis. We prefer not to use suction drains in proximity to bowel due to the risk of injury to the bowel wall.

14.3 Additional Medication and Procedures

All patients receive antibiotic prophylaxis with cefuroxime and metronidazole and octreotide, 100 μg subcutaneously, 3 times a day for 7 days, commencing on the evening before operation.

All patients are admitted routinely to a postoperative critical care unit for the first night postoperatively, but transferred to the Pancreatic Enhanced Recovery Unit the following day, where they remain until fit for discharge on day 7-10.

A nasogastric tube is left routinely in situ postoperatively but is not used routinely for supplemental feeding, instead we encourage early introduction of fluids – sips of water may be taken as soon as the patient has recovered sufficiently from the anaesthetic – and oral intake is gradually increased over the next few days until the patient is taking solids by day 4. Early mobilization is encouraged.

The drains are gradually shortened, commencing on day 3 as long as the output is not excessive and there is no clinical suspicion of an anastomotic leak.

During 2007–2008, we performed 25 duodenum-preserving pancreatic head resections, but also a further 39 pancreatoduodenectomies for suspicious mass lesions within the head of pancreas which on subsequent histology proved to be due to chronic pancreatitis rather than malignancy (compared with 151 for cancer – thus, 20 % of pancreatic resections were for presumed cancer).

14.4 Chronic Pancreatitis Affecting the Body/Tail of Pancreas

14.4.1 Operative Technique

Our operative approach to the pancreatic body/tail is very similar to that described for resection of pancreatic tumours in this area, although in most cases of chronic pancreatitis, we would aim to preserve the spleen.

Initial exposure of the pancreas proceeds as for a pancreatoduodenectomy with separation of the greater omentum from the transverse colon, although for a left-sided resection, this separation is continued across to the splenic flexure.

The duodenum is Kocherized in the same way as we would for a pancreatic head resection in order to allow control of the superior mesenteric and portal veins if necessary. This manoeuvre is particularly important if the pancreas is to be transected formally across the neck. For more distal lesions, it is sometimes possible to transect the pancreas further to the left, however, adequate access for control of the veins is still essential before dissection of the pancreas commences.

After mobilisation of the pancreatic neck in a manner similar to that employed for a pancreatic head resection (although preserving the gastroduodenal artery and right gastro-epiploic vessels), the splenic artery is ligated and divided and the pancreatic neck divided. This may be performed using a stapling device, or using diathermy as described for the pancreatic head resection. In the latter case, the stump is oversewn with 4-0 PDS, taking care to identify and ligate the pancreatic duct separately. The splenic vein is then ligated and divided behind the body of the pancreas, and the pancreatic body mobilised, continuing the

dissection up to the splenic hilum, but preserving the short gastric vessels. The splenic hilum is then transected using a vascular stapling device (ATS-45, Ethicon) and the specimen removed.

Postoperative care is similar to that for pancreatic head resection, although often only a single corrugated drain is required.

During 2007–2008, we performed 14 left-sided pancreatic resections for chronic pancreatitis.

14.5   Drainage Procedures

We favour a Roux-en-Y cyst-jejunostomy rather than a cyst-gastrostomy for drainage of pancreatic pseudocysts, and the technique used is as described. Drainage procedures for the pancreatic duct are employed rarely in our practice, because we rarely see patients with isolated duct dilatation in whom such procedures would be appropriate. In most cases, a dilated duct is due to a stricture within the duct in the pancreatic head or disease within the pancreatic head, and therefore, we favour resection of the strictured/diseased portion of the duct in the head rather than drainage of the duct in the tail. If the duct is dilated with no apparent stricture then other pathologies, such as a main-duct IPMN should be considered, and a formal resection is undertaken because of the malignant potential of such lesions.