A Tale of 2 Techniques

Preoperative Biliary Drainage and Routine Surgical Drainage with Pancreaticoduodenectomy

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KEYWORDS

• Pancreatectomy • Whipple procedure • Pancreatic cancer • Jaundice
• Biliary stenting • Drainage

KEY POINTS

- Deeply jaundiced patients benefit from biliary stenting with improvement of liver function, well being, immune function and nutritional status.
- Selective stenting for patients undergoing pancreaticoduodenectomy should be considered in patients with symptomatic jaundice or biliary obstruction, with biliary obstruction before neoadjuvant chemotherapy, for whom evaluation or optimization may be prolonged and therapy delayed, or with altered liver function and significant cardiac or renal disease.
- A well-placed, well-functioning drain after pancreaticoduodenectomy may not always be necessary, but it could prove invaluable and lifesaving.

INTRODUCTION

Challenging common surgical traditions is always welcome, particularly if it eliminates unnecessary practices and leads to better outcomes. Preoperative drainage of an obstructed bile duct and liver before pancreaticoduodenal resection (PDR), and placement of intraabdominal drains following pancreatic resection, have been suggested to be unnecessary and associated with a higher complication rate, although with a similar hospital stay and course, compared with a no-drain or no-stent approach. This article reviews the rationale of a 40-year evolution of understanding and practice regarding biliary stenting and postoperative drains.

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PREOPERATIVE BILIARY STENTING

Involvement of surgeons in treating malignant biliary obstruction came about by necessity and not design. Absent imaging, endoscopy, and nuclear medicine, surgery was a diagnostic and therapeutic modality until 40 years ago. At the end of the nineteenth century, and before resecting an ampullary tumor by segmental duodenal resection, including a wedge resection of the head of the pancreas, Halsted[1] fashioned a cholecystogastrostomy as the first of a 2-stage procedure to decompress the obstructed liver. Absent endoscopy and body imaging, the diagnosis of jaundice relied on abdominal exploration. Even when axial imaging became available, its acceptance as a preoperative predictor of tumor resectability was slow, as was acceptance of biliary endoscopy, including sonography, and stenting of obstructed bile ducts. In many centers, surgery continued as a diagnostic, palliative, and curative procedure so as not to deny cancer of the pancreas (CaP) patients the chance of cure. Though difficult to believe today, the operative mortality in patients undergoing open, palliative, biliary bypass between 1965 and 1980 averaged 29% (range 7%–50%).[2] This was a reflection of late-stage disease at presentation rather than technical issues and morbidity from the bypass itself. This was reinforced by Shapiro[3] who reported a mean operative mortality of 21% after PDR from large institutions by well-known, accomplished surgeons. Patients characteristically were jaundiced, anorectic, and had late-stage disease and limited survival regardless of therapy.

When Molnar and Stockum,[4] in Europe, and Ring and colleagues,[5] in the United States, developed percutaneous transhepatic cholangiography (PTC), it permitted preoperative visualization of the biliary tree, reduced the need for diagnostic laparotomy, and allowed external-internal drainage to decompress the obstructed liver. The ability to internalize catheters in the duodenum and exchange obstructed catheters avoided the sequela of bile loss and made patient care, catheter management, and electrolyte and fluid management more effective. This was soon supplanted by endoscopy and endoscopic retrograde cholangiopancreatograms (ERCPs), which had the added benefits of visualization of the pancreatic duct, avoidance of a percutaneous approach, and the ability to stent 1 or both ducts. It did require a repeat endoscopy and stent exchange when stents occluded. The ability of the liver to recover normal function was an important predictor of survival time. In a study of 46 consecutive jaundiced subjects (mean bilirubin 16 mg/dL) all decompressed by PTC, 17% showed no improvement in liver function or jaundice, 23% had a 50% decrease in LFTs, and the remaining 60% regained normal liver function, appetite, and well-being.[6] The inability to fully correct liver function, and the presence of hepatic metastases were important negative predictors of survival time, regardless of subsequent surgical procedures (**Table 1**). Even when LFTs returned to normal 7 out of 29 who had liver metastases died within 30 days (25%). The inability to predict responders after PTC based on presentation, and the gravity of no or partial response, and presence of hepatic metastases emphasized the necessity of stenting all jaundiced subjects and waiting until a return of normal liver function and well-being before considering resection or systemic therapy. The very limited survival of those whose livers did not clear was sobering. Additionally, fewer postoperative complications and a shorter hospital stay after resection was noted after stenting. The overall 30-day mortality of 28% was similar to the palliative surgical series and confirmed late-stage disease was the cause of the high mortality and surgery could be avoided in many. Studies and trials of preoperative biliary stenting suggest 2 complications after stenting: stent occlusion (less for covered metallic than plastic stents) and more wound infections after resection.[7] Hospital stay, fistulas, and all other complications were similar. The beneficial effects of stents are easily overlooked (relief of