

ORIGINAL ARTICLE

Operative procedures for unresectable pancreatic cancer: does operative bypass decrease requirements for postoperative procedures and in-hospital days?

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Abstract

Background: The optimal surgical management of patients found to have unresectable pancreatic cancer at open exploration remains unknown.

Methods: Records of patients who underwent non-therapeutic laparotomy for pancreatic cancer during 2000–2009 and were followed until death at Memorial Sloan–Kettering Cancer Center, New York, were reviewed.

Results: Over the 10-year study period, 157 patients underwent non-therapeutic laparotomy. Laparotomy alone was performed in 21% of patients; duodenal bypass, biliary bypass and double bypass were performed in 11%, 30% and 38% of patients, respectively. Complications occurred in 44 (28%) patients. Three (2%) patients died perioperatively. Postoperative interventions were required in 72 (46%) patients following exploration. The median number of inpatient days prior to death was 16 (interquartile range: 8–32 days). Proportions of patients requiring interventions were similar regardless of the procedure performed at the initial operation, as were the total number of inpatient days prior to death. Patients undergoing gastrojejunostomy required fewer postoperative duodenal stents and those undergoing operative biliary drainage required fewer postoperative biliary stents.

Conclusions: In this study, duodenal, biliary and double bypasses in unresectable patients were not associated with fewer invasive procedures following non-therapeutic laparotomy and did not appear to reduce the total number of inpatient hospital days prior to death. Continued effort to identify unresectability prior to operation is justified.

Keywords

periampullary carcinoma, pancreatic cancer, palliative surgery, pancreatic surgery, unresectable pancreatic cancer, therapeutic strategy unresectable

Received 14 March 2012; accepted 30 March 2012

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Introduction

Pancreatic cancer remains a lethal malignancy. The majority of patients present with metastatic disease in which survival is measured in months. Resection of pancreatic cancer by

pancreaticoduodenectomy is favoured in patients who present with radiographically localized disease as this treatment in combination with systemic therapy provides the only chance for long-term survival.

Despite improvements in preoperative assessment, many patients with pancreatic cancer are unresectable at the time of laparotomy. Non-therapeutic laparotomy has been associated with significant morbidity, a decreased likelihood of receiving systemic treatment, and diminished quality of life.^{1,2} Several pre-emptive or palliative procedures have been advocated in

This manuscript was presented at the annual AHPBA meeting, Miami, 7–11 March 2012 and will be presented at the 10th World IHPBA Congress, Paris, 1–5 July 2012.

unresectable patients at the time of non-therapeutic laparotomy. These procedures include biliary bypass and duodenal bypass (gastrojejunostomy) to prevent biliary and duodenal obstruction, respectively, and coeliac plexus block to decrease or prevent pain.

Proponents of prophylactic operative bypass report that 75% of patients with unresectable periampullary malignancy will develop biliary obstruction and 25% will develop gastric outlet obstruction (GOO) prior to death.^{3,4} However, critics of this strategy have reported that 97% of unresectable patients who do not receive a surgical bypass can be effectively palliated without an operation, particularly now that endoscopic biliary and duodenal stenting have become more effective.⁵ Thus, the optimal surgical strategy for patients found to be unresectable at the time of exploration remains unclear.

The current study sought to evaluate outcomes in patients with unresectable disease at laparotomy, and to determine the efficacy of biliary, duodenal or double bypass operations. These patients were analysed to determine the number of subsequent invasive procedures they required following exploration and the total number of hospital days they accrued prior to death.

Materials and methods

Under a waiver of authorization from the Memorial Sloan-Kettering Cancer Center (MSKCC) Institutional Review Board, the MSKCC prospective pancreatic cancer database was retrospectively reviewed to identify all patients who underwent non-therapeutic laparotomy for periampullary carcinoma during 2000–2009. The majority of these patients (93%) underwent laparotomy for pancreatic adenocarcinoma. Only patients who had been followed until death at this institution were included for analysis.

Patients who had undergone non-therapeutic laparotomy were denoted as having had one of four different procedures: exploratory laparotomy; duodenal bypass; biliary bypass, or double bypass. Exploratory laparotomy was defined as an exploration followed by closure without the performance of any surgical bypass procedure(s). Duodenal bypass was defined as a gastrojejunostomy at operation. Biliary bypass was defined as a surgical biliary drainage procedure including hepaticojejunostomy,

choledochojejunostomy, hepatico- or choledochoduodenostomy, and cholecystojejunostomy. Double bypass was defined as both a duodenal and a biliary bypass. Postoperative procedures included any surgical, endoscopic, percutaneous or interventional radiology intervention that took place following the initial procedure in order to manage a complication associated with the procedure or to intervene in the context of new obstructive symptoms.

Perioperative events were defined as those occurring within 30 days of laparotomy. Perioperative complications were graded according to an institutional system that has been previously reported.⁶ Categorical variables were compared using Fisher's exact test. Continuous variables were evaluated using a Student's *t*-test or analysis of variance (ANOVA) according to the number of comparisons.

Results

During 2000–2009, 1286 patients were explored for potentially resectable periampullary tumours. All patients underwent exploration with the intent of curative resection. This group included 157 (12%) patients who were designated as unresectable at laparotomy and were followed at the study institution until death. Patient characteristics according to the procedures performed are presented in Table 1. Diagnostic laparoscopy was performed in 109 patients (69%) prior to non-therapeutic laparotomy. Reasons for unresectability were local invasion in 113 (72%) patients, metastatic disease to the liver in 35 (22%) patients, peritoneal disease in six (4%), and both or other causes in three (2%) patients. Having been categorized as unresectable at exploration, 33 (21%) patients underwent no further procedure (laparotomy). Duodenal bypass was performed in 17 (11%) patients; 47 (30%) patients underwent biliary bypass and 60 (38%) underwent double bypass (Fig. 1).

Biliary drainage was performed in 63 patients prior to exploration (via endoluminal catheter or stent in 61 patients and via operative drainage in two patients). Preoperative biliary drainage did not influence intraoperative management of the biliary tree: 43 of the 63 patients (68%) who underwent preoperative drainage also underwent either biliary or double bypass, and 64 of the 94 patients (68%) who did not undergo preoperative drainage

Table 1 Preoperative characteristics in the study cohort

	All patients (<i>n</i> = 157)	Laparotomy patients (<i>n</i> = 33)	Duodenal bypass patients (<i>n</i> = 17)	Biliary bypass patients (<i>n</i> = 47)	Double bypass patients (<i>n</i> = 60)
Age, years, mean	67	69	66	66	65
Male gender, <i>n</i> (%)	87 (55)	21 (63)	5 (29)	28 (60)	33 (55)
Site of primary (HoP), <i>n</i> (%)	141 (93)	31 (97)	16 (94)	42 (93)	52 (91)
Preoperative nausea/vomiting, <i>n</i> (%)	23 (15)	0	9 (53)	4 (8)	10 (16)
Preoperative bilirubin, mg/dl, mean	4.5	2.1	1.0	6.4	5.4
Prior biliary drainage	63 (40)	14 (42)	6 (35)	17 (36)	26 (43)
M1 disease at laparotomy, <i>n</i> (%)	44 (28)	9 (27)	5 (29)	13 (27)	17 (28)

HoP, head of the pancreas.

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