

ORIGINAL ARTICLE

The extent of vascular resection is associated with perioperative outcome in patients undergoing pancreaticoduodenectomy

Olga Kantor¹, Mark S. Talamonti^{2,3}, Chi-Hsiung Wang⁴, Kevin K. Roggin¹, David J. Bentrem⁵, David J. Winchester^{2,3}, Richard A. Prinz^{2,3} & Marshall S. Baker^{2,3}

¹Department of Surgery, University of Chicago Medicine, ²Pritzker School of Medicine, University of Chicago, Chicago, IL, USA,

³Department of Surgery, ⁴Center for Biomedical Research Informatics, NorthShore University HealthSystem, Evanston, IL, USA, and

⁵Department of Surgery, Northwestern University, Chicago, IL, USA

Abstract

Background: Few studies have examined the relation between extent of vascular resection and morbidity following pancreaticoduodenectomy (PD) with vein resection (PDVR).

Methods: Patients undergoing PD for malignancy were identified using the American College of Surgeons National Surgical Quality Improvement Project from 2006 to 2013. Current procedural terminology codes were used to characterize PDVR.

Results: 9235 patients underwent PD, 977 (10.6%) had PDVR - 640 with direct and 224 with graft repair. PDVR had longer operative times (456 ± 136 vs 374 ± 128 min, $p < 0.05$) and higher intraoperative transfusions (1.8 ± 3.4 vs 4.3 ± 4.9 units, $p < 0.05$) than PD alone. On adjusted multivariable regression, PDVR with either direct or graft repairs was associated with higher rates of overall morbidity (OR [odds ratio] 1.50 for direct, 1.74 for graft, $p < 0.05$), bleeding (OR 2.18 for direct, 3.26 for graft, $p < 0.05$), and DVT (OR 2.12 for direct, 2.62 for graft, $p < 0.05$) compared to PD alone. Graft repair was further associated with increased risk of reoperation (OR 1.59), septic shock (OR 2.77) and 30-day mortality (OR 2.72), all $p < 0.05$.

Discussion: The risk of significant morbidity and mortality for PDVR is associated with the extent of vascular resection, with graft repairs having increased morbidity and mortality rates.

Received 9 September 2016; accepted 13 August 2017

Correspondence

Marshall S. Baker, Department of Surgery, NorthShore University HealthSystem, 2650 Ridge Avenue, Evanston, IL 60201, USA. Tel: +1 847 570 2560. Fax: +1 847 570 2930. E-mail: Mbaker3@northshore.org

Introduction

Pancreaticoduodenectomy (PD) is the only treatment that offers a potential for cure in patients presenting with ductal adenocarcinoma of the pancreatic head. Increased surgeon experience, improved understanding of mechanisms contributing to development of postoperative complications, and improving methods for managing complications have made PD safer over the past three decades. Despite these advances,

pancreaticoduodenectomy remains a complex procedure with substantial associated morbidity. Likewise, the odds of long-term disease free survival remain relatively low. Rates of postoperative complications range from 30 to 75% in most published series. Rates of 5-year disease-free survival range from 15 to 35%.^{1,2}

Tumor involvement of the mesenteric venous system was once considered a contraindication to PD. As safety profiles for PD have improved and the potential for long term disease free survival become more well established, pancreaticoduodenectomy with segmental resection of the porto-mesenteric venous system (PDVR) has become increasingly utilized in attempt to achieve margin-negative resection in patients with these tumors.^{3,4} Many studies have examined the safety and efficacy of PDVR but the

This work was presented at the 12th World Congress of the International Hepato-Pancreato-Biliary Association on April 22, 2016 in Sao Paulo, Brazil.

results of these studies have been mixed. Several single institutional studies as well as multicenter studies have found comparable postoperative morbidity rates for patients undergoing PDVR compared to PD alone.^{5–8} Others have shown increased morbidity and/or mortality among patients undergoing PDVR.^{9–11} A recent meta-analysis of PDVR for venous reconstructions found similar morbidity rates¹² while a recent meta-analysis of arterial reconstructions demonstrated increased perioperative mortality.¹³

The factors that may contribute to morbidity in PDVR have not been well studied in isolation. Specifically, the extent of vascular resection required in PDVR varies substantially from one patient to the next and may be one factor that increases the risk of morbidity. The utilization of PDVR to achieve a margin negative resection may require a wide range of techniques – from limited resection of one wall of the vein with primary closure, to circumferential resection of a short segment of the vein with primary end-to-end anastomosis, to long segment vein resection with interposition graft reconstruction. All three techniques have been reported to be safe with acceptable complication rates,¹⁴ although it has been reported that long segment resections requiring interposition grafts are associated with poorer perioperative outcomes than short segment resections and primary repairs.^{15,16} These reports include small numbers of patients from single institution reviews. Very few well-powered studies have examined the effect of the extent of vascular resection on perioperative outcomes, and none of these have been multi-institutional studies.

The American College of Surgeons' National Surgical Quality Improvement Project (NSQIP) database was used to evaluate the association between the extent of vascular resection and perioperative outcomes after PD. The hypothesis was that patients undergoing PDVR with interposition graft repair have increased perioperative morbidity compared to either PDVR with direct repairs or PD alone.

Methods

ACS NSQIP is a surgical quality improvement database of a sampling of cases from over 400 institutions.^{17,18} It includes preoperative, intraoperative, and postoperative data for a variety of surgical procedures. Variables include procedure specific data as reported by Current Procedure Terminology (CPT) codes, patient demographics, certain comorbidities, height and weight, preoperative blood test values, neoadjuvant chemotherapy or radiation therapy within 90 days, operative time, intraoperative red blood cell (RBC) units transfused, postoperative complications such as wound infection, bleeding, deep venous thrombosis (DVT; including portal vein thrombosis), pulmonary embolism (PE), renal failure, sepsis, shock, urinary tract infection (UTI), reoperation, readmission, and 30-day mortality. High quality data is maintained through extensive training of designated NSQIP data abstractors.¹⁹ Institutional review board approval

was waived for this study as the collected information was de-identified, no protected health information was reviewed, and the analysis was retrospective.

Any patient that had pancreaticoduodenectomy (as defined by primary procedure CPT code 48150, 48152, 48153, or 48154) for a diagnosis of “malignant neoplasm of the pancreas” (as defined by a postoperative diagnosis of International Classification of Disease 9th edition codes 157.0–157.9)²⁰ as an elective procedure between 2006 and 2013 was included for analysis. Patients with disseminated cancer were excluded. PDVR was defined as a concurrent procedure CPT code of 35221 for direct repair or 35251, 35281, 35531, 34631 for graft repair. Age (<70, ≥70), race (Caucasian, African American, Hispanic, Asian), Body Mass Index (BMI; <30, ≥30), and intraoperative units transfused (0,1,2,3,4, ≥5) were analyzed as categorical variables. Operative time and surgical LOS were analyzed as continuous variables. Other variables were analyzed as binary indicator variables. Primary outcomes were 30-day overall morbidity and 30-day mortality. 30-day morbidity was defined as having at least one reported morbidity outcome in the dataset. 30-day mortality was defined as reported in the dataset. Secondary outcome measures included specific complications, readmission, and surgical length of stay. Readmission is defined as an unplanned readmission after discharge as recorded in the data.

All statistical analyses were performed using SPSS statistical software v19.0 (SPSS Corp., Armonk, NY). Pearson's chi-square tests were used to examine differences between PD, PDVR with direct repair, and PDVR with graft repair groups. Univariate and multivariable regression were used to identify predictors of any morbidity, with odds ratio (OR) >1 indicating increased odds of postoperative morbidity. Multivariable regression was also used to identify predictors of specific complications, again with OR >1 indicating increased odds of each complication. Multivariable models include adjustments for preoperative and intraoperative variables with differences between groups noted on chi-square analysis, including gender, race, ASA class, BMI, preoperative diabetes, preoperative hypertension, preoperative albumin, preoperative bilirubin, preoperative chemotherapy and radiation therapy, and intraoperative blood transfusion. All variables within the multivariable regression were coded as categorical variables, with any missing data coded as a category of “unknown”, to avoid significantly narrowing the dataset. Full models for all multivariable regressions including the breakdown of missing variables are shown in [Supplemental Tables 1 and 2](#). Confidence intervals (CI) are reported to a 95% level of significance. All reported p-values are 2-sided.

Results

Cohort characteristics

Between 2006 and 2013, 9235 patients underwent elective PD for pancreatic malignancy. Of these, 977 (10.6%) had

Download English Version:

<https://daneshyari.com/en/article/8722811>

Download Persian Version:

<https://daneshyari.com/article/8722811>

[Daneshyari.com](https://daneshyari.com)