

ORIGINAL ARTICLE

Health economic implications of complications associated with pancreaticoduodenectomy at a University Hospital: a retrospective cohort cost study

Jason Wang¹, Ronald Ma², Paul Eleftheriou³, Leonid Churilov⁴, David Debono⁵, Ray Robbins⁵, Mehrdad Nikfarjam⁶, Chris Christophi⁶ & Laurence Weinberg^{1,6}

¹University of Melbourne, Department of Anaesthesia, ²Department of Finance, ³Chief Medical Office, Austin Health, Studley Road, ⁴Statistics and Decision Analysis Academic Platform, Florey Institute of Neuroscience & Mental Health, Melbourne Brain Centre, Austin Campus, ⁵Business Intelligence Unit, Austin Health, Studley Road, and ⁶Department of Surgery, University of Melbourne, Austin Health, Studley Road, Heidelberg, VIC 3084, Australia

Abstract

Background: A cost analyses of complications following pancreaticoduodenectomy (PD) was performed in a high volume hepato-biliary-pancreatic service. We hypothesised that costs are increased with both severity and number of complications; we investigated the relationship between complications and specific cost centres.

Methods: 100 patients from 2011 to 2016 were included. Data relating to their perioperative course were collected. Complications were documented by the Clavien–Dindo classification and costs were inflated and converted to 2017 USD.

Results: Mean hospital costs in complicated patients more than doubled those of uncomplicated patients (\$28 330 vs. \$57 150, $p < 0.0001$). Total hospital costs significantly increased with both severity and number of complications. This cost increase was influenced by medical consult, pathology, pharmacy, radiology, ward, intensive care, and allied health costs, but not operating theatre or anaesthesia costs. Postoperative pancreatic fistula, postoperative haemorrhage, delayed gastric emptying and infection were associated with cost differentials of \$65 438, \$74 079, \$35 620 and \$46 316 respectively over uncomplicated patients.

Conclusion: The development of complications following PD is common, costly and associated with increased length of stay. Costs increased with greater complication severity, and specific complications. The in-depth breakdown of hospital costs suggests specific targets for cost containment.

Received 6 August 2017; accepted 18 November 2017

Correspondence

Laurence Weinberg, Department of Anaesthesia, Austin Hospital, 145 Studley Road, Heidelberg, VIC 3084, Australia. E-mail: laurence.weinberg@austin.org.au

Introduction

Background rationale

As healthcare policy makers increasingly judge quality based on both costs and outcomes, the importance of cost containment has become paramount. Pancreaticoduodenectomy (PD), commonly referred to as a Whipple procedure,¹ is a complex, highly invasive and costly surgical procedure performed most

commonly in elderly patients and associated with significant perioperative morbidity. It is considered standard treatment for resectable malignant or benign cancers arising in the pancreatic head, ampulla, distal bile duct or duodenum. Despite low perioperative mortality, PD is associated with a morbidity rate of approximately 50% for major complications² due to its invasive nature. Postoperative complications are a greater determinant of mortality than patient and intraoperative risk factors post-major surgery,³ and are associated with both increased length of stay (LOS) and the requirement for further operative intervention.⁴

The paper is not based on a previous communication to a society or meeting.

Furthermore, it has been shown that the development of complications following pancreatic surgery is the most significant factor of increased cost.^{5,6} Complications following PD have significant clinical and economic burden, and therefore represent a target for improvement.

Despite this knowledge, for patients undergoing PD there remains a lack of research investigating the basis of costs and their relationship to the development of complications. Topal *et al.*⁷ examined hospital cost-categories of PD using an activity-based costing method, and reported that hospitalisation and medical staffing costs were significantly increased in PD patients with complications. Further analyses of this nature are required to determine potential targets for cost containment and sustainable structural changes in the hospital services. Additionally, a dearth of accurate, quality costing data detracts from the ability to make conclusive remarks on the economic burden of complications following major surgery, including major pancreatic surgery.⁸

The primary objectives were to determine the health economic burden of complications, measured using the Clavien–Dindo classification scheme,⁹ of PD patients presenting to a high-volume tertiary teaching hospital. In addition, the genesis of cost differentials between complicated and uncomplicated stays was examined. Secondary objectives were to identify patient and anaesthetic factors that may influence clinical and economic outcomes.

The study was conducted to confirm the hypothesis that hospital costs for PD are increased with both severity and number of complications. Exploratory analyses were also conducted to generate hypotheses related to the relationship between complications and specific cost centres.

Methods

The study was approved by the Austin Health Human Research Ethics Committee. This cohort study considered the index admission and any 30-day readmissions for patients with and without complications following PD. Patients undergoing PD between July 2011 and December 2016 at Austin Hospital, a university hospital with a high-volume hepato-pancreaticobiliary service were considered. Data relating to their preoperative, intraoperative and postoperative details were collected from a prospectively maintained electronic medical database. Collected data included patient demographics, American Society of Anesthesiologists (ASA) class, consultant surgeon, preoperative blood values, comorbidities, pathological diagnosis, intraoperative and postoperative fluid balance, operation duration, usage of blood products, 30-day readmissions, and the presence and grade of any complications.

Patients undergoing classic PD (Whipple) or pylorus-preserving PD (PPPD) for any indication were identified from the Austin Health Information Services database using the ICD-10 code '30584-00: Pancreaticoduodenectomy with formation of

stoma' for the desired date range. The operation type was further validated by examining the operation report in electronic medical records. Patients undergoing total, distal or completion pancreatectomy were excluded.

Ten consultant surgeons performed at least one PD during the study period. All patients underwent a standardised Enhanced Recovery After Surgery (ERAS) protocol introduced in our institution in August 2009 with the program fully established in 2010. As part of our institution's ERAS protocol, all patients underwent preoperative multidisciplinary assessment and where necessary were optimised prior to surgery. Preoperative haemoglobin optimisation was based on the National Blood Authority of Australia's patient blood management initiative.¹⁰ Optimisation was identical in all patients and included assessment and treatment for anaemia, and commencement of iron therapy (if indicated). General anaesthesia was managed using a hospital ERAS protocol designed to standardise care with regards to perioperative fasting, analgesia, fluid intervention, antiemesis, antibiotic and chemo-thromboprophylaxis use. Regular dietitian input was routine in all patients to determine graduation from nasogastric feeding. Postoperative analgesia was optimised by a dedicated acute pain service and all patients received daily physiotherapy. Postoperative surgical care was standardised for nasogastric tube, surgical drain and urinary catheter removal. Discharge criterion included unassisted mobilisation, full dietary intake, satisfactory pain control, and absence of medical or surgical complication.

Variables

The presence of complications was coded from electronic medical records and then manually cross-checked with the patients' medical records by two independent investigators, before being further stratified according to the Clavien–Dindo system. The Clavien–Dindo system is a validated schema classifying complications based on the level of treatment required: Grade I, a deviation from the normal postoperative course without requiring intervention, excluding antiemetics, antipyretics, analgesia, diuretics, electrolyte and physiotherapy; Grade II, requiring pharmacological treatment, blood transfusion or total parenteral nutrition; Grade III: requiring radiological, surgical or endoscopic intervention; Grade IV: life-threatening complication; Grade V: death.⁹ The presence of postoperative pancreatic fistula (POPF) was adjudged using the International Study Group on Pancreatic Fistula (ISGPF) definition¹¹; delayed gastric emptying was defined as per the International Study Group of Pancreatic Surgery (ISGPS) definition.¹²

The principal diagnosis was ascertained from ICD-10-CM codes. Preoperative demographic and disease-related data was collected. This included American Society of Anesthesiologists (ASA) score, preoperative bloods, consultant surgeon and comorbidities. Cost analysis included the index admission for PD, and did not consider the preoperative course or readmissions. Costs were calculated using an activity-based costing

Download English Version:

<https://daneshyari.com/en/article/8722743>

Download Persian Version:

<https://daneshyari.com/article/8722743>

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