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

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Background

Cost containment is important in the context of escalating international healthcare expenditure. Pancreaticoduodenectomy (PD) is a costly and invasive procedure with a high complication rate, yet its costs have never been evaluated in Australia. We performed a detailed cost study of PD complications in a university hospital with a high-volume hepato-biliary-pancreatic surgical service. We hypothesised that hospital costs for PD are increased with both severity and number of complications. We conducted exploratory analyses to investigate the relationship between complications and specific cost centres.

Methods

One hundred patients undergoing PD between 2011 and 2016 at a single tertiary institution were included. All patients received routine care following our institution’s PD Enhanced Recovery After Surgery protocol. Data relating to their preoperative, intraoperative and postoperative course was retrospectively collected from a prospectively maintained database. Complications were defined by the Clavien-Dindo classification and costs were inflated and converted to 2017 US Dollars.

Results

Overall morbidity rate was 81%, and in-hospital mortality was 1%. Baseline characteristics and intraoperative anaesthesia and surgical variables were similar in complication and uncomplicated patients. Among complicated patients, 17 (21%) were Grade I, 50 (62%) were Grade II, 10 (12%) were Grade III, 3 (4%) were Grade IV and 1 (1%) was Grade V. Median length of stay was significantly higher for complicated patients (8 days vs. 13 days, p<0.0001), and increased with severity, except grade V (p<0.0001). Mean total 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 and postoperative haemorrhage were associated with cost differentials of $65,438 and $74,079 respectively over uncomplicated patients.

Conclusion
The development of complications following PD is common, costly and associated with lengthier hospitalisation. Hospital costs increased with complication severity, and specific complications. The in-depth breakdown of hospital costs suggests specific targets for cost containment. Reducing complications is likely to reduce the economic burden of PD.