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Surgeon Variation in Intraoperative Supply Cost for Pancreaticoduodenectomy: Is Intraoperative Supply Cost Associated with Outcomes?

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Abstract

Background—With increased scrutiny on the quality and cost of healthcare, surgeons must be mindful of their outcomes and resource utilization. We evaluated surgeon-specific intraoperative supply cost (ISC) for pancreaticoduodenectomy and examined whether ISC was associated with patient outcomes.

Study Design—Patients undergoing open pancreaticoduodenectomy between January 2012 and March 2015 were included. Outcomes were tracked prospectively through postoperative day 90. ISC was defined as the facility cost of single-use surgical items and instruments, plus facility charges for multi-use equipment. Multivariate logistic regression was used to test associations between ISC and patient outcomes using repeated measures at the surgeon level.

Results—249 patients met inclusion criteria. Median ISC was \$1,882 (IQR \$1,497 – \$2,281). Case volume for six surgeons ranged from 18 to 66. Median surgeon-specific ISC ranging from \$1,496 to \$2,371. Greater case volume was associated with decreased ISC ($p < 0.001$). Overall, ISC was not predictive of postoperative complications ($p = 0.702$) or total hospitalization expenditures ($p = 0.195$). At the surgeon level, surgeon-specific ISC was not associated with the surgeon-specific incidence of severe complication or any wound infection ($p > 0.227$ for both) but was associated with delayed gastric emptying ($p = 0.004$) and postoperative pancreatic fistula ($p < 0.001$).

Conclusions—In a single-institution cohort of 249 pancreaticoduodenectomies, high-volume surgeons tended to be low-cost surgeons. Across the cohort, intraoperative supply cost was not associated with outcomes. At the surgeon level, associations were noted between ISC and complications, but these may be attributable to unmeasured differences in the postoperative

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management of patients. These findings suggest that quality improvement efforts to restructure resource utilization towards more cost-effective practice may not affect patient outcomes, although prospective monitoring of safety and effectiveness must be of the utmost concern.

INTRODUCTION

Physicians have long been the primary drivers of resource utilization in healthcare settings. In an era where alternative payment models and public reporting of patient outcomes have come to the forefront, healthcare systems and payers have recently developed significant roles in defining resource utilization¹⁻³. Although many important quality improvement initiatives will require comprehensive and costly overhauls to systems of delivery of care across hospitals, smaller and more immediate changes can be made through interventions at the level of the individual provider.

Surgeons, as leaders of their inpatient teams, can exert great control over the cost-effectiveness of care but only if they possess the knowledge and data allowing them to lead quality improvement efforts. While the sources of expenditure within a single episode of care are numerous⁴, this study focuses on one component under direct control by surgeons: intraoperative supply cost (ISC). We define ISC as the direct-to-facility costs for single-use surgical instruments and supplies plus charges for related equipment. ISC is distinct from other categories of operating room cost including facilities fees, staffing, professional fees, and anesthesia-related supply costs.

Variability in ISC has been identified as a possible source of excess expenditures in common general surgery procedures, and efforts to reduce this variability have yielded significant cost-savings⁵⁻⁹. One common challenge to standardization of intraoperative supplies is that increased expenditures may be justified if patient outcomes are better. We previously reviewed more than 2,000 laparoscopic cholecystectomies across our healthcare system and determined that, despite significant variability in ISC, ISC was not associated with patient outcomes¹⁰. This began an ongoing effort at our institution to standardize operating room supply lines for specific procedures with the goal of containing costs without negatively impacting care. However, we hypothesized that the lessons learned from common procedures with low complications rates may not translate to more complex and more costly procedures such as pancreaticoduodenectomy (PD). In this study, we report the distribution of ISC for PDs performed by surgeons at a single tertiary academic medical center. We specifically reviewed major resource categories contributing to ISC and evaluated whether patient-specific variables contribute to ISC. Finally, we examined the associations between ISC and postoperative outcomes across the practice and at the level of the individual surgeon.

METHODS

This study was approved by the Institutional Review Board of Washington University School of Medicine. Patients who underwent a pancreaticoduodenectomy for any diagnosis between January 2012 and March 2015 were identified from a prospectively collected clinical database. Cases were excluded if they involved any concurrent procedure other than

biopsies, such as a hernia repair or additional bowel resection. Chart review was performed independently by two authors (DGB, KAO) to ensure accuracy of the coded procedure. One case of a secondary pancreatic malignancy was excluded. All operations were performed by surgeons from the Division of Hepatobiliary-Pancreatic and Gastrointestinal Surgery or the Division of Abdominal Transplantation at a single tertiary academic medical center. Complications were recorded prospectively through 90-days postoperatively and were reviewed weekly for the patients of four surgeons. Complication data for the remaining surgeons (case n=34) was collected using retrospective chart review of inpatient and outpatient records through 90 days postoperatively. Missing data was addressed using chart review and, where unavailable, was considered to be missing at random and excluded from analyses. No variables were utilized with greater than 5% missing data. All complications were graded using the Modified Accordion Grading System (MAGS) of surgical complications¹¹. Delayed gastric emptying and postoperative pancreatic fistula (POPF) were defined according to consensus guidelines^{12,13}. POPF was coded as both POPF and an organ space surgical site infection only when antibiotics were started and/or abscess contents were aspirated and positive on bacterial culture.

All cases were then matched to a hospital billing database. The primary outcome was ISC, which was defined as the direct-to-facility costs for single-use surgical instruments and supplies plus charges for related equipment. ISC is distinct from other categories of operating room cost including facilities fees for OR time, staffing, professional fees, and anesthesia-related supply costs. This is a combination of cost and charges because true cost data is available for line-items opened for each case but there is no single true cost for equipment with repeated use such as instrument trays and electrosurgical device units; therefore, line-item expenditures for such items represent a charge. For cases in the top 5% for ISC, operative notes and line-item ISC records were reviewed to ensure concordance between the operative note and the billed case, with no further exclusions or corrections necessary. Secondary outcomes were postoperative variables including ICU stay, length of stay, 90-day readmissions, 90-day complications, and total index hospitalization expenditures, which represented the variable patient-specific costs and charges of intraoperative and postoperative care, including direct (such as nursing care, medications, laboratory tests, procedures, and bed rate charges for intensive care unit and post-surgical inpatient ward stay) and indirect expenditures of the initial surgical hospitalization. Professional fees are excluded from this analysis.

Statistical Analysis

Demographic and clinical characteristics were summarized by descriptive statistics (i.e., mean/standard deviation (SD) or median/interquartile range (IQR) for continuous variables; count and percentage for categorical variables). Chi-square and Fisher's exact tests were used for between-group comparisons. Univariate and multivariate analysis were conducted to investigate the association of demographic and clinical characteristics with intraoperative supply cost and total hospitalization expenditures using general linear models. Stepwise selection was used in the multivariate analysis, where a significance level of 0.3 was required to allow a factor into the model, and a significant level of 0.15 was required for a factor to stay in the model. The association between ISC and total hospitalization

expenditures, as well as the association between surgeon case volume and cost, were also examined via general linear models. Univariate logistic regression was used to test associations between ISC or total hospitalization expenditures on 90-day readmission, 90-day mortality, complications, and ICU stay. To test the association between ISC and patient outcomes across the cohort, logistic regression was employed with and without repeated measures, adjusting for surgeon-level effects. All statistical tests were two-sided with $p < 0.05$ considered statistically significant. SAS Version 9.4 (SAS Institute, Cary, NC) was used to perform all analyses.

RESULTS

295 pancreaticoduodenectomies (PDs) were performed during the 39-month study period. 249 cases met inclusion criteria (84.4%), with 46 cases (15.6%) excluded due to additional procedures performed during the index case. The mean age was 64 ± 12 years and 54.2% were male ($n=135$). The primary pathology was pancreatic ductal adenocarcinoma ($n=170$, 68.3%) (eTable 1). R0 resection, confirmed on final pathology, was achieved in 170 of 209 cases (81.3%) performed for malignancy.

The distribution of and relationship between preoperative comorbidities, intraoperative variables, and ISC is reviewed in Table 1. Diagnostic laparoscopy was used in 37 cases (14.9%). Diagnostic laparoscopy was not significantly associated with ISC, although this may be subject to bias as lower-cost surgeons performed diagnostic laparoscopies more frequently (data not shown). 49 patients (19.7%) underwent any extent of vascular resection and reconstruction (19.7%). Vascular resection was associated with ISC on univariate analysis. Median ISC with vascular resection was \$2,108, +\$263 compared to cases without vascular resection ($p=0.018$). However, higher-cost surgeons had a higher incidence of cases requiring vascular resection (data not shown). To further evaluating confounding with diagnostic laparoscopy or vascular resection, multivariable analysis was performed, and neither diagnostic laparoscopy nor vascular resection were associated with ISC (Table 1). 90-day postoperative mortality was 3.2% ($n=8$).

Median ISC was \$1,882 (interquartile range (IQR) \$1,497 – \$2,281; Figure 1). The largest resource categories of ISC were suture (30%) and expenditures related to electrosurgical devices (24%; Figure 2). On review of operative notes for high outliers, defined as cases in the top 5% for ISC, increased utilization of staplers, electrosurgical devices, and/or sutures were responsible for high ISC, with no specific patterns or contributing adverse events were identified. Univariate and multivariate analysis of the association between ISC and patient-specific preoperative variables or intraoperative variables is presented in Table 1. Median procedure time was 311 minutes (IQR 250 – 388). Increasing procedure time was associated with increasing ISC on both univariate and multivariate analysis.

The median total hospitalization expenditure was \$12,606 (IQR \$10,170 – \$17,915). History of deep vein thrombosis or pulmonary embolism ($n=12$; 4.8%), intraoperative transfusion ($n=24$; 9.6%), and increasing procedure time were significantly associated with increased total hospitalization expenditures. Preoperative biliary and/or pancreatic stenting was

associated with decreased total hospitalization expenditures on both univariate and multivariate analysis (Table 1).

Outcomes

181 patients (72.7%) developed any Modified Accordion Grading System (MAGS) complication, with 34.3% of these (n=62) experiencing a MAGS III or greater (MAGS III+) complication. Complications across the entire cohort are reviewed in Table 2. After stratifying ISC using three tiers (lowest quartile, middle two quartiles, and highest quartile), no significant differences were observed for postoperative length of stay, total hospitalization expenditures, readmissions, or 90-day mortality (Table 3).

Next, the association between these outcomes and total hospitalization expenditures was assessed. Greater total hospitalization expenditures were associated with days in the ICU, increased length of stay, and a MAGS III+ complication on univariate analysis ($p<0.001$ for all).

Across the entire cohort, ISC was not significantly associated with any evaluated outcomes: any MAGS complication ($p=0.837$), any complication MAGS III+ ($p=0.729$), postoperative pancreatic fistula ($p=0.511$), delayed gastric emptying ($p=0.326$), or any type of surgical site infection (superficial, deep, or organ space; $p=0.236$).

Surgeon-Level Outcomes

248 cases were performed by six surgeons. All were open (laparotomy) and 34 (13.7%) were pylorus-sparing. Mean case volume during the 39-month inclusion period was 41 cases (range 18 – 66). Surgeon-specific median ISC ranged from \$1,486 (\$396 below the group median) to \$2,448 (\$566 above the group median). Higher-volume surgeons tended to be lower-cost surgeons and exhibited less variability in their intraoperative supply cost (Figure 3). Greater case volume was significantly associated with decreased ISC ($p<0.001$). Case volume was not significantly associated with total hospitalization expenditures ($p=0.104$).

In assessing the relationship between ISC and outcomes, repeated measures testing was incorporated to account for unmeasured variables at the surgeon level. Surgeon-specific ISC, case volume, and outcomes are presented in Figure 4. ISC was not associated with experiencing a complication of any severity, of any complication MAGS III+, or of surgical site infection. Additionally, ISC was not associated with achieving R0 (negative) margins for malignancies ($p=0.411$). However, at the surgeon level, ISC was associated with two outcomes: pancreatic fistula ($p=0.001$) and delayed gastric emptying ($p=0.004$). The magnitude of these associations were small: for each \$100 increase in ISC, the odds of pancreatic fistula increased by 4% (OR 1.04, 95% CI 1.01 – 1.06), and for each \$100 increase in ISC, the odds of delayed gastric emptying decreased by 5% (OR 0.95, 95% CI 0.91 – 0.98).

DISCUSSION

In a single-institution cohort, we evaluated institutional and surgeon-specific intraoperative resource utilization for pancreaticoduodenectomy and the association between resource

utilization and outcomes. The implementation of quality improvement projects to reduce cost through streamlining resources can be met with a number of disagreements and concerns. To address the common argument that greater cost is acceptable if patient outcomes are better, we evaluated the association between cost and adverse events. Across the entire cohort, ISC was not associated with any significant postoperative complication. At the surgeon level, higher-volume surgeons tended to be low cost surgeons. Finally, ISC was associated with two outcomes: the incidence of postoperative pancreatic fistula and delayed gastric emptying.

The results presented here have an incredible amount of complexity and nuance complicating the conclusions to be drawn and the generalizability of these conclusions. The impetus for this study was to evaluate cost in a controlled environment where future interventions might translate into small but easily identifiable results. Frequently, assessment of variation in expenditures and outcomes has been studied at the hospital level, where policy changes, including creating centers of excellence or applying minimum case volume requirements, demand complex implementation efforts from multiple stakeholders and can proceed slowly at great expense^{14–22}. Alternatively, quality improvement at the individual surgeon level may result in smaller but more rapid changes with presumably less expense. Additionally, while surgeon-specific performance report cards have been reported in general surgery^{23,24}, little emphasis has been placed on attributing variability in resource utilization to the individual surgeon. We have previously described the extent of surgeon-level variation in ISC for laparoscopic cholecystectomy and identified areas for improvement, which have been described for similar common procedures^{5–7,10,25}. However, we hypothesized that lessons learned for common procedures might not translate to more complex procedures, where altering the available resources for surgeons may be met with greater resistance.

In this study, we identified that the primary drivers of ISC were different than for laparoscopic cholecystectomy but, even for a complex surgical procedure, significant surgeon-level variation in ISC exists. We have begun reductions of variability in supplies and suppliers, yielding cost savings for this and other procedures. However, in attempting to generalize this study beyond our institution, this analysis should serve as a starting point leading to extensive and nuanced discussions of intraoperative and postoperative variables. Here, intraoperative supply cost and outcomes were not associated but, because we cannot discuss causation in a retrospective study, we can only suggest that clinicians and healthcare administrators learn from this data by discussing the potential that cost-reduction efforts can be undertaken without obvious implications on outcomes. No matter the intended intervention, prospective monitoring of patient safety and outcomes must be included.

Two novel findings were identified in our results. First, high-volume surgeons tended to be low cost surgeons. Advocating for case volume minimums or centers of excellence are beyond our aims and been explored in other studies^{16–18,20}, so we instead suggest that higher-volume surgeons participate heavily in creating an environment of transparency where surgeon-specific cost and outcomes can be openly discussed to inspire quality improvement efforts benefiting patients and providers. Second, with our surgeon-level analysis, we identified significant associations between ISC and postoperative pancreatic fistula and delayed gastric emptying. However, we caution the reader from assuming clinical

significance from these associations. Despite coming from a high-volume center, the sample size and incidence rates of the examined adverse events is insufficient to derive risk-adjusted models for the primary and secondary outcomes. Ultimately, these findings were risk-adjusted at the surgeon-level but not at the patient-level. Perhaps more importantly, this analysis was undertaken prior to the implementation of enhanced recovery protocols across our practice. Therefore, this analysis does not account for variations in the postoperative management of patients. Surgeons differed in their management of nasogastric tubes or in checking drain amylase, which clearly have a significant impact on the incidence of these complications. Unfortunately, these differences were not recorded. Although this is a limitation, we suggest this limitation is rather pragmatic. Physician-level reports of outcomes and quality may be regularly limited by low case volume and limited or no risk adjustment. Detailed analysis of reports on quality must include thorough discussion of risk-adjustment and unmeasured variables prior to comparison between providers or facilities.

There are additional limitations to our study. The cost and expenditure figures have limited generalizability, as facilities in other regions or settings may have quite different supply contracts and hospital facility fees. Complex economic concepts inherent to our definitions and analyses are beyond the scope of this paper. We carefully selected the terms “cost” and “expenditures” within our definitions. “Cost” was used in intraoperative supply cost because we track true facility cost from the supplier for most of our operative supplies, with the exception of fee-per-use charges for items such as electrosurgical units. “Expenditures” was chosen for total hospitalization expenditures because this value is derived from a number of indirect cost that are reflected as charges, including labor and facility fees. A final limitation is the exclusion of cases in which additional procedures were performed. We elected to eliminate these cases to reduce bias, as it was difficult to determine which intraoperative supplies or outcomes could be attributed to the additional procedure and not the PD. We anticipate that inclusion of these cases would reflect a greater case complexity with a greater likelihood for ICU stay, increased length of stay, and potential for additional complications and greater total hospitalization expenditures. These and other outcomes of excluded patients were tracked in our database and there were no apparent differences compared to the 249 included cases.

CONCLUSION

Here we have examined specific intraoperative supply cost for 249 pancreaticoduodenectomies and identified that this cost is not significantly associated with postoperative outcomes across the cohort and, at the surgeon level, was associated with outcomes likely related to individual surgeon practices in the postoperative management of patients. It is our hope that this data serves as a starting point to stimulate discussion, encouraging providers and facilities to gather and report high-quality surgeon-level data while suggesting that changes to intraoperative resource utilization may not have negative implications for patients. As pay-for-performance and bundled payment initiatives continue to change the landscape of reimbursement models for episodes of care, data similar to those presented here should be made readily available to surgeons so that cost-effective resource utilization can be practiced while ensuring adequate focus on the safety and outcomes of our patients.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Distribution of intraoperative supply cost. Dashed reference line represents the group median cost, \$1,882, and solid horizontal reference lines represent the upper limits of the first and third quartiles (\$1,497 – \$2,281). Q, quarter.

Figure 2.
Distribution of major categories of intraoperative supply cost.

Figure 3.

Distribution of intraoperative supply cost by surgeon. Surgeons are sorted in ascending order by increasing case volume (y-axis; range 18 – 66). Box width represents interquartile range (IQR) for intraoperative supply cost, with vertical lines within the box representing median cost and circles within the box representing mean cost. Whiskers represent 1.5 times the IQR, with outliers beyond these limits represented as individual circles. Increasing case volume was associated with decreased intraoperative supply cost ($p < .001$).

Figure 4.

Surgeon-specific intraoperative supply cost and surgeon-specific non-risk-adjusted outcomes for 249 patients undergoing pancreaticoduodenectomy. Specific intraoperative supply cost (x-axis) is graphed against specific outcomes (y-axis, non-risk-adjusted): (A) the percentage of patients experiencing any Modified Accordion Grade complication; (B) the percentage of patients experiencing any complication Modified Accordion Grade III or greater; (C) the percentage of patients experiencing delayed gastric emptying; (D) the percentage of patients experiencing postoperative pancreatic fistula; (E) the percentage of patients experiencing any designation of wound infection. Bubble size reflects surgeon volume over the 39-month

study period (range 18 – 66) and color corresponds to the surgeons represented in Figure 3.
p Values are derived from logistic regression with repeated measures at the surgeon level.

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Table 1
Association of Preoperative and Intraoperative Variables with Intraoperative Supply Cost and Total Hospitalization Expenditures

	n (%) or	p Value			
		Intraoperative supply cost		Total hospitalization expenditures	
		Univariate	Multivariate	Univariate	Multivariate
Demographics					
Age, y, mean $\pm$ SD	64.1 $\pm$ 12.2	0.551		0.670	
Female, n (%)	114 (45.8)	0.351		0.539	
Distance traveled, mi, mean $\pm$ SD	115 $\pm$ 98	0.334		0.511	
Race, n (%)		0.818		0.519	
Caucasian	221 (88.8)				
African American	23 (9.2)				
Other	5 (2.0)				
Primary insurance, n (%)		0.859		0.348	
Medicare	125 (50.2)				
Private insurance	98 (39.4)				
Medicaid	17 (6.8)				
None	9 (3.6)				
Comorbidities					
BMI, kg/m ² , mean $\pm$ SD	27.9 $\pm$ 5.6	0.524		0.381	
Diabetes mellitus, n (%)	75 (30.1)	0.335		0.443	
COPD, n (%)	35 (14.1)	0.411		0.723	
Coronary artery disease, n (%)	55 (22.1)	0.020 ^{*,†}		0.941	
Hypertension, n (%)	143 (57.4)	0.037 ^{*,†}	0.030 ^{*,†}	0.187	0.116
History of DVT or PE, n (%)	12 (4.8)	0.667		<0.001 [†]	
Chronic Pancreatitis, n (%)	48 (19.3)	0.533		0.135	0.100
Past or current alcohol abuse, n (%)	21 (8.4)	0.205	0.077	0.091	
Smoking pack years, mean $\pm$ SD	20 $\pm$ 28	0.895		0.076	0.044 [†]
Weight loss 10 lb, n (%)	123 (49.4)	0.006 [†]		0.649	

	n (%) or	p Value		
		Intraoperative supply cost	Total hospitalization expenditures	
		Univariate	Multivariate	Multivariate
Previous abdominal surgery, n (%)	85 (34.1)	0.681		
Preoperative jaundice, n (%)	143 (57.4)	0.777	0.718	
Preoperative stent placed, n (%)	157 (63.1)	0.756	0.463	
Neoadjuvant therapy, n (%)	24 (9.5)	0.060	0.037 ^{**†}	0.013 ^{**†}
ASA physical status classification, n (%) [*]		0.622	0.880	
1 or 2	107 (43.0)		0.567	
3 or 4	142 (57.0)			
Preoperative laboratory values				
Hematocrit, g/dL, mean ± SD	37.5 ± 4.9	0.264	0.909	
Creatinine, mg/dL, mean ± SD	0.8 ± 0.2	0.307	0.975	
Platelets, 10 ³ per µL, mean ± SD	259 ± 84	0.920	0.547	
Albumin, g/dL, mean ± SD	4.0 ± 0.5	0.788	0.294	
Bilirubin, mg/dL, mean ± SD	4.3 ± 6.2	0.990	0.844	
Alkaline phosphatase 100 U/L, n (%)	179 (71.9)	0.030	0.360	
CA 19-9, U/mL, mean ± SD	455 ± 1543	0.262	0.374	
Intraoperative variables				
Diagnostic laparoscopy, n (%)	37 (14.9)	0.441	0.214	0.082
Malignant pathology, n (%)	210 (84.3)	0.870	0.629	
Tumor diameter, cm, mean ± SD	2.7 ± 1.7	0.689	0.922	
Vascular resection, n (%)	49 (19.7)	0.043 [†]	0.403	
Estimated blood loss, mL, mean ± SD	476 ± 392	0.727	0.156	
Intraoperative transfusion, n (%)	24 (9.6)	0.402	0.004 [†]	<0.001 [†]
Procedure time, min, mean ± SD	322 ± 94	<0.001 [†]	0.011 [†]	0.001 [†]

^{*} Inverse association (presence of coronary artery disease, HTN, or preoperative stent were independently associated with decreased intraoperative supply cost or total hospitalization expenditures).

[†] All other significant associations are associated with increasing cost.

DVT, deep venous thrombosis; PE, pulmonary embolism; ASA, American Society of Anesthesiologists; CA, cancer antigen

Table 2

Distribution and Severity of Complications

Complication	Any grade		Modified accordion grade III	
	n	%	n	% of this complication
Wound infection, superficial and deep *	74	29.7	25	33.8
Delayed gastric emptying	54	21.7	12	22.2
Pancreatic fistula *	46	18.5	17	37.0
Genitourinary, urinary retention, UTI	25	10.0	0	--
Cardiac, atrial fibrillation, MI	21	8.4	7	33.3
Postoperative bleeding	19	7.6	15	78.9
DVT or PE	15	6.0	3	20.0
Failure to thrive, dehydration, anorexia	9	3.6	2	22.2
Respiratory, pneumonia, respiratory failure	13	5.2	2	15.4

* Pancreatic fistula is also coded as wound infection when antibiotics were initiated and/or bacteria was cultured from aspirate.

UTI, urinary tract infection; MI, myocardial infarction; DVT, deep venous thrombosis; PE, pulmonary embolism.

Table 3

Association of Intraoperative Supply Cost with Postoperative Outcomes

	Overall	Intraoperative supply cost, quartile			p Value
		1	2 to 3	4	
n (%)	249	62 (24.9)	124 (49.8)	63 (25.3)	
Intraoperative supply cost (minimum to maximum), USD, IQR	\$859 – \$4,870	\$859 – \$1,496	\$1,497 – \$2,281	\$2,282 – \$4,870	
Complications					
Any, n (%)	181 (72.7%)	45 (72.6%)	89 (71.8%)	47 (74.6%)	0.702
MAGS III, n (%)	62 (24.9%)	15 (24.2%)	28 (22.6%)	19 (30.2%)	0.271
ICU Stay, n (%)	127 (50.4%)	29 (46.8%)	63 (50.8%)	36 (57.1%)	0.150
Length of stay, d (IQR)	8 days (7 – 13)	9 (7 – 12)	10 (8 – 14)	10 (8 – 15)	0.377
Total hospitalization expenditures, USD (IQR)	\$12,592 (10,170 – 17,915)	\$10,417 (9,138 – 14,219)	\$12,666 (10,492 – 17,703)	\$13,844 (11,363 – 20,419)	0.195
90-d Readmission, n (%)	67 (26.9%)	19 (30.6%)	31 (25.0%)	17 (27.0%)	0.872
90-d Mortality, n (%)	8 (3.2%)	1 (1.6%)	6 (4.8%)	1 (1.6%)	0.254

IQR, interquartile range; MAGS, Modified Accordion Grading System.