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Cost Benefit of Coblation Versus Electrocautery Adenotonsillectomy for Pediatric Patients

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Abstract

Introduction: Coblation and electrocautery are two common techniques used for adenotonsillectomy (T&A). Numerous studies have assessed surgical outcomes of coblation versus electrocautery and overall, postoperative complications are similar with the exception of a decrease in patient reported postoperative pain for coblation. Instrumentation required for coblation is significantly more expensive than that required for electrocautery. With minimal outcome differences, justification for the additional instrumentation costs is difficult. We performed this study to assess if there is a difference between operative & postoperative costs of electrocautery and coblation.

Methods: 300 patient medical records were reviewed from 2015 to 2017 with equal numbers of electrocautery and coblation surgeries. Outcome measures included finance information, duration and cost of OR and Phase I and Phase II post-anesthesia care unit (PACU), in-hospital pharmacy costs, and postoperative complications. Logistic regression was used for analysis.

Results: The median patient age for each surgical technique was 6 years old. Electrocautery resulted in more time in the OR compared to coblation, (OR:1.11,95%CI:1.07–1.15, p<.001), with greater associated costs, p<.001. Electrocautery patients were under anesthesia longer and had a longer surgical duration, p<.001. These same patients had longer duration in Phase II PACU, p=.028, and were given pain medications an increased number of times, p<.001. Total costs including operative expense, physician charges, OR and anesthesia times, pharmacy, and instrument were significantly higher for electrocautery patients, p=.003. There were no differences in ED visits, post-tonsillectomy bleed, or additional surgery between techniques, p>.05.

Conclusion: T&A electrocautery technique was found to have increased overall indirect costs. Costs of instrumentation in addition to increased operative time, use of analgesics and post-operative care contribute to costs associated with electrocautery and coblation should be used when assessing surgical costs.

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Keywords

adenotonsillectomy; coblation; electrocautery; cost-benefit; pediatric

1 Introduction

Coblation and electrocautery are two common techniques used for adenotonsillectomy (T&A). Numerous studies have assessed surgical outcomes of coblation versus electrocautery and overall, postoperative complications are similar with the exception of a decrease in patient reported post-operative pain [1,2]. Instrumentation required for coblation is significantly more expensive than that required for electrocautery. With minimal outcome differences, justification for the additional instrumentation costs is difficult. This study was designed to assess if there is a difference between intraoperative & postoperative costs of electrocautery and coblation techniques.

The direct hospital cost of the coblation instrument is $320 total for both the plasma wand and suction for each patient. The electrocautery supplies come in cases and total $0.28 per patient. Based on these obvious differences in instrument costs, physician preference leans towards the more traditional approach with a decreased cost.

Based on an observed difference in patients with cautery having longer stays in the post-anesthesia care unit (PACU) and needing more pain medication, we hypothesized that the coblation method 1) leads to patients spending decreased time in the PACU with less pain medication 2) would be more cost effective than the electrocautery method including time in the recovery units. No study to date has assessed peri-operative costs associated with different surgical techniques for T&A.

2 Materials and Methods:

An Institutional Review Board (IRB) protocol was approved to review medical records of patients with a T&A from one outpatient surgery center from 2015 to 2017. All eleven attending surgeons performing T&A in our department were included in the study, 4 exclusively using cautery, 5 using coblation, and 2 using both techniques over the 3 study years. Surgeons were not assisted by medical residents or fellows in the surgery center. The randomized number of surgeries used in the analysis per surgeon was reflective of the total number of surgeries performed by the surgeon at the outpatient center (i.e. rate per surgeon = patients used in the analysis/patients seen in the outpatient center). There were 18 total anesthesiologists with 17 different anesthesiologists working with ENT surgeons during electrocautery surgery and 12 during coblation. Eleven anesthesiologists were involved in both techniques. There were 2,109 total T&A surgeries performed from 2015 to 2017 with 810 electrocautery technique and 1,299 coblation. No tonsillectomies or partial tonsillectomies were included in the analysis. All patients were randomized within technique group and year. A power analysis was performed on preliminary analysis for total cost using G* Power 3.1 and a sample size of 148 for each technique group was needed for $\alpha = .05$ and power = .80 [3]. Using this data, we reviewed 50 patients from each of the three years and both techniques for a total of 300 patients.

Data collected included demographics, insurance type, body mass index (BMI), American Society of Anesthesiologists (ASA) status, surgeon and anesthesiologist, finance information from our Finance Department, physician costs, surgical pathology costs, instrument cost, duration and costs of the operating room (OR) and Phase I and Phase II PACU, in-hospital pharmacy costs, and post-operative complications. OR and PACU costs were adjusted for inflation from 2015 to 2017. Finance information included operating expense, total hospital revenue based on insurance, and the operating margin (total revenue minus operating expense). Revenue and operating margin were not factored into the total costs because of their dependence on specific insurance. Operating expense can be broken down into direct costs (i.e. supplies), employee salary, depreciation, unit operating, unit supporting, and indirect overhead costs. Physician costs include primary surgeon, anesthesiologist, and surgical pathologist. Intravenous (IV) medications that were reviewed for cost and frequency during surgery and in-hospital recovery include anesthesia (propofol, lidocaine, dexmedetomidine, glycopyrrolate, midazolam), pain (fentanyl, acetaminophen, morphine), steroid (dexamethasone), nausea (ondansetron, metoclopramide), and hydration (Lactated Ringer's Injection). For postoperative information, we collected number of follow-up otolaryngology appointments and nurse phone calls related to T&A, minor complications defined as coughing up mucous, blood tinged mucus, and pain and dehydration, major complications defined as hemorrhage, emergency department (ED) visits and length of stay, and additional surgeries for hemorrhage. Our primary outcome measure was total cost which summed operating expense, total physician costs, surgical pathology, OR and PACU I and II costs, IV medications, and instrument cost.

Patients were excluded from the study if they had tonsillectomy only, revision or partial T&A, coinciding surgeries, coagulopathy, and were syndromic. Statistics were performed using SPSS version 24 and included logistic regression and Mann-Whitney U test [4].

3 Results:

Demographics and confounding factors between the two surgical techniques are described in Table 1. The median age at surgery was 6 years old with a female majority for both methods. Roughly two-thirds of patients in each group had private insurance.

At our institution, surgical duration was longer for electrocautery compared to coblation, M(SD)=18.37(8.46) minutes versus M(SD) = 10.99(3.96) minutes; OR:1.27,95%CI:1.19–1.35, p<.001. This finding coincides with electrocautery patients being in the OR room longer compared to coblation, M(SD) = 32.86(8.98) minutes versus M(SD) = 25.67(14.09) minutes; OR:1.11,95%CI:1.07–1.15,p<.001, with increased associated costs, M(SD) = $874.93($257.16) versus M(SD) = $689.75($407.09); p<.001. The electrocautery patients were under anesthesia longer, M(SD)=39.67(9.81) minutes versus M(SD)=31.69(6.70) minutes; OR: 1.14, 95%CI:1.09–1.78, p<.001, resulting in higher associated costs, M(SD) = $1,974.70(459.41) vs M(SD) = $1,656.20($369.00); p<.001. When assessing differences in additional time patients were under anesthesia outside of the surgery itself, there were no differences between techniques, 21.3 minutes for electrocautery and 20.7 minutes for coblation, p=.236.

Patients spent more time in PACU II, M(SD)=120.5(36.4) minutes or 73.7% of the total PACU time, compared to PACU I, M(SD)=41.2(15.3) minutes (26.3%). Patients that had the electrocautery technique performed spent significantly more time in PACU II than those with coblation, M(SD)=125.18(39.71) versus M(SD)=115.83(32.32), p=.028. However, when recovery phase I and II were combined there were no differences, p=.130. There were no differences in costs between the techniques due to an hourly charge for the recovery room.

Electrocautery patients were given IV pain medications an increased number of times compared to coblation with increased associated costs (Table 2). Medication costs for anesthesia, pain, steroid, nausea, and hydration during and after surgery in the hospital were increased for electrocautery patients as well, p<.001. The average total cost for electrocautery is significantly higher than coblation with a 5% increase, $11,788.57 versus $11,197.90 (Table 3).

As expected, the occurrences of both minor and major complications were not significantly different between the two methods, p=.865 and p=.902, respectively. There were also no differences in follow-up ENT appointments, p=.605, or nurse phone calls for T&A, p=.776. Patients with coblation or electrocautery had no difference in likelihood of an ED visit, p=.403, and had the same number of post-tonsillectomy hemorrhage surgeries, n(%) = 4(2.7%).

In a sub-analysis of this study, we analyzed the two anesthesiologists who made up two thirds of our study to assess if there were any anticipatory alterations of medications due to technique differences. The remaining anesthesiologists assisted in a range of 1 to 28 surgeries with a median of 4. The first anesthesiologist assisted in 44 (29.3%) of electrocautery cases and 46 (30.7%) coblation cases. There were no significant differences for whether fentanyl, acetaminophen, or morphine was given and the number of times each medication was given between both techniques, p>.05. The second anesthesiologist performed 46 (30.7%) of cautery and 54 (36.0%) coblation surgeries. There were no significant differences in whether fentanyl, acetaminophen, and morphine were given but fentanyl was prescribed an increased number of times for electrocautery compared to coblation, M(SD) = 3.59(1.07) versus M(SD) = 2.85(1.07), p<.001.

4 Discussion:

With morbidity and mortality in mind, costs in healthcare are a driving force. Cost benefit analyses are traditionally preserved for the business world. However, cost management reporting coinciding with a retrospective chart review can be a valuable tool. With tonsillectomy being the second most common outpatient procedure following myringotomy with tubes (BMT), it makes sense to delve into the resources behind it to make data driven decisions [5]. The differences in surgical times, postoperative pain, and complications have been well researched in the literature between coblation and electrocautery, the two most common T&A methods [6–8]. However, this is the first cost analysis study to describe the differences in cost from the start in the OR to discharge, including OR time, anesthesia time, PACU I and II, IV medications, physician charges, instrument costs, and operative expenses from the finance department. The extent of this detail allows us to understand the true cost benefit of both surgical techniques.

In the limited literature analyzing the costs between the methods, a historical consensus concludes electrocautery is the more economical option. Thottam *et al.* assessed instrument and anesthesia costs based on surgical times and determined that electrocautery is more cost effective [6]. In another study, total cost was assessed by summing costs for the procedure, pharmacy and central supply and concluded electrocautery to be lower as well [9]. Electrocautery was also found to have an increased time in the OR which correlates with increased costs [10]. The aforementioned studies have reported no differences in post-operative complications, such as hemorrhage and readmission rates, between the two methods. This is consistent with our findings of no differences in minor or major complications. Nevertheless, limiting the focus to intraoperative cost findings does not paint the entire picture.

Although cautery appears to be a cost-effective option based on the list price of the instrument ($0.28 versus $320), we must take postoperative pain into consideration. Pain is thought to be decreased with the coblation method because of the inherent differences in the surgical technique and reaction with the instrument and tissue [11]. The coblation method, first described in 2001, only heats up to 60°C with minimal damage to the surrounding tissue because of the reaction of the bipolar electrical current with normal saline [11]. As extensively researched, cautery heats up to 400–600°C [12] and works by generating heat directly to the tissue, ultimately burning adjacent tissue [13]. A histological study of tonsillectomy specimens by Modi et al. assessed the thermal damage between scalpel, electrocautery, and coblation techniques [14]. Interestingly, coblation caused a 0.71 mm thermal injury depth while cautery resulted in a 0.58 mm depth. Although vasculature was seen in the pathology of this study, it is impossible to detect surrounding areas where the electrical current from electrocautery transmits, such as nearby blood vessels and nerves, presumably accounting for the pain after the procedure. Studies in the pediatric literature have focused on postoperative pain after discharge with a consensus that the coblation method results in decreased subjective pain levels [8,15,16], but a paucity of research involves looking at pain before discharge which would directly affect hospital resources and costs of all patients needing the surgery, not just those with readmissions [7]. To our knowledge, there are no studies that research costs and frequency of all pain medications given intra- and post-operatively. Our findings suggest electrocautery patients are given pain medications significantly increased number of times while in the hospital with increased associated costs. Confounding factors, such as weight, age, ASA status, race, and sex were not significant between the groups, helping to validate our results.

Conventionally, decreased surgical times were correlated with the cautery approach [17]. However, recent literature, has suggested that coblation demonstrates decreased or comparable times. Kim and colleagues found coblation took Mean (SD) = 19.1 (5.46) minutes compared to cautery Mean (SD) = 27.6 (8.36), $p<.05$, [18] and another study reported M(SD) = 10.63 (2.45) minutes for coblation versus M(SD) = 30.66.0 (8.66) for electrocautery, $p<.001$ [19]. Although not significant, Lin *et al.* found that electrocautery took 15 minutes and coblation took 14 minutes [7] and Chang's study also found no significance between methods [20]. Because of the variance in surgical duration and significant findings, times could be reliant on experience and technique of the surgeon, which would be hospital dependent. While we found increased times for electrocautery in the current study, our data for total costs were not completely dependent on OR and anesthesia times.

We also found in this study that anesthesia, steroid, nausea, and hydration medications were increased for the cautery approach. Our findings do not suggest that cautery caused an increase in these medications but do result in a possible correlation with increased OR and PACU times. We collected all intravenous medications that each patient was given during their time in the hospital for T&A irrespective of their potential for direct differences due to technique for a comprehensive pharmacy total cost.

A recent review by Kaye et al. describes the challenges and variability in pediatric anesthesia [21]. Although focusing on anesthesia is out of the scope of this paper, we have provided a sub analysis of the eighteen different anesthesiologists during the study period to address a major contributing factor to costs during T&A surgery. We found no differences in additional time that patients were under anesthesia between electrocautery and coblation, which would suggest there were no significant differences in technique that would attest to cost. When looking at the two main providers who assisted in two thirds of the surgeries to assess variability in individual practice, we found that the rate of prescribed pain medication was not increased for either group, although fentanyl was given more times for electrocautery for one of the two anesthesiologists. This finding suggests that the anesthesiologists were not prescribing anticipatory alterations of pain medications due to technique differences, although further study is needed.

When summing all available costs that are detailed in our study, we found a 5% increase when electrocautery method was used with an average of $590.67 increase per patient ($11,788.57 versus $11,197.90). For 1,000 surgeries of each method over 3 years, this can be extrapolated to a $590,670 difference between the two. Over a 10-year period, this sums to almost two million dollars. With PACU times and costs taking the biggest slice out of the pie, it is suggested that surgeons should not focus on instrument choice but focusing on which method would result in less postoperative pain and decreased recovery time periods. In addition to costs, surgeons should focus on the technique that they are most comfortable using and which they feel most confident.

Inherent limitations exist with retrospective medical chart reviews. All eleven surgeons in our department from 2015–2017 were included irrespective of their technique choice. There was little overlap of surgeons using both techniques during this time period. Although T&A is a frequently performed surgery, experience of the surgeon could play a part in surgical times. However, no residents or fellows performed surgeries at our outpatient surgery center and therefore all surgeons were experienced. Although our randomization process was representative of the distribution of T&A surgeries per surgeon at the outpatient surgery center, there was an inherent selection bias in our sampling. The number of surgeons per year differed, with senior faculty leaving the institution and junior faculty joining during this time period. By randomizing the entire groups, we were not statistically weighing those who left after year 2015 the same as surgeons who remained the entire 3-year study period. Because only 2 (18%) surgeons overlapped surgical techniques, our sample would not be powered to block randomize. Older, more experienced surgeons are also more likely and in our study were more likely (64% of the electrocautery group with > 20 years' experience versus 0% in coblation) to use the electrocautery technique, which can be generalized across institutions as the coblation technique was introduced after many of the experienced surgeons started their careers. Those surgeons who used both techniques had shorter times than their peers using cautery (their most used technique) but longer times compared to other surgeons using coblation. Age and experience as a surgeon and experience using each technique are confounding factors that would need to be explored further in prospective study. A prospective study randomizing surgical techniques would be optimal but would disrupt personal preference for either method. There are also costs that are impossible to research in a retrospective manner, such as costs of outpatient medications needed and time and costs of caregiving postoperatively.

The direct costs to the hospital were used for the analyses due to the variability in the end cost directed to the payer. Although the costs described are detailed and accurate, we did not take into account insurance type, private versus public. By doing this, it would severely limit the results to our institution with patients having specific insurances to our surrounding area. Costs to the patient are immensely dependent on insurance type. In our hospital, we provide services to all patients regardless of insurance type, private versus public. Hospital revenue is dependent on both insurance type and specific insurance company and plan. Based on the operative costs alone in our study, private insurance ensues an average of a $1,000 increase in revenue per patient for T&A surgery compared to public insurance.

Every hospital has variable factors that play into the total cost of each T&A surgery: experience of the ENT surgeon, age and generation of surgeon which may impact technique and instrument used, comfort level using different techniques, and operative team including anesthesiologists, nurses, and other assistants. Instrumentation is historically up for great debate and should be assessed as a fraction of the total cost.

5 Conclusion:

T&A electrocautery technique was found to have increased overall indirect costs and coblation was found to be more cost effective. Costs of instrumentation in addition to increased operative time, use of analgesics and post-operative care contribute to costs associated with electrocautery and coblation should be used when assessing surgical costs. In our study, we have shown instrument type and price is one aspect of many involved. Costs, surgical times, recovery period, and postoperative pain should be viewed in a holistic approach without focusing on one factor when deciding on a surgical method for T&A.

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References:

[1]. Hong S-M, Won jae-Gu C., Woo C-ML-S, Coblation vs. electrocautery tonsillectomy: A prospective randomized study comparing clinical outcomes in adolescents and adults, Clin. Exp. Otorhinolaryngol 6 (2013) 90–93. 10.3342/ceo.2013.6.2.90. [PubMed: 23799166]

[2]. Noordzij JP, Affleck BD, Coblation versus unipolar electrocautery tonsillectomy: A prospective, randomized, single-blind study in adult patients, Laryngoscope 116 (2006) 1303–1309. 10.1097/01.mlg.0000225944.00189.e9. [PubMed: 16885729]

[3]. Faul F, Erdfelder E, Lang AG, Buchner A, G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences, Behav Res Methods 39 (2007) 175–191. 10.3758/bf03193146. [PubMed: 17695343]

[4]. Corp IBM., IBM SPSS Statistics for Windows, (2016).

[5]. Hall MJ, Schwartzman A, Zhang J, Liu X, Ambulatory surgery data from hospitals and ambulatory surgery centers: United States, 2010, Natl. Health Stat. Report 2017 (2017) 1–15.

[6]. Thottam PJ, Christenson JR, Cohen DS, Metz CM, Saraiya SS, Haupert MS, The utility of common surgical instruments for pediatric adenotonsillectomy, Laryngoscope 125 (2015) 475–479. 10.1002/lary.24830. [PubMed: 25042823]

[7]. Lin C, Thung AK, Jatana KR, Cooper JN, Barron LC, Elmaraghy CA, Impact of coblation versus electrocautery on acute post-operative outcomes in pediatric tonsillectomy, Laryngoscope Investig. Otolaryngol 4 (2019) 154–159. 10.1002/lio2.212.

[8]. Jones DT, Kenna MA, Guidi J, Huang L, Johnston PR, Licameli GR, Comparison of postoperative pain in pediatric patients undergoing coblation tonsillectomy versus cautery tonsillectomy., Otolaryngol. Head. Neck Surg 144 (2011) 972–7. 10.1177/0194599811400369. [PubMed: 21493315]

[9]. Adeyemi A, Delhougne G, PMD51 - Comparison of costs and outcomes between coblation technology and electrocautery following tonsillectomy and adenoidectomy procedures, Value Heal 21 (2018) S251 10.1016/j.jval.2018.09.1500.

[10]. Sjogren PP, Thomas AJ, Hunter BN, Butterfield J, Gale C, Meier JD, Comparison of pediatric adenoidectomy techniques, Laryngoscope 128 (2018) 745–749. 10.1002/lary.26904. [PubMed: 29152748]

[11]. Temple RH, Timms MS, Paediatric coblation tonsillectomy, Int. J. Pediatr. Otorhinolaryngol 61 (2001) 195–198. 10.1016/S0165-5876(01)00553-5. [PubMed: 11700188]

[12]. Belloso A, Chidambaram A, Morar P, Timms MS, Coblation tonsillectomy versus dissection tonsillectomy: Postoperative hemorrhage, Laryngoscope 113 (2003) 2010–2013. 10.1097/00005537-200311000-00029. [PubMed: 14603065]

[13]. Maddern BR, Electrosurgery for tonsillectomy, Laryngoscope 112 (2009) 11–13. 10.1002/lary.5541121405.

[14]. Modi VK, Monforte H, Geller KA, Koempel JA, Histologic assessment of thermal injury to tonsillectomy specimens: A comparison of electrocautery, coblation, harmonic scalpel, and tonsillotome, Laryngoscope 119 (2009) 2248–2251. 10.1002/lary.20612. [PubMed: 19688863]

[15]. Parker NP, Walner DL, Post-operative pain following coblation or monopolar electrocautery tonsillectomy in children: A prospective, single-blinded, randomised comparison, Clin. Otolaryngol 36 (2011) 468–474. 10.1111/j.1749-4486.2011.02384.x. [PubMed: 21854552]

[16]. Glade RS, Pearson SE, Zalzal GH, Choi SS, Coblation adenotonsillectomy: an improvement over electrocautery technique?, Otolaryngol. Head. Neck Surg 134 (2006) 852–5. 10.1016/j.otohns.2005.11.005. [PubMed: 16647547]

[17]. Parsons SP, Cordes SR, Comer B, Comparison of posttonsillectomy pain using the ultrasonic scalpel, coblator, and electrocautery., Otolaryngol. Head. Neck Surg 134 (2006) 106–13. 10.1016/j.otohns.2005.09.027. [PubMed: 16399189]

[18]. Kim NG, Oh HM, Kim JY, Kim DW, Kim WH, Choi DJ, Comparison of tonsillectomy by conventional dissection, electrocautery, laser, and coblation, Korean J. Otorhinolaryngol. Neck Surg 56 (2013) 773 10.3342/kjorl-hns.2013.56.12.773.

[19]. El-Taher M, Aref Z, Coblation Versus conventional tonsillectomy: A double blind randomized controlled trial, Indian J. Otolaryngol. Head Neck Surg 71 (2019) 172–175. 10.1007/s12070-017-1189-z.

[20]. Chang KW, Randomized controlled trial of coblation versus electrocautery tonsillectomy., Otolaryngol. Head. Neck Surg 132 (2005) 273–80. 10.1016/j.otohns.2004.11.002. [PubMed: 15692541]

[21]. Kaye A, Jeha G, Renschler J, Fuller M, Pham A, Cornett E, Anesthetic Agents in Pediatric Patients, A Comprehensive Review of Pharmacological Considerations in Clinical Practice, Med. Res. Arch 8 (2020). 10.18103/mra.v8i4.2057.

Table 1.

Demographics and confounding factors between two adenotonsillectomy techniques

	Electrocautery	Coblation	p value
Age at surgery (y), Mdn (range)	6(3–18)	6 (3–21)	.804
Sex, n (%)			
Male	67 (44.7%)	66 (44.0%)	1.000
Female	83 (55.3%)	84 (56.0%)	
Race, n (%)			
Caucasian	135 (93.8%)	133 (89.9%)	.808
African American	8 (5.6%)	9 (6.1%)	
Insurance, n (%)			
Private	106 (70.7%)	99 (66.0%)	.457
Public	44 (29.3%)	51 (34.0%)	
Weight Centile, Mdn (range)	66.5 (2.7–99.9)	67.5 (4.9–99.9)	.726
ASA Status, Mdn (range)	2 (1–3)	2 (1–3)	.932

Abbreviations: y, year; mdn, median; n, frequency

Table 2.

Direct hospital costs of IV pain medications for electrocautery versus coblation

	Electrocautery, M (SD)	Coblation, M (SD)	p value
IV Pain Med # Times Given	4.85 (1.50)	4.24 (1.24)	<.001
IV Pain Med Costs	$10.43 ($3.66)	$8.97 ($3.01)	.001
IV Med Costs	$51.68 ($13.82)	$43.07 ($10.39)	<.001

Abbreviations: M, mean; SD, standard deviation; IV, intravenous

Table 3.

Average total costs for electrocautery and coblation methods

	Electrocautery	Coblation	p value
Operative Expense	$1,222.08	$1,051.10	<.001
Physician charges			
ENT Surgeon	$837.00	$837.00	1.000
Anesthesiologist	$648.00	$648.00	1.000
Surgery			
OR Duration	$874.93	$689.75	<.001
Anesthesia	$1,974.70	$1,656.20	<.001
Post Anesthesia Care Unit			
PACU I	$2,619.76	$2,657.19	.053
PACU II	$3,528.65	$3,321.17	.052
Pharmacy	$51.17	$43.07	<.001
Surgical pathology	$32.00	$32.00	1.000
Instrument	$0.28	$320.00	<.001
Mean Total Cost	$11,788.57	$11,197.90**	.003