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Original Article

Physician Education on Controllable Costs Significantly Reduces Cost of Laparoscopic Hysterectomy

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ABSTRACT **Study Objective:** To determine whether educating surgeons about their controllable instrumentation costs by providing cost data on total laparoscopic hysterectomy (LH) would reduce the cost of this procedure.

Design: Prospective cohort study (Canadian Task Force classification III).

Setting: Academic-affiliated community hospital.

Patients: Patients who underwent LH between April 2014 and March 2015 with surgeons who performed at least 10 LHs during that time period, along with a second group who underwent LH with the same cohort of surgeons between July 2015 and September 2015.

Intervention: The cost of LH was calculated for all surgeons who performed more than 10 LHs between April 2014 and March 2015. Itemized cost data were collected. The individual costs, as well as a summary of the data, were shared with all of the physicians to highlight areas of potential cost savings. The costs were then measured for 3 months after the educational intervention (July–September 2015) to gauge the impact of physician cost education.

Measurements and Main Results: Thirteen surgeons met the criteria for inclusion in this analysis. Together, they performed 271 hysterectomies, with an average instrumentation cost of $1539.47 ± $294.16 and an average operating room time of 178 ± 26 minutes. Bipolar instrument choice represented 37% of the baseline costs, followed by 10% for trocar, 9% for cuff closure, and 8% for uterine manipulator. This same group of surgeons performed a total of 69 hysterectomies in the 3-month follow-up period of July–September 2015, with an average instrumentation cost of $1282.62 ± $235.03 and an average operating room time of 163 ± 50 minutes. There was statistically significant cost reduction of $256.85 ± $190.69 ($p = .022$), with no significant change in operating room time. Bipolar instrument cost decreased significantly, by $130.02 ± $125.02 ($p = .021$), representing 51% of the total cost savings. Trocar, cuff closure, and uterine manipulator costs were not significant sources of cost savings on average, but did represent sources of cost savings for some surgeons individually.

Conclusion: Given adequate education about the products available for use in their institution, surgeons make informed decisions regarding the choice of instrumentation, allowing them to directly impact the cost of total LH, resulting in cost savings. Journal of Minimally Invasive Gynecology (2017) 24, 62–66 © 2016 AAGL. All rights reserved.

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Hysterectomy is the second most common major surgical procedure performed in women of reproductive age. Approximately 1 in 9 women will undergo hysterectomy within their lifetime, resulting in approximately 600,000 hysterectomies performed annually [1]. Abdominal hysterectomy is traditionally the most predominant route, followed by vaginal then laparoscopic [2]. In the past decade, there has been an increased push toward minimally invasive approaches for hysterectomy, based on evidence that minimally invasive hysterectomy is associated with decreased length of hospitalization, fewer complications, and lower costs. This practice has been supported by the American Congress of Obstetricians and Gynecologists, which in 2009 advocated total vaginal hysterectomy (VH) as the preferred route [3], and by the AAGL, with its 2010 position statement

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recommending performing hysterectomy by the vaginal or laparoscopic route whenever possible [4]. The increased use of total laparoscopic hysterectomy (LH) has significantly decreased the number of abdominal hysterectomies; however, this practice is often criticized owing to the higher cost of LH compared with VH [2].

The use of disposable operative devices to perform LH is a major contributing factor to its poorer cost-effectiveness. Although there are published studies aimed at justifying costlier bipolar instruments and cuff closure devices owing to operating room time savings, few studies have broken down instrumentation cost by surgeon to identify areas of potential cost savings [5,6]. Those that do break down costs are commentaries on current practice and have been published to educate physicians on instrumentation costs [7].

As a quality improvement project, we collected data to identify opportunities for cost savings for LH. We sought to determine whether education of surgeons with respect to the costs of disposable instruments would decrease the total instrumentation cost associated with LH.

Materials and Methods

For each of the 13 surgeons who performed at least 10 total LHs between April 2014 and March 2015, we used detailed itemized billing sheets for all LHs without other procedures during this time span to establish a baseline cost of instrumentation for this procedure. The itemized bill was summarized to aid in categorizing costs. Categories included bipolar instruments, trocars, cuff closure, uterine manipulators, and miscellaneous items, which included monopolar devices, laparoscopic instrument components (i.e., graspers), hemostatic agents, sequential compression devices, padding, and drapes. The billing sheet also contained the average case duration for each surgeon, as defined by the interval from patient in-room time to patient out-of-room time.

The data obtained were used to identify areas for potential cost savings that a surgeon could directly impact through his or her instrumentation choices in the operating room. At the end of this data collection period, a meeting was held with each group of surgeons practicing at the hospital. Each member of the group was shown his or her average cost per case with the cost of each instrument used. Then the costs of alternative instruments available in each category were shared, allowing each surgeon to evaluate his or her choices.

Next, the same cost data were collected between July and September 2015 (the third quarter of that year) to assess the impact of the intervention. Itemized cost data and surgical times were collected and compared with the initial data using Student's t test. A p value $< .05$ was considered statistically significant.

Results

Thirteen of the 39 surgeons performed at least 10 LHs between April 2014 and March 2015. This group performed a total of 271 hysterectomies during this period, with an average instrumentation cost of \$1539.47 ± \$294.16 and an average operating room time of 178 ± 26 minutes. Bipolar instrument choice contributed the most to the overall cost, representing on average 36% of the total disposable operative equipment cost (Fig. 1). Both trocar and cuff closure devices contributed significantly, at 11% and 9%, respectively. Uterine manipulators represented 8% of the cost, and miscellaneous items (e.g., drapes, SCDs, hemostatic agents, monopolar instruments) the remainder.

A wide range of costs was associated with each of these categories (Fig. 2). The cost of 5-mm trocars ranged from \$16 to \$50 apiece; the cost of 12-mm trocars ranged even more widely, from \$33 to \$154. Bipolar instrument costs also varied widely, with the traditional Kleppinger bipolar device incurring no additional cost because it is reusable and included in the instrument set, but costs of reprocessed options ranging from \$182 to \$277. Ultrasonic instruments ranged in cost from \$154 to \$450; advanced bipolar instruments, from \$316 to \$632. For cuff closure, the cost of traditional laparoscopic suturing was \$22–\$29, whereas the cost of a suturing device was \$176 plus the cost of sutures, which ranged from \$34 to \$69. If the cuff was closed vaginally, then the suture cost was included in miscellaneous category instead of the cuff closure category, owing to difficulty delineating the exact suture breakdown in this dataset. Throughout the study period, there were no changes to the hospital formulary regarding to the instruments available in these categories or the associated costs.

During the third-quarter follow-up period (July–September 2015), a total of 69 LHs were performed by the same group of 13 surgeons. The cost per LH decreased by an average of \$256.85, with an instrumentation cost of \$1282.62 ± \$235.03, representing a 17% cost savings. The baseline and follow-up costs by surgeon are shown

Fig. 1

Cost contribution by category.