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Picking apart surgical pick lists – Reducing variation to decrease surgical costs

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ABSTRACT

Background: Average costs associated with common procedures can vary by surgeon without a corresponding variation in outcome or case complexity.

Methods: De-identified cost and equipment utilization data were collected from our hospital for elective laparoscopic cholecystectomy performed by 17 different surgeons over a 6-month period. A group of surgeons used this data to design a standardized equipment pick list that became optional (not mandated) for laparoscopic cholecystectomy. Cost and consumable surgical supply utilization data were collected for six months prior to and following the creation of the standardized pick-list.

Results: 280 elective laparoscopic cholecystectomies were performed during the study interval. In the 6 months after standardized pick list creation, the cost of disposable supplies utilized per case decreased by 32%.

Conclusions: Surgical cost savings can be achieved with standardized procedure pick lists and attention to the cost of consumable surgical supplies.

Summary for the Table of Contents: Average costs associated with common procedures can vary by surgeon without a corresponding variation in outcome or case complexity. With implementation of a standardized pick-list for a commonly performed general surgery procedure, we have demonstrated decreased costs per case.

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1. Introduction

Health care expenditures in the United States exceed two trillion dollars annually.¹ These costs have more than doubled in the past 10 years and now account for more than 17% of the United States Gross Domestic Product. With the advent of the Affordable Care Act, reimbursement for hospital services provided has become linked to the quality of care. Hospitals and health care providers have been incentivized to achieve quality, value based care for optimal reimbursement. The costs for care has also been shifted to the patient due to large deductible health plans, and this has brought consumerism into the health care marketplace like never before.

It has become apparent that significant variability exists in how individual providers practice medicine and surgery, and that this variation is not always directly linked to quality or the desired outcome.^{2,3} In General Surgery, the laparoscopic cholecystectomy is

among the most common surgical procedures performed in adults. The average cost of a laparoscopic cholecystectomy differs from institution to institution across the United States.⁴ At our own institution, it became apparent that there was significant variability in the equipment used for routine cholecystectomy by surgeon, and as a result there was great variation in cost per case. A group of surgeons who frequently perform elective laparoscopic cholecystectomy met and developed a standardized pick list for laparoscopic cholecystectomy by consensus. The cost of the various kinds of consumable surgical supplies used by different surgeons was taken into account. Our hypothesis was that the introduction of this standardized pick list and a dialogue around controlling costs where possible would result in decreased cost per case for laparoscopic cholecystectomy across all surgeons at our institution.

2. Materials and methods

In a 6-month period, 17 surgeons at our hospital performed more than 3 laparoscopic cholecystectomies. A group of 5 of the surgeons to perform the greatest number of cholecystectomies

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during this interval were recruited to take part in the creation of a standardized pick list for laparoscopic cholecystectomy. These surgeons reviewed all 17 unique surgeon pick lists and supplies that were opened routinely and as needed. From our hospital's cost manager software, reports of all consumable surgical supplies and their associated cost were pulled for each surgeon and all cases performed over these 6 months. These were the costs of the supplies to us from the vendor and based on our contract in place at the time of utilization. Our hospital participates in a collaborative purchasing consortium to help negotiate the best prices on many of these consumable surgical supplies. Opportunities for cost savings were ranked based on cost per unit and utilization per case. Special attention was given to opportunities where there were multiple equivalent products in the same category at variable costs. An example was laparoscopic clip appliers where there were 5 comparable products from 3 manufacturers with significant cost differences. Of note, no 2 surgeons had identical pick lists for this common laparoscopic procedure.

A standardized pick list was created by consensus in an effort to decrease variation where appropriate. Consensus as to what equipment should be opened every time (trocars for example), and what equipment should be in the room but not opened unless needed (laparoscopic suction irrigator for example) was attained. Where there was an appropriate reusable alternative to a disposable product, these changes were made to the standardized pick list. Two examples are the use of a reusable scissors instead of a disposable scissor tip, and the use of a reusable hook cautery rather than a disposable cautery tip. In the case of the scissors, our operating room agreed to sharpen the scissors after 10 cases rather than the previous standard of 20. The costs of these reusable instruments were not amortized across the study or included in our analysis. In an effort to decrease costs and possibly to decrease our rate of catheter associated urinary tract infection, patients were asked to void on call to the operating room and Foley catheters were no longer routinely placed as well.

The initiative and cost per case variability data were discussed and shared with all surgeons in the department of surgery on multiple occasions. Surgeons were informed about the new standardized pick list for laparoscopic cholecystectomy, and asked to adhere to the list if clinically appropriate. Operating room staff was educated on the initiative and encouraged to use the pick list when feasible. The practice of routinely opening consumable surgical supplies at the beginning of the case that are almost never utilized was discouraged. Cost and utilization data were collected for six months (June 1, 2013 to November 30, 2013) prior to and six months (January 1, 2014 to June 30, 2014) following introduction of the standardized pick-list. Total costs of consumable surgical supplies for all surgeons prior to and following the implementation of the pick list was assessed. Surgical residents participated in all surgical procedures, but were not directly educated on the initiative.

This study was exempt from institutional review board approval due to the de-identified and administrative nature of the data. The creation of the standardized pick list was a quality initiative designed to decrease cost and unnecessary variability in equipment utilization and as such was also exempt from IRB review. All data was obtained from the Surgical Profitability Compass Procedure Cost Manager System (The Advisory Board Company, Washington DC) for our health care system for elective laparoscopic cholecystectomy (ICD-9 code 51.23). Costs were limited to consumable supplies utilized on a per case basis. The consumables utilized were itemized. Case duration and volume per surgeon were also retrieved from the system.

Statistical analysis of our data was conducted using VassarStats (Vassar College, Poughkeepsie, NY). A two-tailed T-Test was used for continuous variables when appropriate. Chi-square tests were

used for categorical variables. A p-value < 0.05 was considered statistically significant.

3. Results

The standardized pick list was implemented on January 1, 2014. A total of 280 elective laparoscopic cholecystectomies were performed during the 12-month study interval. There were 17 surgeons who performed elective laparoscopic cholecystectomy in the study interval. All surgeons realized a significant reduction in the cost of consumable surgical supplies per case for laparoscopic cholecystectomy. For the entire surgeon cohort, mean cost of consumable supplies per case prior to the creation of the standardized pick list was $\$875 \pm 299$ per case. Following implementation, the total cost per case was $\$591 \pm 180$ per case. This is a 32% decrease in overall cost per case ($p < 0.01$). There was not a significant difference in cost reduction for the 5 surgeons to create the standardized pick list when compared to the rest of the surgeons to perform laparoscopic cholecystectomy. Despite significant reductions in cost, there was no significant difference in case duration (Table 1).

The frequency of use of specific instruments was compared between surgeons before and after implementation of the standardized pick list. In the case of specimen retrieval bags we were able to consolidate our inventory from 3 to 2 vendors. Utilization of a more economical and equivalent retrieval bag increased significantly, bringing the price per case for specimen retrieval down considerably. Retrieval bags were also opened only when needed and not routinely prior to the case. The same is true for laparoscopic clip appliers, where the cost for one vendor with whom we no longer enjoyed a preferred pricing contract was excessive compared to their competitors alternative. Table 2 depicts the top 5 changes in consumable surgical supplies utilization and mean savings per case as a result of these changes.

4. Discussion

In our retrospective interval review of cost data for laparoscopic cholecystectomy over a 12-month period, we provided evidence of procedural cost savings after implementation of a standardized pick-list for disposable surgical supplies. Previous studies have analyzed the impact of several strategies on procedural costs. Strategies have included provider education, individual or institutional feedback, and standardization of equipment use. Our significant cost reduction per case can be attributed to a combination of these strategies.

Our data gives further strength to a previous study on cost containment for laparoscopic cholecystectomy with the strategy of surgeon education.⁶ In this study, the authors analyzed surgical supply cost between fiscal year 2013 and 2014, before and after surgeons were educated on disposable supply costs. The authors demonstrated a 10% reduction in costs associated with surgeon education alone.

There has also been a positive effect of auditing of surgical equipment use. Through analysis of equipment utilization and cost, equipment can be exchanged for more economical alternatives

Table 1
Study Interval Comparisons. T1 = 6 months prior to pick list, T2 = 6 months following creation of standardized pick list.

	T1	T2	p-value
Case volume	132	148	
Case duration (minutes)	91 ± 43	86 ± 49	0.24
Supply costs/case (\$)	875 ± 299	591 ± 180	<0.01

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