

Laparoscopic appendectomy using staplers vs. endoloops:

A case-costing analysis

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INTRODUCTION

Laparoscopic appendectomy is currently the standard of care in the treatment of acute appendicitis. Compared to traditional open appendectomy however equipment costs and operating time are greater.¹ There are 2 generally accepted techniques for closure of the appendiceal stump during laparoscopic appendectomy, use of an ENDO-LOOP or use of an ENDO-STAPLER

ENDO-LOOP

PRO

- Inexpensive
- Smaller port sites (5mm)
- Resident teaching

CON

- Increased operative time
- More dissection required
- Concern over appendix stump

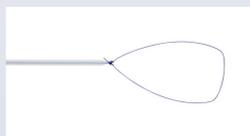
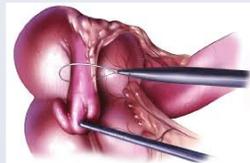
ENDO-STAPLER

PRO

- Faster operating time
- Ease of use
- Less handling of appendix

CON

- Considerably more expensive
- Larger port sites (12mm)



The medical literature suggests equipoise in outcomes such as length of stay, total peri-operative complication rate, and post-operative appendiceal abscess rates.^{2,3} The stapler however does have an advantage in reducing operative time by 5-9 minutes compared to the loop technique. In cases of appendicitis complicated by perforation or necrosis of the appendiceal base the consensus is less clear.⁴

The department of surgery has undertaken initiatives to constrain budgetary expenditures. Currently the standard of practice among surgeons at the South Health Campus is to perform stapled appendectomy.

PROJECT OBJECTIVES

- Determine use rates of endo-loop vs endo-stapler for laparoscopic appendectomies at South Health Campus.
- Perform a case-cost analysis to determine the savings that would result from a transition to endo-loop use for a period of 1 fiscal year.
- Initiate a plan whereby it would be the goal to reduce use of laparoscopic staplers to 25% of total appendectomies
- Perform a follow up case-cost analysis
- Perform a pre and post clinical outcomes analysis

RESEARCH METHODS

A database query of the Operating Room Information System (ORIS) was undertaken to gather the following information on all laparoscopic appendectomies performed at the South Health Campus in the 2014-2015 fiscal year.

- Operating surgeon
- Date of operation
- Surgeon pick-list and cost
- Surgeon specific items and cost
 - PDS/Vicryl Endo-loop
 - Endo-GIA stapler
 - Stapler cartridges/reloads

Statistical analysis was performed using MS Excel. For each individual case a total case cost was established from the sum total of all items on the surgeon pick-list. This was then subdivided into a base cost and a specific cost which was either the cost of laparoscopic staplers or endo-loop devices used in performing the case.

RESULTS

A total of 401 appendectomies were identified in the fiscal year of 2014-2015, of which 389 were laparoscopic appendectomies. Of these 55 lacked the needed financial data to perform the case cost analysis. Of the remaining 334 the distribution of endo-loop vs endo-stapler usage is outlined in Figure 1 and Figure 2

Figure 1: Laparoscopic Appendectomies 2014-2015 (n=334)

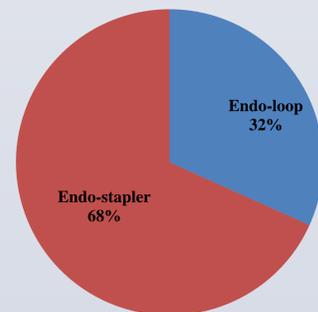
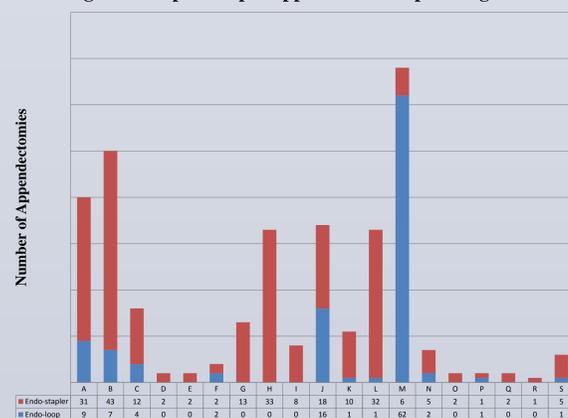


Figure 2: Laparoscopic Appendectomies per Surgeon



RESULTS (cont)

The average base cost of an appendectomy was found to be \$360.93. Average specific costs related to endo-loop were \$108.21. Average specific costs related to laparoscopic staplers were \$622.71. The difference in specific costs between endo-loop devices and laparoscopic staplers were \$514.50 per case

Figure 3: Total Equipment Expenditures on Laparoscopic Appendectomy 2014-2015

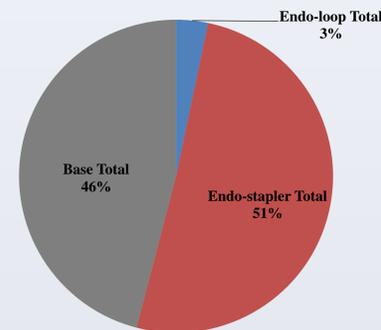


Figure 4: Average Equipment Expenditure Per Surgeon

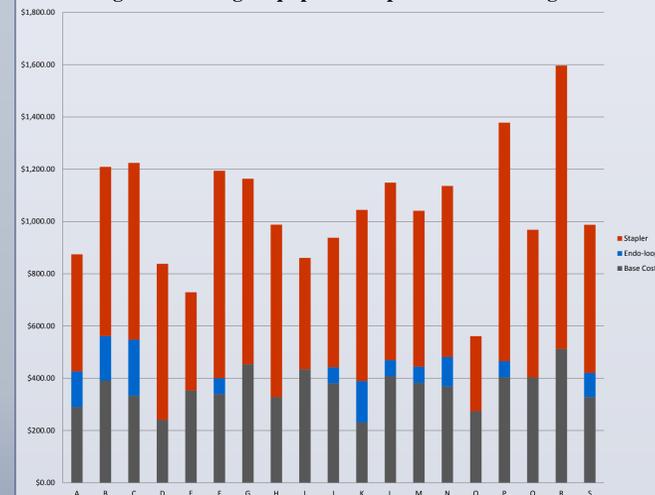


Figure 5: Projected expenditure based on ratio of endo-loop to stapler – assuming 400 cases/yr



TOTAL PROJECTED SAVINGS: \$92,070.76 (28.3%)

CONCLUSIONS AND FUTURE PLANS

- Laparoscopic staplers were used in 68% of laparoscopic appendectomies in the 2014-2015 fiscal year.
- Most surgeons used the stapler almost exclusively for all appendectomies.
- The average case cost difference between an endo-loop and stapler was \$514.50.
- Staplers comprised greater than 50% of equipment expenditure for this procedure
- By limiting stapler use to select cases of complicated appendicitis (~25%) a savings of **\$92,070.76 (28.3%)** would be incurred on an annual basis, assuming constant case volume and equipment prices.

Follow-up cost analysis for the 2016-2017 fiscal year is planned to assess the change in practice and actual cost savings incurred.

A pre and post outcomes analysis will also be carried out in order to assess whether the change in technique has brought about any change in rates of peri-operative complication rates

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