Outcomes of Single-Incision vs Multiport Laparoscopic Appendectomies in Pediatric Populations at a Single Institution

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Background

- Acute appendicitis is the most common cause for urgent abdominal surgery in children.
- While 3-port laparoscopic access has been considered the standard procedure, singular and 2-port access techniques are being utilized to minimize surgical incisions.
- Current data is inconsistent in operative time, length of stay, postoperative pain needs, and postoperative complications amongst the operative techniques in uncomplicated appendicitis within single institutions.
- The variability of the data suggests the need to further explore the peri- and postoperative outcomes of these methods, with additional defined advantages and disadvantages.

Problem Statement

The objective of this study is to compare clinical outcomes of three operative techniques in the treatment of acute uncomplicated appendicitis in pediatric patients in a single institution.

Methods

- American College of Surgeons National Surgical Quality Improvement Pediatric (ACS NSQIP-P) database
- January 2015 to June 2020
- Inclusion criteria:
  - Patients, ages 1-17, who underwent laparoscopic appendectomy for uncomplicated appendicitis
- Exclusion criteria:
  - Appendectomy for a diagnosis other than appendicitis
  - Interval appendectomy for history of perforated appendicitis
  - Prolonged stays due to complicated appendicitis and medical reasons unrelated to the procedure
- Study variables:
  - Age and gender
  - Length of stay, 30-day readmission and ED visits, surgical site infections (SSI), intra-abdominal abscess formation, opioid use
- Statistical analysis:
  - Chi-squared analysis and Fisher's Exact Test

Results

- Total of 583 pediatric patients

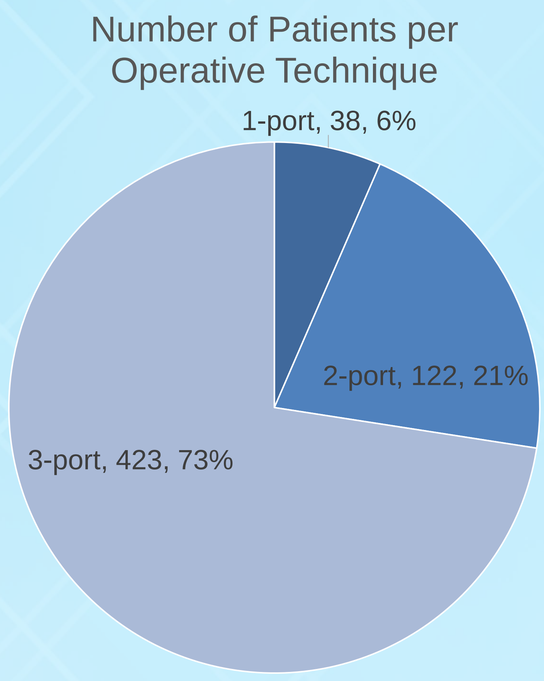

Figure 1. Number of patients who underwent laparoscopic appendectomy divided by operative technique.

	1-port	2-port	3-port	p-value
Operative Time (min)	50.5	37.0	48.0	p<0.0001
Same-day discharge	5 (13.2%)	36 (29.5%)	61 (14.4%)	p<0.0004

Table 1. Operative time and same-day discharge rates based on operative technique.

	1-port	2-port	3-port	p-value
30-day ED visit	7 (18.4%)	9 (7.4%)	25 (5.7&)	p<0.015
30-day readmission	0	4 (3.3%)	6 (1.4%)	p=0.3351

Table 2. 30-day ED return visits and readmissions based on operative technique.

	1-port	2-port	3-port	p-value
Post-op opioids	0	0	3 (0.7%)	p>1
Post-op SSI	0	0	6 (1.4%)	p=0.5644
Post-op abscess	0	0	4 (1.0%)	p=0.6793

Table 3. Post-operative opioid needs and complications based on operative technique. *SSI = surgical site infection*

Discussion

- Study Limitations:
  - Single institution, operative technique difficulty and level of training
- SELECT connections to Health Systems and the Iron Triangle:
  - Quality of care can be affected by the operative technique that is decided upon, despite a diagnosis of uncomplicated appendicitis.
  - Increased operative times increase cost of care for the hospital.
  - Increased length of stay due to operative technique or post-operative complications and post-operative return visits increase cost of care for the patient and the hospital.
- Self-Directed Learning Goals Achieved:
  - In 1 year, I have learned how to perform a proper literature search through public and reliable online databases, resulting in 20 total previous publications utilized for this capstone project.

Conclusions

- Trends in pediatric surgery in favor of single port appendectomies are supported from small single institutional studies.
- Our study demonstrated an increase in operative time, length of stay, and in 30-day return to ED visits when using the single port technique compared to the 2-port and 3-port technique.
- Future directions:
  - A multi-institutional review to compare outcomes between operative techniques

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