

AUDIT OF LAPAROSCOPIC APPENDICECTOMY IN A SURGICAL UNIT

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Abstract

Keywords: laparoscopy, appendicectomy, surgical unit.

Background

With the advent of laparoscopy, surgeons need new skills and must relearn the procedures that had been familiar in open surgery. For some procedures, like appendicectomy, the learning curve can be steep, owing to the diversity of clinical presentations and the different locations of the appendix. Laparoscopic appendicectomy is gaining momentum worldwide because of the purported benefits of minimal access. The implication is that surgical training needs to adjust accordingly to provide adequate skills to prospective surgeons. In this manuscript, we endeavor to review the practice of laparoscopic appendicectomy in our unit.

Objective

A two-year review of laparoscopic appendicectomy in a surgical unit to reflect on the stages of appendicitis at presentation, the percentage of procedures done laparoscopically, and the trainees' contributions.

Method

Retrospective analysis of data prospectively collected between January 2013 and December 2014 in a surgical unit at the Chris Hani Baragwanath Academic Hospital (CHBAH), Johannesburg, South Africa. The parameters analyzed included patient demographics, surgical approach, intraoperative findings, and histopathological reports.

Results

The male to female ratio was 2:1, with a mean age of 25.7 years. The percentages of complicated, uncomplicated, and normal appendices, based on histopathological reports, were 53%, 20%, and 12%, respectively.

Conclusion

The laparoscopic approach represented 63% of all appendicectomies. More than half of the cases of appendicitis were complicated. Specialist surgeons performed most of the laparoscopic cases.

Introduction

Progress in technology has ushered in an era of minimal access surgery, which compels surgeons to relearn the procedures that had been familiar in open surgery. Laparoscopy enables adequate visualization of internal organs with minimal access. This is by no means an easy surgery; surgeons need to adjust to the interpretation of images, instrument handling, tissue manipulation, and other technical considerations. New skills are needed to overcome the challenges brought about by the new techniques to continue working without compromising the standard of care, but rather improving it through innovation. As with all new approaches, a learning curve of 20–30 cases is necessary, as delineated in guidelines and previous studies, to obtain a better outcome.^{1,2}

While it is straightforward to perform an appendicectomy in early appendicitis at a favorable location, the markedly inflamed retrocaecal or subserosal appendix poses a serious challenge even in experienced hands.³ Furthermore, when there is an intra-abdominal abscess (IAA), adequate drainage is required. While some surgeons may decide to revert to the more familiar technique of open surgery, some others embrace the new trend with enthusiasm motivated by its

purported advantages. The implication is that surgical training needs to accommodate the evolving laparoscopic surgery. Laparoscopic appendectomy has been represented by other international training units as an appropriate procedure to introduce the skill of laparoscopy without compromising patient safety or incurring procedural costs. It is a procedure that has been introduced at a medical officer and registrar level to help develop laparoscopic skills.^{2,4,5}

The minimal access offered by laparoscopy reduces the risk of wound sepsis, improves the patient's comfort, and allows for an early discharge and return to normal activity.^{1,6,7} The comparison between open and laparoscopic appendectomy is well documented in the literature and will not be discussed in this manuscript. The same goes for the safety of laparoscopic appendectomy.⁵⁻⁸ However, there are few publications on laparoscopic appendectomy in Sub-Saharan Africa, presumably because most Sub-Saharan African countries are low-income countries.⁹⁻¹⁵ We need local data to evaluate the state of laparoscopic appendectomy in our institution. Open appendectomy is generally a trainee's procedure, but with the laparoscopic approach, new challenges emerge that require the trainee's curriculum to be adjusted accordingly.^{2,4,6,16} In this study, we consider the presentation of appendicitis and reflect on the laparoscopic management thereof.

Objectives

- To evaluate the stages of appendicitis, based on intraoperative findings and histopathological reports;
- To establish the incidence of laparoscopic appendectomy;
- To identify the contribution of the trainees in laparoscopic appendectomy.

Method

We carried out a retrospective analysis of data collected between January 2013 and December 2014 in a surgical unit (Unit 5) with junior trainees at the Chris Hani Baragwanath Academic Hospital (CHBAH), Johannesburg, South Africa. The parameters analyzed included patient demographics, surgical approach, intraoperative findings, and histopathological report. Ethics approval was obtained from the Human Ethics Committee of the University of the Witwatersrand (clearance number M150377) and from the research review board of CHBAH.

Surgical technique

Laparoscopic appendectomies were performed either via the conventional approach (three ports—umbilical, suprapubic, and left lower quadrant) or trans-umbilically (with two or three ports). The appendicular artery was divided with electrocautery (diathermy), and the base of the appendix was tied off with an endoloop or Roeder knot. The appendix was retrieved with an endopouch. A thorough washout with warm saline was done, and a pencil drain was left in situ in cases complicated with IAA. In the trans-umbilical approach, the appendix was delivered through the umbilicus.

Trans-umbilical approach

The trans-umbilical approach with two or three ports uses one 10 mm umbilical port for the camera, a 10 mm suprapubic port, and an optional 5 mm left lower quadrant (LLQ) port. Through the suprapubic port, the appendix is grasped and delivered through the umbilicus after removal of the umbilical port (favorable scenario); or, when dissection is needed, a dissector is introduced via the LLQ to aid in the dissection of the appendix before it is exteriorized via the umbilicus. The mesoappendix is ligated, and the appendix is tied off at the base and divided.

Data analysis

This is an observational descriptive study. The mean was used for continuous variables, and proportion by ratio or percentage was used for categorical variables.

Results

165 appendectomies were performed during the period of interest. 61 (36.9%) were open surgeries (50 Lanz incisions and 11 midline laparotomies), and 104 (63%) were laparoscopies. Of the 104 laparoscopic procedures, appendectomy was not performed in 8 cases for the following reasons: disintegrated appendix (6), appendix mass (1), and pelvic inflammatory disease (1). 32 appendectomies were done trans-umbilically, either via two ports (25)

or three ports (7). In the majority of cases (72/104), a conventional approach was used. The contribution of the trainees and specialists were as follows.

Open surgery: - Trainees: 49/61 (80.3%)
 - Specialists: 12/61 (19.6%)
 Laparoscopy: - Trainees: 19/104 (18.2%)
 - Specialists: 85/104 (81.7%)

Table 1. Patient demographics

Male, n (%)	72 (69.2)
Female, n (%)	32 (30.7)
Male to female ratio	2:1
Race, n (%) Black and others	97 (93.2) and 7 (6.7)
Age (years), mean (range)	25.7 (10–66)
Pediatric age* (<18 years), n (%)	31 (29.8)

* Does not include children between 0 and 9 years old, who are referred to pediatric surgery. Children aged 10 and above are referred to adult surgery in our institution.

Table 2. Intra-operative findings of 104 cases

Intraoperative findings	Number, (%)	Number with IAA, (%)
Normal or mildly inflamed appendix	39 (37.5)	0 (N/A)
Complicated appendix (gangrenous, sloughed, suppurative, perforated)	59 (56.7)	30 (28.8) - Generalized: 1 (0.9) - Regional: 15 (14.4) - Localized: 14 (13.4)
Appendix abscess	4 (3.8)	4 (3.8)
Appendix mass	1 (0.9)	0 (0)
PID	1 (0.9)	1 (0.9)

Table 3. Histopathological reports of the appendix

Appendix	Number, (%)
Normal appendix	12 (12.5)
Early appendicitis	10 (10.4)
Acutely inflamed appendix	10 (10.4)
Complicated appendix (suppurative, gangrenous, perforated)	53 (55.2)
NET (Neuro-endocrine tumor)	1 (1.0)
Peritonitis unrelated to the appendix	5 (5.2)
Specimen not found	5 (5.2)

Discussion

Laparoscopic appendectomy has become widely accepted in centers that are equipped to perform the procedure, which in the literature has been shown to be safe and effective for acute appendicitis. Laparoscopic appendectomy includes single incision laparoscopic appendectomy, which is particularly beneficial for obese patients.^{17,18} Laparoscopic surgery has evolved considerably, so that it is now imperative to identify the key basic procedures for training.

In this study, 56.7% of cases were of complicated appendicitis, of which 28.8% were associated with IAA. A possible explanation may be delayed presentation due to the patient's inability to interpret the initial symptoms. Appendicitis is mostly an acute event and can rapidly progress to an appendicular mass, an appendicular abscess, or free peritonitis (localized or generalized). At our facility, we treat a significant volume of complicated appendicitis.

We do not practice single incision laparoscopic surgery (SILS). In most cases, our approach was conventional laparoscopic appendectomy. The trans-umbilical approach was indicated in selected cases and has the added benefit of reducing the cost by obviating the need for the endopouch and endoloop.

The use of laparoscopic appendectomy on 62% of cases is not representative of the whole country; it is only a reflection of one unit at a tertiary hospital. We estimate that the overall percentage of laparoscopic appendectomies countrywide is much smaller, as the laparoscopic procedure is most likely to be performed specifically at a tertiary hospital.

It is alarming that specialists handled the majority of cases; the steep learning curve, complicated appendicitis, inadequate exposure to laparoscopy, together with the level of seniority of the trainees are possible contributing factors. Also, the practice of laparoscopic appendectomy in our institution has been introduced relatively recently, unlike the well-established laparoscopic cholecystectomy. As is often the case with new procedures, it is possible that the theatre unpreparedness might have contributed. It was not uncommon for us to encounter resistance in the operating room when booking emergency laparoscopic procedures (mainly appendectomies). With appropriate training, the ultimate aim is to make laparoscopic appendectomy a trainee's procedure, as it is with open surgery. To achieve this goal, we want to make laparoscopic appendectomy a default procedure and to expect an ongoing trainer's supervision. Incentives such as learning through a simulator are also not readily available.

Conclusion

Laparoscopic appendectomy was mainly performed by specialists (81.7%) and represented 63% of all appendectomies. Based on intraoperative findings and histopathological report, complicated appendicitis represented more than half of all cases.

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