

Laparoscopic versus Open appendectomy in Acute Appendicitis

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ABSTRACT

Background: Although laparoscopic appendectomy is widely practiced nowadays, controversy still continues about the advantages of laparoscopic versus open appendectomy. To compare LA with OA to determine the length of hospital stay, post operative morbidity and length of operation.

Methods: A retrospective study carried out, between February 2009 and January 2012, involving 226 patients (111 males and 115 females) with a diagnosis of suspected acute appendicitis. LA group consisted of 54 patients and OA group of 172 patients. The groups were compared by using Chi-square test for categorical variables and student t-test for continuous variables.

Results: The mean length of hospital stay in LA was 2.69 days and in OA 4.03 days ($p < 0.001$). The mean operative time in LA was 61.52 minutes and in OA 39.61 minutes ($p < 0.001$). Post operative wound infection was seen in one patient (1.8%) in LA group and 17 patients (9.8%) in OA group. Conversion to open surgery was not necessary.

Conclusions: Laparoscopic appendectomy is as safe and effective as open procedure with major benefits like less post operative pain, decreased wound infection, less hospital stay and early return to normal activities.

Keywords: acute appendicitis; laparoscopic appendectomy; open appendectomy.

INTRODUCTION

Acute appendicitis is the most common etiology of acute abdomen, generally requiring urgent surgical intervention, with a lifetime incidence between 7 and 9%.¹ Open appendectomy (OA), as described by McBurney in 1894, remained the gold standard for the treatment of acute appendicitis for more than a century.² In 1983, laparoscopic appendectomy (LA) was first described by Semm, a German surgeon,³ since then, this approach has gained popularity at the expense of open appendectomy.

More than two decades later, the benefits of LA are still controversial. Despite numerous randomized trials,^{4,6} several meta-analyses,⁷⁻¹⁰ and systematic critical reviews^{11,12} comparing the two techniques, the relative advantages of each procedure have yet to be established. The European Association of Endoscopic Surgeons (EAES)

has recently released guidelines on appendectomy that clearly favour the laparoscopic approach.¹³

Our hospital is a tertiary care private hospital in western region of the country where laparoscopic procedures are frequently performed. There is no cost difference between laparoscopic and open procedures in this hospital. There is no health insurance system or government support for healthcare in private sector. In this condition where the patient has to abide the cost, it is better to minimise the expense by minimally invasive procedure. Common advantages of laparoscopic appendectomy are: less postoperative pain, short hospital stay, quicker return to bowel function, quicker return to normal activity and better cosmetic results.³

The aim of the study is to compare the outcomes in terms of duration of surgery, length of hospital stay, and post operative complications.

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METHODS

A retrospective study was carried out in the department of Surgery, MCOMS from February 2009 to January 2012, involving a total of 226 patients (111 males and 115 females), admitted with a diagnosis of suspected acute appendicitis. Written informed consent was taken from the entire participant. There was no age limit in this study. In this hospital there is no cost difference between the two approaches. In all cases, the surgeon was the one to explain the procedure with its possible complications to the patients. The patients were explained both the procedures and were the one to choose the approach.

All Laparoscopy were performed in the following manner: An umbilical puncture with a Veres needle allowed insufflation of the peritoneal cavity with carbon dioxide gas, following which a 10mm port and telescope was inserted to view the abdominal contents. The telescope was connected via a video camera to a monitor. With the Trendelenburg manoeuvre and left rotation of the table the appendix was brought into view. Acute appendicitis was confirmed at this stage and other pathologies excluded. A second port, 5mm, was inserted into the right iliac fossa lateral to the inferior epigastric artery under direct vision. A third port, 5mm was inserted in the midline suprapubic area, again under direct visual control. Through the second port an atraumatic forceps was inserted to enable manipulation of the appendix. The third port was used variously for the diathermy hook, the laparoscopic scissors, the Roeder-loop suture, extraction of the appendix and suction/irrigation. With the appendix under traction, the appendicular artery was identified and its branches to the appendix carefully coagulated and divided using a diathermy hook. The mesoappendix was then separated by diathermy until the base of the appendix was cleared of mesentery. A pre-tied chromic catgut Roeder-loop suture was inserted through the suprapubic port and secured around the base of the appendix. The appendix was then transected distal to the tie and retrieved through the umbilical port. The appendix site and inflamed areas were cleaned by laparoscopic suction/irrigation with saline. After desufflation of the peritoneal cavity the port sites were sutured.

The open approach was done by traditional Grid- Iron or Lanz incision over McBurney's point. The arteries in the mesentery and the base of the appendix were simply ligated and divided. The base of the appendix was ligated using Vicryl 2-0. The appendix was divided 1 cm distally to the ligature without invagination of the appendicular stump. All the resected specimens were submitted for histopathologic examination.

All patients received preoperative antibiotics, third generation Cephalosporin and Metronidazole. Postoperative antibiotics administration varied and was determined by the surgeon according to the surgical findings. The operating time, hospital stay, and perioperative complications were recorded. The patients were given narcotic analgesia as the first medication for postoperative pain control for 24 hours. They were given oral liquids next day after the surgery, gradually the diet was progressed as tolerated. Patients were discharged once they were afebrile, had good pain control and tolerated soft diet.

The data were analyzed by using SPSS version 16. Descriptive data were given as mean (SD). The groups were compared by using Chi-square test for categorical variables and student *t*-test for continuous variables. The *p* value of <0.05 was considered as significant.

RESULTS

A total of 226 patients underwent surgery for suspected acute appendicitis. Of these, LA group consisted of 54 patients and OA group consisted of 172 patients. In the LA group, male to female ratio was 1:1.5, age ranging from 13-48 year. In OA group, male to female ratio was 0.9:1, age ranging from 15-50 year (Table 1).

The operative time for LA was 21.9 minutes longer compared to OA group. The operative time decreased with the increasing number of patients (Table 2).

Table 1. Age and sex distribution in laparoscopic and open groups

Variable	LA	OA
Age	26.26±7.96	32.98±9.07
Sex		
Male	21(38.9%)	90(52.3%)
Female	33(61.1%)	82(47.7%)

Table 2. Mean operative time, hospital stay in laparoscopic and open groups

Variable	LA	OA	P	95% CI
Operative time	61.52±15.52	39.61±5.56	<0.001	19.1; 24.66
Hospital stay	2.69±0.74	4.03±1.09	<0.001	-1.66; -1.03

One patient had developed DVT which was detected on follow-up after 2 weeks. There was no conversion rate after LA (Table 3).

Histological analysis showed acute appendicitis in 220 patients and a normal appendix in 6 patients. Other findings such as mesenteric lymphadenitis was 2 with normal appendix during appendectomy (Table 4).

Table 3. Post operative complications in laparoscopic and open groups

Complications	LA	OA	Chi value	df	P
None	53	154	3.96	2	0.13
Wound infection	1	17			
DVT	0	1			

Table 4. Finding during Appendicectomy in patient with normal appendix

Diagnosis	LA (n=4)	OA (n=2)
Mesenteric lymphadenitis	2	1
Tubal pregnancy	1	0
Meckel's diverticulitis	0	1
Ovarian cyst	1	0

DISCUSSION

During the past two decades, general surgery has seen a major shift from open to minimally invasive surgery. Although classic open appendectomy is simple and effective, it has some drawbacks like wound infection, painful, and delayed recovery. Laparoscopic appendectomy is another option which appears to have advantages over the open method since it uses smaller incision for access and allows clearer and wider vision with a camera. Although the incision is smaller, the benefits are still not clear. One should always think of laparoscopic surgery and open as being complimentary to each other. The advantages claimed by several studies are shorter hospital stay, decreased mortality rates, quicker return to work and lower hospital cost.¹² However, the controversy still continues about these advantages and laparoscopic appendectomy has not replaced the open method as laparoscopic cholecystectomy has done.^{11,14-16}

A global trend towards an increased use of laparoscopic appendectomy has been observed and in our institution the rate has increased from 19.6% in 2009 to 46.4% in 2011. All patients were explained about both the procedures, and the approach was based on patient's preference. In this study, younger age group patients preferred to go for laparoscopic surgery.

The mean operative time of LA was 21.9 minute longer than OA. Other authors have also reported similar results.^{17,18} In this study, one patient had post operative complication in LA group whereas 17 patients in OA group. Most of the morbidities were due to wound infection. Wound infection rate in the open surgery group was higher than LA group. In one study it has highlighted that the difference in wound complication rates is a major benefit of laparoscopic appendectomy.¹⁹ There

was significant decrease in the length of hospital stay in patients undergoing LA ($p<0.001$), which is consistent with the findings of other studies.²⁰⁻²³

Vallina et al²⁴ found the average total cost of LAs to be 30% greater than that of conventional OAs. In this hospital, there was no operation cost difference between the two groups, but the cost would be more based on the duration of hospital stay, making laparoscopy procedures more cost effective. However laparoscopic approach still has to prove its efficacy and safety in clinical trials.

CONCLUSIONS

This study demonstrates that laparoscopic appendectomy is as safe and effective as the open procedure. The overall benefits of LA are modest, it results in faster recovery, lower pain, better patient cosmetics and fewer post operative complications as compared with open appendectomy.

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