

Research Article

Comparison of the complications between laparoscopic and open appendectomy: a study in a teaching hospital in Telangana, India

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ABSTRACT

Background: Given the large number of procedures done annually, the validation of a minimally invasive technique that would improve outcomes may have a direct impact on patient management and possibly an indirect effect on the economics of health care. Even now, the benefits of the laparoscopic appendectomy over the open appendectomy are still controversial. The objective of the study was to analyze the difference in the benefits of laparoscopic appendectomy over open appendectomy.

Methods: The patients scheduled for appendectomy were divided into 2 groups : laparoscopic group who underwent laparoscopic appendectomy consisted of 69 patients and open group who underwent open abdominal appendectomy consisted of 42 patients.

Results: The mean operating time in the laparoscopic group was 68 minutes while in the open group it was 55 minutes. The number of analgesic doses given to the patients was 2.4 in the laparoscopic group and 3.6 in the open group. The intake of the oral foods was also faster after the laparoscopy than after open surgery while the hospital stay was lesser. Post-operative complications observed in the laparoscopic surgery patients were diarrhea in 2 patients, one case of urinary tract infection, post-operative bleeding, surgical site infections and intra-abdominal abscess. Among the open group patients, 4 patients had surgical site infection and 3 had diarrhea. 2 patients had intra-abdominal abscess and intraoperative bleeding.

Conclusions: Laparoscopic appendectomy is an effective and safe procedure which can be performed on any kind of patient regardless of the age, sex and BMI.

Keywords: Laparoscopic appendectomy, Open appendectomy, Comparison, Complications

INTRODUCTION

Open appendectomy has been a safe and effective operation for acute appendicitis for over a century. It is one of the most frequently performed abdominal operation. It is estimated that approximately 7% of the population develop appendicitis in their life time.¹ Laparoscopic surgery for appendectomy was first introduced in 1983 by Semm, but since then, it has

struggled to prove its superiority over open appendectomy, while its counterpart, laparoscopic cholecystectomy has become a gold standard technique for gall stone disease.^{2,3} Open appendectomy has withstood the test of time for more than a century, since its introduction by McBurney.⁴ This procedure is standardized among the surgeons and is completed using a small right lower quadrant incision unlike the open cholecystectomy. The number of post-operative

complications are also minimal and hence preferred by the surgeons. The overall mortality due to open appendectomy is estimated to be 0.3% and morbidity about 11%.⁵ Given the large number of procedures done annually, the validation of a minimally invasive technique that would improve outcomes may have a direct impact on patient management and possibly an indirect effect on the economics of health care.

Even now, the benefits of the laparoscopic appendectomy over the open appendectomy are still controversial.

The objective of the study was to analyze the difference in the benefits of laparoscopic appendectomy over open appendectomy.

METHODS

This study was carried out in the Deccan College of Medical Sciences by the Department of Surgery, Telangana, India. Patients with right iliac fossa pain suspected of appendicitis during the period two years were enrolled in to the study. Those patients having pathology other than acute appendicitis were excluded from the study. Patients with other co-morbidities were also excluded from the study.

The patients were then scheduled for appendectomy and were divided into 2 groups: laparoscopic group who underwent laparoscopic appendectomy consisted of 69 patients and open group who underwent open abdominal appendectomy consisted of 42 patients. The decision for the type of surgery was dependent on the performing surgeon's preference. The procedures were explained to the patients and the relatives in detail and informed consent was obtained.

The open appendectomy was performed with the Mc Burney or Lanz muscle splitting incision. In the laparoscopic technique, pneumoperitoneum was established with Hasson's technique and the appendectomy was performed with the standard three-trocar technique.

The parameters measured for the assessment of the study were operative time, hospital stay, analgesic use, post operative complications, mean duration of post operative ileus and start of the oral foods. All the patients were given similar oral analgesics such as paracetamol and dextropropoxyphene hydrochloride for pain. If there was a persistence of pain, meperidine hydrochloride was given. Chi square test and student t-test were used for statistical analysis.

RESULTS

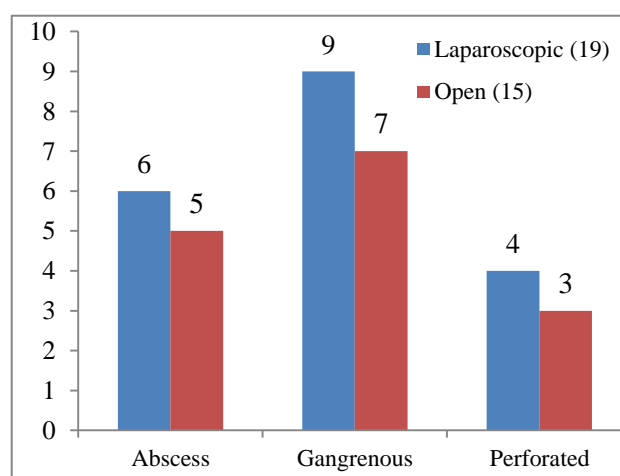
69 patients underwent laparoscopic appendectomy while open appendectomy was done on 42 patients. In both the groups there was no case of mortality reported. The

number of males were 56.5% in the laparoscopic group and 59.5% in the open group (Table 1).

Table 1: Demographic details.

Characteristics	Laparoscopic group	Open Group
Age	31.2±4.8	29.1±3.2
Sex		
Males	39 (56.5%)	25 (59.5%)
Females	30 (43.5%)	17 (40.5%)
Body Mass Index	24.3 ± 3.8	22.5 ± 4.1
WBC	12.3 ± 3.2	12.6 ± 2.9
Previous abdominal surgeries	2 (2.9%)	3 (7.1%)
Duration of symptoms (days)	1.98 (1-15)	1.82 (1-12)
ASA score		
2	19 (27.5%)	10 (23.8%)
3	4 (5.8%)	3 (7.1%)

Among 69 laparoscopic patients 19 (27.5%) had complicated appendicitis. 6 of them were abscesses, 9 were gangrenous and 4 were perforated. 15 (35.7%) were complicated appendicitis in the open group, and of them 5 were abscesses, 7 were gangrenous and 3 were perforated (Figure 1).



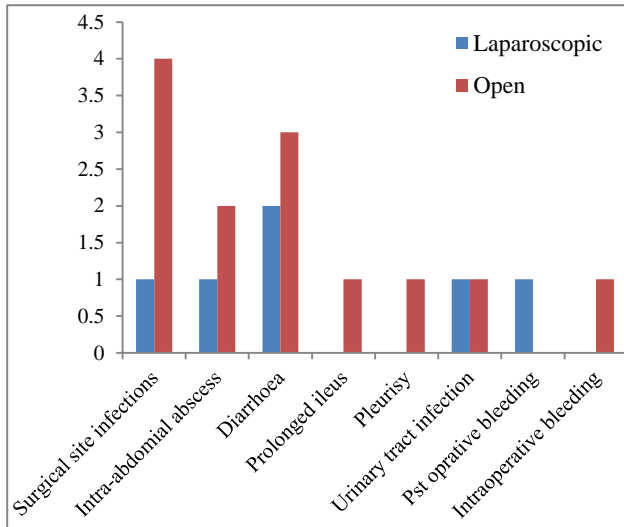
The mean operating time in the laparoscopic group was 68 minutes while in the open group it was 55 minutes. The number of analgesic doses given to the patients was 2.4 in the laparoscopic group and 3.6 in the open group. The intake of the oral foods was also faster after the laparoscopy than after open surgery while the hospital stay was lesser (Table 2).

6 (8.7%) post-operative complications were observed after the laparoscopic surgery out of which diarrhea was seen in 2 patients. One case of urinary tract infection, post-operative bleeding, surgical site infections and intra-abdominal abscess. Among the open group patients, 4 patients had surgical site infection and 3 had diarrhea. 2

patients had intra-abdominal abscess and intraoperative bleeding (Figure 2).

Table 2: Outcomes of the surgeries.

	Laparoscopic	Open
Operating time (in minutes)	68±8.8	55±6.2
No of analgesic doses	2.4	3.6
Intake of oral food (in hours)	43	66
Hospital stay (in days)	2.2	3.1
Duration of post-op ileus (days)	1.4	1.7



DISCUSSION

The introduction of laparoscopic appendectomy, the use was concentrated mainly on its efficacy as a diagnostic tool. The standard technique consisted of 3 or 4 trocar techniques, where the base of the appendix was ligated by intracorporeal or extracorporeal suturing, end loop placement, clip application, or stapling device.^{6,7} Present study was also performed using three trocars.

It is generally believed that minimally invasive surgeries result in less postoperative pain, fewer complications and shorter recovery periods in comparison to open surgeries.⁸ This was supported by Nowzaradan et al and in meta-analysis by Garbutt et al and Sauerland et al, who have all shown that there is less postoperative pain, lesser complications and faster return to normal activities with laparoscopic appendectomy.^{9,10,11}

The question of whether LA decreases the length of hospitalization has been a matter of great debate over the past decade.¹²⁻¹⁶ Some recent retrospective cohort studies, meta-analysis studies and other retrospective investigation have reported lesser hospital stay.^{11-13,17-19} There have been many other similar studies, who have reported no significant difference between laparoscopic and open surgeries.²⁰⁻²⁵ Present study showed a significant reduction in the number of hospital days, with

the mean in laparoscopic group being 2.2 days and among the open group the mean was 3.1 days. The cause for the shorter hospital stay according to some literatures was not due to the type of the surgery but was affected by the hospital factors or social habits.^{26,27,28} The diverse health care policies in different countries also seem to play a role in these discrepancies. For instance, although Hebebrand et al from Germany reported a length of hospital stay of 5.3 days for LA and 7.6 days for OA, Mutter and colleagues (UK/France) found 5.3 versus 4.9 days 24, and Minne et al (USA) 1.1 (LA) and 1.2 days (OA).^{29,30}

In present study, the number of wound infections were considerably more in open appendectomy as compared to the laparoscopic surgery. The rate of diarrhea and intra-abdominal abscesses were also higher among the open group. Intraoperative bleeding and prolonged ileus was seen only among the open group and there were no cases among the laparoscopic group.

Most studies have reported no significant differences in the occurrence of wound infections between laparoscopic and open appendectomies.¹⁴⁻¹⁷ Very few studies have corroborated our findings where wound infections among the open surgeries were higher than the laparoscopic surgeries.^{23,32-34} In yet another meta-analysis, Golub et al found a wound infection rate for laparoscopic group was less than half the rate in patients undergoing open appendicitis.³⁵ The chance of wound infection is greater in open appendectomy partly because the inflamed appendix is removed from the abdominal cavity directly through the wound, whereas in laparoscopic appendectomy it is extracted via a bag or trocar. In addition, the port-site wounds in LA are smaller compared to the longer wounds of OA, especially in obese patients.³⁶

The number of doses for pain medication was higher among those undergoing open appendectomy. This was in accordance to a similar study by Xiaohang Li et al.³⁶

Intra-arterial bleeding was more in the open surgery category while the urinary tract infection and intra-abdominal abscess was same in both the cases. This was in contrast to a study by Xiaohang Li et al who found all these complications to be more among the people who underwent laparoscopic surgery rather than the open one.³⁶

Regarding the time of operation, it was longer in the laparoscopic group than in the open group. This was observed in several other studies and has been attributed to the inexperience of the surgeons, as this is still a new technique.^{37,38}

There was an earlier return to normal activity in the patients who underwent laparoscopic appendectomy compared to those who went through open appendectomy. This was supported by a large scale meta-

analysis conducted by the Cochrane colorectal cancer group.³⁹ This was because the incision were of minimal trauma and less pain.⁴⁰ Thereby the recovery was faster. The reason also could be because the return to oral feeds is faster in this group.

CONCLUSION

The study shows that laparoscopic surgery is superior to open appendectomy with reference to the as it requires less hospital stay, less painful and minimal complication. With experienced surgeons performing the procedure, the operation time can also be considerably reduced. Therefore, laparoscopic appendectomy is an effective and safe procedure which can be performed on any kind of patient regardless of the age, sex and BMI.

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