



## Evaluation of Laparoscopic Versus Open Appendectomy: A Hospital Based Study

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### ABSTRACT

Both open and laparoscopic appendectomies are commonly performed procedures. The aim of this study was to investigate the difference in the benefits of laparoscopic appendectomy over open appendectomy. The subjects were then randomised into the open appendectomy and laparoscopic appendectomy groups, comprising of 30 patients each. This present study suggest that the laparoscopic appendectomy is a safe and effective approach for perforated appendicitis.

**KEYWORDS :** Acute appendicitis, Laparoscopic appendectomy and Open appendectomy

### Introduction:

Acute appendicitis is a common surgical emergency requiring rapid intervention, with a lifetime risk of 6-7%.<sup>1</sup> Open appendectomy (OA), first described in 1894 by McBurney, performed through the right lower quadrant muscle splitting incision has for long been applied as the Gold standard procedure.<sup>2</sup> This procedure has mainly remained unchanged for about 100 years due to its favorable efficacy and safety.

In 1983, Kurt Semm, a German gynaecologist, introduced the used laparoscopy to remove the appendix, the debate over laparoscopic appendectomy (LA) versus open appendectomy (OA) has remained active. LA has gradually gained widespread use for the treatment of acute appendicitis because meta-analyses of prospective randomized trials have concluded that LA is better than<sup>3-7</sup> or as good as<sup>8</sup> OA in terms of postoperative wound infections, analgesia requirement, hospital stay, return to work intervals, and overall recovery. The main aim of the study was to investigate the difference in the benefits of laparoscopic appendectomy over open appendectomy.

### Material and Methods:

This study was conducted in the Department of Surgery, Pacific Institute of Medical Sciences, Udaipur, India during the period from August 2015 to March 2016. Ethical clearance was obtained by the Ethics Committee of the institute before commencement of the study. 60 patients reporting to the surgical OPD with features of acute appendicitis were included in our study, excluding patients below 12 years, pregnant women, patients unfit for GA/laparoscopy and those having generalized peritonitis. After obtaining an informed consent, all patients were subjected to a preoperative work up including routine investigations, USG abdomen, erect X-ray abdomen, renal and liver function tests as well as any other tests required by the anesthesiologists. The subjects were then randomised into the open appendectomy and laparoscopic appendectomy groups, comprising of 30 patients each. All patients received one preoperative course of antibiotics (3rd generation cephalosporin or fluoroquinolone with Metronidazole) and were taken up for surgery under GA only.

### Surgical techniques for open/ conventional appendectomy:

Surgery was done either through McBurney's muscle splitting or Lanz's skin crease incision. Appendix was identified, mobilised, mesoappendix ligated, appendix removed and base was transfixed.

### Surgical techniques for laparoscopic appendectomy:

Surgery was done using three ports - one 10 mm at the umbilicus and two 5 mm ports in the suprapubic and left iliac regions. After identification of appendix, base was clamped using 2 endoclips and appendix divided. All specimens were sent for histopathological examination. All patients were observed in the postoperative ward for 24 hours, and then shifted. Oral feeding was commenced on appearance of bowel sounds. Wounds were dressed on second postoperative day and sutures removed on the 7th postoperative day (in uninfected wounds). Discharge, in case of uncomplicated patients of open surgery was done as per patient's preference but at least after completing one bowel movement. All patients underwent minimum of 2 fol-

low-ups - first after 1 week and 6 months later. Comparable data was tabulated and analyzed statistically to reach a conclusion regarding the surgical outcomes of both procedures.

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 and Discussion:

A total of 60 patients underwent appendectomy during the study period. Of these surgeries, 30 were performed laparoscopically and 30 by open surgery based on the operating surgeon's preference. The number of males were 63.33% in the laparoscopic group and 36.6% in the open group. Average age and male:female ratios were similar in both groups table-1. The average body mass index was higher in the laparoscopic group (LA 25.6kg/m<sup>2</sup> ; OA 23.2kg/m<sup>2</sup>) the duration of surgery was 72 minute in the laparoscopic group and 58 minute in the OA.

Among 60 laparoscopic patients 14 had complicated appendicitis. 4 of them were abscesses, 10 were gangrenous and 01 were perforated. 12 were complicated appendicitis in the open group, and of them 2 were abscesses, 8 were gangrenous and 2 were perforated.

**Table-1: Demographic details:**

| variables | Laparoscopic Group | Open Group  |
|-----------|--------------------|-------------|
| Age (Yrs) | 30.5±4.02          | 26.01±4.21  |
| Male      | 19 (63.33%)        | 19 (63.33%) |
| Female    | 11 (36.6%)         | 11 (36.6%)  |
| BMI       | 25.6 ± 2.01        | 23.2 ± 2.03 |
| WBC       | 12.5 ± 6.04        | 12.3 ± 2.01 |

**Table-2: Comparison of variables between the two groups:**

| variables                        | Laparoscopic Group | Open Group |
|----------------------------------|--------------------|------------|
| Mean operative time (Minute)     | 72±4.31            | 58±7.01    |
| Hospitalization (days)           | 1.9                | 3.2        |
| Time to oral intake (hrs)        | 41                 | 67         |
| No of analgesic doses            | 2.1                | 3.4        |
| Duration of post-op ileus (days) | 1.5                | 1.9        |

Excellent results following laparoscopic appendectomy and easier availability of instruments for laparoscopic surgery in recent years has made laparoscopic appendectomy a popular choice of surgery

amongst many patients for both simple and complicated cases of acute appendicitis. The rate of LA between 1998 and 2008 increased from 20.6% to 70.8%, becoming the prevalent approach to treat acute appendicitis since 2005.<sup>9</sup> It is generally believed that minimally invasive surgeries result in less postoperative pain, fewer complications and shorter recovery periods in comparison to open surgeries.<sup>10</sup> 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.<sup>11,12,13</sup>

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 intraabdominal 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.<sup>14-17</sup> Very few studies have corroborated our findings where wound infections among the open surgeries were higher than the laparoscopic surgeries.<sup>18,19-21</sup> 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.<sup>22</sup> 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.<sup>23</sup> 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.<sup>23</sup> Intra-arterial bleeding was more in the open surgery category while the urinary tract infection and intraabdominal 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.<sup>23</sup>

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.<sup>24,25</sup> 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.<sup>26</sup> This was because the incision were of minimal trauma and less pain.<sup>27</sup> Thereby the recovery was faster. The reason also could be because the return to oral feeds is faster in this group.

### Conclusion:

These findings suggest that the laparoscopic appendectomy is a safe and effective approach for perforated appendicitis. Despite a prolonged operative time, LA was found to be superior to OA with respect to the postoperative pain, hospital stay, early recovery, wound infection and cosmesis. The added advantage of laparoscopic appendectomy is its improved diagnostic ability.

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