

# Comparative Analysis of Clinical Outcomes of Open Appendectomy and Laparoscopic Appendectomy

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## ABSTRACT

**Introduction:** Open appendectomy (OA) is standardized among surgeons and, OA is typically completed using a small right lower quadrant incision and postoperative recovery is usually uneventful. It is the second most common general surgical procedure performed in India and the most common intra-abdominal surgical emergency, with a lifetime risk of 6%. Study aimed to compare the clinical outcomes between laparoscopic and open appendectomy.

**Material and methods:** The present study was conducted in the Department of General Surgery of our medical college. For the study, we retrospectively viewed the medical records of patients aged 60 years or more with acute appendicitis who underwent Laparoscopic appendectomy (LA) and were compared to patients who underwent open appendectomy (OA). A total of 70 patients (35 each for LA and OA) were selected. The analysis of preoperative, intra-operative, and postoperative parameters was done and was compared.

**Results:** A total of 70 patients were included in the study. Out of 70 patients, 35 patients underwent Laparoscopic appendectomy and 35 underwent open appendectomy. The Male/Female ratio in LA and OA group was 19/16 and 21/14 respectively. The mean age of patients in LA group was 63.1±3.2 years and in OA group was 66.2±3.1. The mean body weight of LA and OA group was 60.2±5.2 Kg and 61.9±3.1 kg respectively. The mean operative time period for LA was 101.8 minutes and for OA was 129.8 minutes. Blood loss more than 500 mL was seen in 5 patient for LA and 8 patients for OA. The nasogastric tube was employed in 6 patients in LA and 9 patients in OA. The mean postoperative stay after completion of procedure was 5.9 days for LA and 8.78 for OA.

**Conclusion:** Laparoscopic appendectomy is safer procedure in comparison to open appendectomy. The postoperative stay at hospital was shorter with Laparoscopic appendectomy.

**Keywords:** Laparoscopic Appendectomy, Open Appendectomy, Acute Appendicitis

## INTRODUCTION

Open appendectomy (OA) is standardized among surgeons and, unlike cholecystectomy, OA is typically completed using a small right lower quadrant incision and postoperative recovery is usually uneventful.<sup>1, 2</sup> It is the second most common general surgical procedure performed after laparoscopic cholecystectomy, and the most common intra-abdominal surgical emergency, with a lifetime risk of 6%. The overall mortality of OA is around 0.3%; and morbidity, about 11%.<sup>4</sup> The introduction of laparoscopic appendectomy (LA) was therefore greeted with initial reluctance, skepticism, or outright rejection by many surgeons.<sup>3,4</sup> Surgeons were discouraged by the disadvantages of the laparoscopic

approach, including longer duration of operation, increased cost to the patient, and reports of complications.<sup>5</sup> Nearly 3 decades later, large series of randomized controlled trials have shown significant evidence in favor of LA in many centers across the world. Despite published studies showing several advantages, the validity of this procedure in developing countries has not been confirmed.<sup>6</sup> Hence the present study was planned to compare the clinical outcomes between laparoscopic and open appendectomy.

## MATERIAL AND METHODS

The present study was conducted in the Department of General Surgery of MES medical college Perinthalmanna, Kerala. Period of study was from October 2013 to March 2014. The ethical clearance for the protocol of study was obtained from the ethical committee of the institute. For the study, we retrospectively viewed the medical records of patients aged 60 years or more with acute appendicitis who underwent Laparoscopic appendectomy (LA) and were compared to patients who underwent open appendectomy (OA). A total of 70 patients (35 each for LA and OA) were selected. In all the patients, history of pain in the abdomen along with tenderness was noticed at the right lower quadrant. The analysis of preoperative, intra-operative, and postoperative parameters was done and was compared.

## STATISTICAL ANALYSIS

The statistical analysis of the data was done using SPSS software for windows. The significance of the data was checked using Chi-square test and Student's t-test. A p-value<0.05 was predetermined to be statistical significant.

## RESULTS

A total of 70 patients were included in the study. Out of 70 patients, 35 patients underwent Laparoscopic appendectomy and 35 underwent open appendectomy. The surgical procedure for LA and OA were performed by experienced medical officers. Table 1 shows the comparison of demographic data between LA group and OA group. The Male/Female ratio in LA and OA group was 19/16 and 21/14 respectively. The

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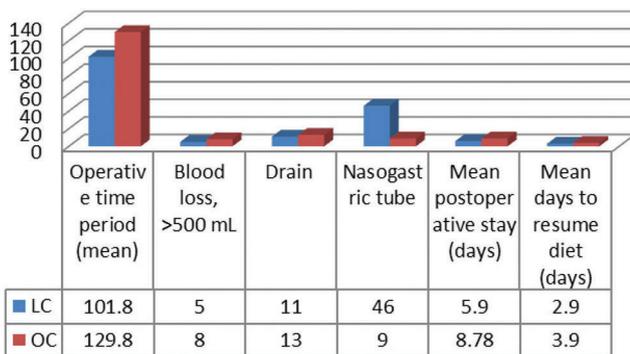
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Variables	LA`	OA	p-value
Sex (M/F)	19/16	21/14	0.42
Mean Age (years)	63.1±3.2	66.2±3.1	0.5
Mean Body weight (kg)	60.2±5.2	61.9±3.1	0.12
Previous surgery (n)	12	9	0.09
ASA physical status score			
1	9	5	0.06
2	17	18	0.71
3	6	8	0.32
4	3	4	0.8

**Table-1:** Comparison of demographic variables for both groups

Variables	LC	OC	p-value
Operative time period (mean)	101.8	129.8	0.21
Blood loss, >500 mL	5	8	0.23
Drain	11	13	0.41
Nasogastric tube	6	9	0.001*
Mean postoperative stay (days)	5.9	8.78	0.02*
Mean days to resume diet (days)	2.9	3.9	0.25

**Table-2:** Comparison of post-operative parameters for both the groups



**Figure-1:** Showing comparison of post-operative parameters for both the groups

mean age of patients in LA group was 63.1±3.2 years and in OA group was 66.2±3.1. The mean body weight of LA and OA group was 60.2±5.2 kg and 61.9±3.1 kg respectively. The history of previous surgery was present in 12 patients in LA group and 9 patients in OA group. Non-significant difference was observed on comparing the data between both groups ( $p>0.05$ ). The mean operative time period for LA was 101.8 minutes and for OA was 129.8 minutes. Blood loss more than 500 mL was seen in 5 patient for LA and 8 patients for OA. The nasogastric tube was employed in 6 patients in LA and 9 patients in OA. The mean postoperative stay after completion of procedure was 5.9 days for LA and 8.78 for OA. The difference for nasogastric tube and mean postoperative stay was statistically significant with p-value less than 0.05 [Fig 2].

## DISCUSSION

Appendicitis is the most common cause of surgical abdomen in all age groups.<sup>7</sup> Approximately 7–10% of the general population develops acute appendicitis with the maximal incidence being in the second and third decades of life. Open appendectomy has been the gold standard for treating

patients with acute appendicitis for more than a century, but the efficiency and superiority of laparoscopic approach compared to the open technique is the subject of much debate nowadays.<sup>8</sup> There is evidence that minimal surgical trauma through laparoscopic approach resulted in significant shorter hospital stay, less postoperative pain, faster return to daily activities in several settings related with gastrointestinal surgery.<sup>9</sup> In the current study, we compared laparoscopic appendectomy with open appendectomy in elderly patients. We observed that the mean operative time in OA is more as compared to LA. Similarly, the complication of blood loss was seen more in OA as compared to LA. The postoperative stay in hospital was more in OA as compared to LA. Similar results were seen by other authors. Tiwari MM et al compared laparoscopy in the management of appendicitis in general and complicated or perforated appendicitis. A review, observational investigation configuration was utilized to assess multicenter results utilizing the University Health System Consortium database. A 3-year release information of all open appendectomy (OA) and laparoscopic appendectomy (LA) techniques in adult patients. A total of 40,337 appendectomy operations were performed in adult patients who were incorporated into the present investigation. LA for uncomplicated an infected appendix brought about altogether better surgical results. However; non-significant reduction in the hospital costs was observed by analyzing these results. From the above results, the authors concluded that in comparison to OL, laparoscopic appendectomy is superior in terms of several surgical outcome measures for both uncomplicated and complicated appendicitis, across most illness severity groups. Therefore, irrespective of appendicitis diagnosis, LA may be the preferred technique. In another study, Sporn E et al compared the results of LA with that of open approach. They assessed the outcomes of length of stay, costs, and complications for uncomplicated and complicated appendicitis. They observed that in the LA group, the risk for complication was higher along with uncomplicated appendicitis. From the results, the authors concluded that for patients with uncomplicated appendicitis, LA results in higher costs and increased morbidity.<sup>10, 11</sup> Yeh CC et al evaluated the determinants of costs and hospital length of stay (LOS) in patients undergoing appendectomy. They included all the inpatients that underwent treatment by LA or OA for appendicitis. They observed that in comparison to OA, LA was associated with comparable costs and reduced LOS for the elderly, patients with comorbidities, and those with complicated appendicitis. From the above results, they didn't observe any significant difference in the hospital mortality and readmission rates for postoperative complications in between LA and OA. Yau KK et al in another study assessed the efficacy of LA in patients with complicated appendicitis. They analyzed the data records of the patients with age of 14 years and above who were diagnosed with appendicitis. For confirming the diagnosis of complicated appendicitis, and for further deciding the line of treatment, all the patients subsequently underwent diagnostic laparoscopy. They collected and compared all the

demographic and peri-operative details of all the patients. A total of 1133 patients with acute appendicitis were included in the present study. They didn't observe any mortality in their case series. From the above results, they concluded that for treating patients with complicated appendicitis, laparoscopic appendectomy is feasible and safe.<sup>12-16</sup>

## CONCLUSION

From the results of present study, we conclude that Laparoscopic appendectomy is safer procedure in comparison to open appendectomy. The postoperative stay at hospital was shorter with Laparoscopic appendectomy.

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