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Ravichandran Subramaniam
Associate professor, Department of
general surgery, Melmaruvathur
Adhi Parasakthi Institute of
Medical Sciences, Melmaruvathur,
Tamil Nadu, India

Analysis of outcomes of laparoscopic appendectomy and open appendectomy

Ravichandran Subramaniam

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Abstract

Background: Open appendectomy is standardized among surgeons and is usually completed using a small right lower quadrant incision and postoperative recovery is usually uneventful. It is the most common general surgical procedure performed all-over the world. And the most common intra-abdominal surgical emergency, with a lifetime risk of 6%.

Aim of the study: To compare the clinical outcomes between laparoscopic and open appendectomy.

Materials and method: The present study was conducted in the Department of General Surgery, Melmaruvathur adhi parasakthi institute of medical sciences, Melmaruvathur during the period January 2018 to December 2018. For the study, we retrospectively viewed the medical records of patients aged 18 years or more with acute appendicitis who underwent Laparoscopic appendectomy and were compared to patients who underwent open appendectomy. A total of 100 patients (50 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 100 patients were included in the study. Out of 100 patients, 50 patients underwent Laparoscopic appendectomy and 50 underwent open appendectomy. The Male/Female ratio in LA and OA group was 28/22 and 29/21 respectively. The mean age of patients in LA group was 58.1 ± 3.2 years and in OA group was 63.2 ± 3.1 . The mean body weight of LA and OA group was 58.2 ± 5.2 Kg and 60.9 ± 3.1 kg respectively. The mean operative time period for LA was 120 minutes and for OA was 130 minutes. Blood loss more than 500 mL was seen in 8 patient for LA and 11 patients for OA. The nasogastric tube was employed in all patients in LA and 12 patients in OA. The mean postoperative stay after completion of procedure was 4.8 days for LA and 8.8 days 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 OA is typically completed using a small right lower quadrant incision and postoperative recovery is usually uneventful^[1, 2]. It is the second most common general surgical procedure performed 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%.⁴ The introduction of laparoscopic appendectomy (LA) was therefore greeted with reluctance and outright rejection by many surgeons^[3, 4]. Surgeons were discouraged by the disadvantages of the laparoscopic approach, including longer duration of operation, increased cost to the patient, and reports of complications^[5]. Nearly three 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^[6]. Hence the present study was planned to compare the clinical outcomes between laparoscopic and open appendectomy.

Materials and Method

The present study was conducted in the Department of General Surgery of Melmaruvathur adhi parasakthi institute of medical sciences, Melmaruvathur. 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 18 years or more with acute

Correspondence
Ravichandran Subramaniam
Associate professor, Department of
general surgery, Melmaruvathur
Adhi Parasakthi Institute of
Medical Sciences, Melmaruvathur,
Tamil Nadu, India

appendicitis who underwent Laparoscopic appendectomy (LA) and were compared to patients who underwent open appendectomy (OA). A total of 100 patients (50 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.

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 100 patients were included in the study. Out of 100 patients, 50 patients underwent Laparoscopic appendectomy and 50 underwent open appendectomy. The surgical procedure for LA and OA were performed by experienced surgeons. Table 1 shows the comparison of demographic data between LA group and OA group. The Male/Female ratio in LA and OA group was 28/22 and 29/21 respectively. The mean age of patients in LA group was 58.1±3.2 years and in OA group was 63.2±3.1. The mean body weight of LA and OA group was 58.2±5.2 kg and 60.9±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 120 minutes and for OA was 130 minutes. Blood loss more than 500 mL was seen in 8 patient for LA and 11 patients for OA. The nasogastric tube was employed in all patients in LA and 12 patients in OA. The mean postoperative stay after completion of procedure was 4.8 days for LA and 8.8 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.⁷ 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 [8]. 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 [9]. In the current study, we compared laparoscopic appendectomy with open appendectomy in all 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. LA for uncomplicated uninfected 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. 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 [10, 11].

Yeh CC *et al.* evaluated the determinants of costs and hospital length of stay (LOS) in patients undergoing appendectomy. They included all the inpatients who 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 [12, 13].

Table 1: Comparison of demographic variables for both groups

| Variables | LA` | OA | p-value |
|---------------------------|----------|----------|---------|
| Sex (M/F) | 28/22 | 29/21 | 0.42 |
| Mean Age (years) | 58.1±3.2 | 63.2±3.1 | 0.5 |
| Mean Body weight (kg) | 58.2±5.2 | 60.9±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 2: Comparison of post-operative parameters for both the groups

| Variables | LA | OA | p-value |
|---------------------------------|-----|-----|---------|
| Operative time period (mean) | 120 | 130 | 0.21 |
| Blood loss, >500 mL | 8 | 11 | 0.23 |
| Drain | 11 | 13 | 0.41 |
| Nasogastric tube | 50 | 13 | 0.001* |
| Mean postoperative stay (days) | 4.8 | 8.8 | 0.02* |
| Mean days to resume diet (days) | 2.9 | 3.9 | 0.25 |

Conclusion

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

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