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LAPAROSCOPIC VERSUS OPEN APPENDICECTOMY – A COMPARATIVE RETROSPECTIVE STUDY

General Surgery

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KEYWORDS

INTRODUCTION

The laparoscopic approach for appendicitis was first introduced by Semm [1] in 1983, and various studies have been conducted since then, to prove its advantages over the open method. Appendicectomy is one of the most common intraabdominal surgical emergencies, with a lifetime risk of 6%. The overall mortality of OA is around 0.3%, and morbidity is about 11%.[2] With such a large number of cases being operated annually, a minimally invasive procedure would improve the outcomes and thereby lead to better patient management. The advantages of LA decreased incidence of wound infection, shorter hospital stay, faster return to normal work activities, reduced postoperative ileus, less postoperative pain and better cosmetic results have been found and documented over the years by the different studies that have been conducted [3-9]. However, LA holds the disadvantages of having a longer operative time, higher risk for postoperative intra-abdominal abscesses, and higher cost of treatment, when compared with open appendectomy (OA) and thus, LA to be called a 'gold standard' method of treatment for acute appendicitis is still debatable [8,10].

The aim of this study was to compare the outcomes between the laparoscopic and open appendicectomy methods for acute appendicitis in terms of operative time, rate of complications, length of stay and the cost of treatment.

METHODOLOGY

A retrospective comparative Study was conducted at MGM Medical College& Hospital, Kamothe, Navi Mumbai from August 2022 to December 2020. The sample size of the study was 60, done by simple randomization technique using a closed envelope method (sequentially numbered, opaque, sealed envelopes – SNOSE system). These 60 cases were randomly divided into two groups, each of 30 cases. One group consisted of patients treated by LA, and the other group was treated by OA.

Inclusion Criteria:

- Age: 18 years and above
- Confirmed diagnosis of acute appendicitis by clinical assessment, confirmed laboratory blood tests and radiological imaging scan (usg or CT)
- All the Sexes
- Patients who give informed written consent

Exclusion Criteria:

- Patient less than 18 years old
- Patient not willing
- Patients with preoperative clinical evidence of bowel perforation

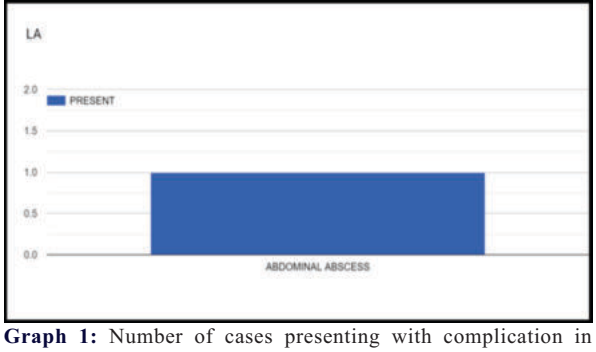
For each patient, the age, gender, duration of symptoms, white blood cell (WBC) value upon admission, and previous abdominal surgeries were recorded. Depending on the intra-operative evaluation, the cases of acute appendicitis were classified as uncomplicated or complicated cases, if phlegmon with peri-appendiceal abscess, gangrene, or perforation were noted during surgery. The mean operative time, intra-operative and postoperative complications, mean duration of postoperative ileus, and average length of hospital stay was recorded for each group. The total hospital costs were calculated as a mean for each group. The cost for each patient was assessed taking into account the length of time that the operating room was used for surgery, the cost of the material used during the surgery, and the cost of the hospital stay. The LA procedure was performed by using two 10mm and one 5 mm ports. After bipolar coagulation and division of the mesoappendix using scissors, two loop ligatures were applied at the base of the appendix; the appendix was then divided and extracted with a bag.

All the appendectomies of the open group were performed with McBurney's incision by other surgeons who preferred this approach. After ligation and division of the mesoappendix with scissors, the base of the appendix was ligated with an absorbable tie, and the appendix was divided with a scalpel. The abdominal incision was extended when found necessary by the surgeon. The results were analyzed using the t Student test for comparison of data measured as quantitative variables which were age, duration of symptoms, white blood cell count value at the time of hospitalization, operative time, duration of postoperative ileus, length of hospital stay, and total hospital costs. The statistical significance of difference between the categorical variables such as gender, ASA risk score, previous abdominal surgery, uncomplicated and complicated appendicitis, and postoperative complications was calculated using the Chi-square test with Yates correction and Fisher exact test, when appropriate. A p Value < 0.05 was considered statistically significant. The data was entered in Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, ver 25.0.

RESULT :

Table 1 : Clinical Data In Both The Groups

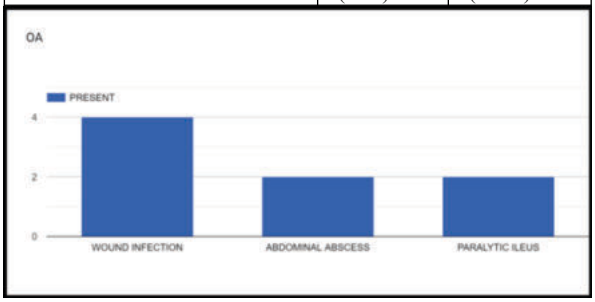
CLINICAL DATA	LA	OA	P-VALUE
Operating time (mins)	46.66 ± 8.64	39.33 ± 6.15	>0.05
Hospital Stay (days)	3.6 ± 1.404	5.56 ± 1.476	<0.05
Billed charges (Rs)	9,616.66 ± 1089.06	4926.66 ± 873.66	>0.05



Graph 1: Number of cases presenting with complication in Laparoscopic appendicectomy group

Table 2 : Postoperative Complications In Both The Groups

COMPLICATIONS	LA n (%)	OA n(%)
Wound infection	0	4 (13.33)
Abdominal abscess	1 (3.33)	2 (6.66)
Paralytic ileus	0	2 (6.66)
Total	1 (3.33)	8 (26.66)



Graph 2: Number of cases presenting with complication in open appendicectomy group

DISCUSSION:

Several studies have been conducted which suggest that laparoscopic appendectomy can decrease postoperative pain, produce a shorter hospital stay, and thereby allowing an earlier return to work or performance of normal activities.[11] However, there are some studies that have shown conflicting data that do not support these advantages [12–14]. The most common objection is that Laparoscopic Appendicectomy involves three trocar incision instead of the 3- to 5-cm-long McBurney incision in Open Appendicectomy. This is true only in the case of thin patients without abnormal positions of the appendix. Due to the varying positions of the appendix, retrieving it from an abnormal position safely requires a longer incision in Open Appendicectomy than in Laparoscopic Appendicectomy. It is also observed that all anatomic variations can be removed laparoscopically by experienced surgeons, and the wound does not need to be lengthened. We undertook this retrospective randomized study to evaluate the operation time, hospital stay, cost, and incidence of complications. Except for operating time and cost there were statistical differences between the open and laparoscopic patients. In some reports, it has been suggested that there is a significant increase in operative times for Laparoscopic Appendicectomy [12, 13, 15]. These longer times likely occurred early in the learning curve when many surgeons and residents were learning this approach. The current recommendation for accreditation of surgeons to perform Laparoscopic Appendicectomy is a minimum of 20 cases [16]. A high conversion rate correlates with less surgeon experience [17]. In our study, no patient had the procedure converted to open surgery. Although the operating time seemed to be shorter for the patients undergoing Open Appendicectomy than for those undergoing Laparoscopic Appendicectomy, this difference failed to be clinically important or to show statistical significance (Laparoscopic Appendicectomy, 46.66 ± 8.64 min vs. Open Appendicectomy, 39.33 ± 6.15 min; $p>0.05$). The mean hospital stay was 3.6 ± 1.4 days after Laparoscopic Appendicectomy, and 5.56 ± 1.476 days after Open Appen. Thus, Laparoscopic Appendicectomy may permit an earlier hospital discharge ($p<0.05$). The prospective randomized trial by Long et al. [18] also noted an earlier discharge of Laparoscopic Appendicectomy patients (2.6 vs. 3.4 days; $p<0.01$). The Laparoscopic Appendicectomy procedure appeared to offer a quicker return to a full diet and a shorter recovery time. This could likely be due to the laparoscopic surgeon's ability to minimize manipulation of the cecum and ileum that may decrease the degree of postoperative paralytic ileus and thus allowed the patient to resume a full diet earlier [19–21]. Secondly, the trocar incisions appear to cause minimal trauma to the abdominal wall and probably less pain [22-24]. Most studies have shown an increased cost of laparoscopic techniques [12, 25]. We were unable to demonstrate any clinically significant difference in operative times between Laparoscopic Appendicectomy and Open Appendicectomy. The billed charges appeared to be higher for the Laparoscopic Appendicectomy group (9,616.66 ± 1089.06 Rs) than for the Open Appendicectomy group (4926.66 ± 873.66 Rs), but this difference failed to be clinically important or statistically significant ($p>0.05$) given the shorter hospital stay and recuperative period. All the Laparoscopic Appendicectomy patients experienced fewer complications. Wound infections were more common among the Open Appendicectomy patients (Open Appendicectomy, 4 vs. Laparoscopic Appendicectomy, 0; $p<0.05$). Whereas wound infections after appendectomy may seem to be a trivial matter for the surgeon, they cause significant disability and psychosocial problems for the individual patient. Wound infection can be reduced by placing the appendix in a bag or drawing it into the trocar for removal and not allowing the specimen to come in contact with the wound. The paucity of wound infections related to Laparoscopic Appendicectomy may represent one of its main advantages. A current meta-analysis [26] found that rate of intraabdominal abscesses for Open Appendicectomy was lower and the risk of intraabdominal abscess development significantly higher than for laparoscopic appendicectomy. In our experience, however, this problem was of no concern. Abscess formation was reported for one patient (3.33%) after Laparoscopic Appendicectomy and two patients (6.66%) after Open Appendicectomy, for a significant difference between the two techniques. Proper irrigation with normal saline during the procedure can decrease the rate of intra-abdominal abscess. Postoperative ileus was more common after Open Appendicectomy, and the difference in ileus reached statistical significance. Possible explanations for these observations include greater intraabdominal manipulation of the appendix and trauma during Open Appendicectomy than during laparoscopic appendicectomy.

CONCLUSION:

The LA operation holds the advantages of its minimal invasiveness, reduced rate of complications, and provides better cosmetic outcomes. It also allows early ambulation and and lesser hospital stay thus forming a useful tool in the treatment of acute appendicitis and can be recommended as an adoptable method for the routine patient with appendicitis.

ABBREVIATIONS:

LA: LAPAROSCOPIC APPENDICECTOMY
OA: OPEN APPENDICECTOMY
USG: ULTRASONOGRAPHY
CT: COMPUTED TOMOGRAPHY

CLINICAL PHOTOS

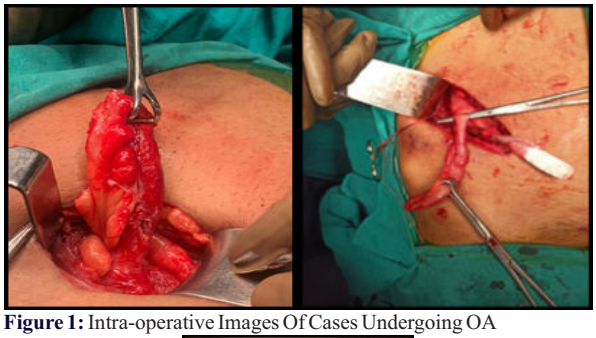


Figure 1: Intra-operative Images Of Cases Undergoing OA

Figure 2: Postoperative Image Of Suture Site Of A Case Of OA

LAPAROCOPIC IMAGES:

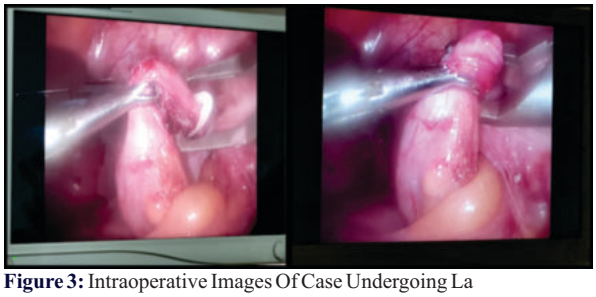


Figure 3: Intraoperative Images Of Case Undergoing La

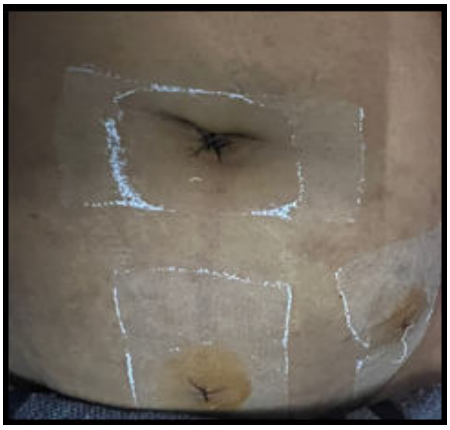


Figure 4: Postoperative Image Of Suture Site After La

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