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Original Article

How Safe is Laparoscopic Surgery in the Treatment of Acute Appendicitis with Complications Compared to Open Abdominal Surgery?

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Abstract

Background: Open abdominal surgery (OAS) is the gold standard in the surgical treatment of acute appendicitis (AA). Appendicectomy with laparoscopy is a safe procedure in uncomplicated cases. It is viewed as a risk in complicated AA by many surgeons. A study was conducted to compare open with laparoscopic procedure in complicated AA.

Aim of the Study: This study aims to study the results and problems encountered in treating AA with complications with laparoscopy and comparing them with OAS.

Materials and Methods: A retrospective study on 68 patients attending the hospital with signs and symptoms of AA with complications was divided randomly into two groups. One group was treated with appendicectomy using laparoscopy and the other group with open abdominal appendicectomy. All the patients were selected such a way that the age, gender, and complications match. Problems encountered while doing the two methods of surgery and results were compared and analyzed.

Observations and Results: A total of 68 patients were divided into two groups with 34 patients each. In Group A (34), males were 22 and females were 12. In Group B, males were 23 and females were 11. The mean age of patients in Group A was 23.16 ± 4.10 and in Group B was 22.80 ± 3.60. The mean time of surgery in Group A was 73.45 ± 1.10 min and in Group B it was 52.95 ± 2.15 min. The hospital stay in Group A was 5.46 ± 2.50 days and in Group B it was 9.30 ± 3.40 days. There was no increase in complication rate in Group A compared to Group B.

Conclusions: Laparoscopic surgery in AA with complications is safe and devoid of post-operative complications when the cases are selected properly. The study observes that there is statistical significance in the duration taken for the surgery and the hospital stay. This study demonstrated no increase in surgical complications between the groups of laparoscopy and OAS after laparoscopy in patients.

Key words: Abscess and appendicectomy, Appendicectomy, Appendicitis, Complications, Laparoscopy

INTRODUCTION

Appendicitis was first described in the 16th century and initially called as "perityphlitis." McBurney described the classical signs and symptoms in 1889. Usage of laparoscopy for acute appendicitis (AA) has increased since 1983.[1] Although the open abdominal surgery (OAS) is the gold standard in the surgical treatment of AA, using laparoscopy has shown that it provides better diagnostic accuracy, reduced use of analgesics, shorter hospital stay, earlier return to daily activities, and a lower rate of wound infection in comparison to OAS for appendectomy.[2-6] Few authors have shown that there is an added advantage in using laparoscopy in elderly patients, morbidly obese patients, and fertile women to treat AA.[7-10] The cosmetic benefit and cost-effectiveness laparoscopy are also observed by few surgeons.[11] Using laparoscopy in complicated AA cases such as peritonitis, appendicular abscess may result in intra-abdominal abscess (IAA) is a debate even today.[12-16] Although some authors have recommended and concluded that laparoscopy is a safe and effective surgical treatment for complicated AA,[17-19] certain facts such as prolonged

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operation time and post-operative stay, increased rate of conversion, and greater complications due to infection have been reported when compared to uncomplicated appendicitis. Therefore, the aim of this study was to study the results and problems encountered in treating AA with complications with laparoscopy and comparing them with OAS by the same surgeon.

Type of Study

Retrospective study.

Period of Study

This study period was from October 2014 to September 2016.

Institute of Study

This study was conducted at KMCT Medical College Hospital, Manassery, Kozhikode, Kerala.

MATERIALS AND METHODS

A total of 68 patients were selected randomly from among the emergency surgical patients with a diagnosis of AA with complications, attending the Department of Surgery of a Tertiary Teaching Hospital, KMCT Medical College Hospital, Manassery, Kozhikode, Kerala. An Ethical Committee clearance was obtained from the Institutional Ethical Committee. The patients were divided into two groups. Group A consisted of patients with AA with complications undergoing laparoscopy surgery and Group B undergoing OAS. The data were collected from the case records obtained from the medical records section of the institute.

Inclusion Criteria

1. Patients aged above 18 years and below 55 years were included.
2. Patients with complications associated with AA were included.
3. The complications were perforation, peritonitis, abscess formation, and gangrene of the appendix.

Exclusion Criteria

1. Patients aged below 18 years and above 55 years were excluded.
2. Patients with other comorbid conditions such as diabetes, hypertension, and thyroid dysfunction were excluded.
3. Patients with previous abdominal surgery were excluded.

The diagnosis of AA had been made by a single senior surgeon by pre-operative clinical presentation and confirmed by ultrasound examination of abdomen. Complications of AA included were defined as the presence of a ruptured gangrenous appendix with or without pus formation. AA associated with peritonitis with perforation was included as complication. All the patients in both groups were subjected to surgical profile laboratory investigations to get clearance for general anesthesia. All the surgeries were done under general anesthesia. Laparoscopy was performed with the three-port approach (two 10 mm, one 5 mm) using Hasson's technique with monopolar dissectors and forceps. The mesoappendix was divided using electrocautery or clips. Pretied suture loops or laparoscopic free ties were used for stump closure. The appendix was extracted within the trocar through the umbilical 10-mm port without using a plastic bag. Gangrenous and ruptured appendices were irrigated with normal saline (at least 2000 mL), and a silastic drain was used for ruptured appendices. All the patients were discharged based on the recovery form symptoms of acute illness, removal of Ryle's tube, when bowel sounds are heard when the patient is able to take oral semisolids and when abdominal rigidity and guarding disappeared. Patients were also followed up 1 week after discharge. Data collected included demographic information, white blood cell (WBC) count, and operation time, length of hospitalization, pathology report, and complications. No case was converted to open abdominal procedure in Group A patients. The parameters of both the groups were compared. All the data were analyzed using standard statistical methods.

OBSERVATIONS AND RESULTS

Total number of patients included in the study was 68 with 34 patients in each group. Group A was in which patients were treated with laparoscopic surgery and Group B in which open abdominal appendicectomy was done. In Group A (34), males were 22 and females were 12. In Group B (34), males were 23 and females were 11. The mean age of patients in Group A was 23.16 ± 4.10 and in Group B was 22.80 ± 3.60. The types of complications were tabulated in Table 1. The comparative data regarding the patients of both groups are not significant. The data of both the groups are almost identical. There was no significant difference in gender and WBC count between the two groups as the *P* value above 0.05 (*P* significant at <0.05) [Table 1].

The mean time of surgery in Group A was 73.45 ± 1.10 min and in Group B it was 52.95 ± 2.15 min. The hospital stay in Group A was 5.46 ± 2.50 days and in Group B it was 9.30 ± 3.40 days. There was no increase in complication rate in Group A compared to Group B [Table 2]. The accuracy of final diagnosis in this study was 100%. The histopathological reports of 25 patients among the 29 patients that underwent computed tomography (CT) scan

abdomen were coinciding with reports of CT scan. The accuracy of CT scan in AA with complications was 86.20%. The duration of surgery and hospital stay were statistically significant in both the groups as P <0.05. The incidence of complications was similar in both the groups and not significant statistically as P >0.05 [Table 2].

DISCUSSION

Laparoscopic surgery for appendectomy was proved to be a safe procedure as a surgical treatment for non-complicated AA. There is controversy regarding its usage in AA with complications.[20,21] Laparoscopy procedure in superior to open appendectomy in terms of post-operative wound infections, analgesia requirement, hospital length of stay, return to work, and overall recovery.[3,22] The post-operative infection rate was much lower in the patients operated by laparoscopy than open method in cases of appendicectomy with complication.[23] The incidence of IAA formation was higher following the uses of laparoscopy for perforated appendicitis with complications.[24-26] There were no incidences of surgical post-operative complications in the present study of both the groups. In the present study, peritoneal lavage was done in all cases of both groups with 3 L 0.9% saline at the end of the procedure and that may be the reason there were no complications postoperatively. This finding is supported by similar study by Gupta *et al*.[27]

Table 1: The demographic data and types of complications in the study (*n*=68)

Observation	Group A	Group B	*P* value
Mean age	23.16±4.10	22.80±3.60	0.131
Gender			
Male	22 (64.70%)	23 (67.64%)	
Female	12 (35.29%)	11 (32.35%)	0.221
Mean duration of symptoms	2.5±1.65	2.1±1.45	0.086
Mean WBC count	12.8±2.7	13.15±1.89	0.430
CT Scan abdomen-29	14 (41.17%)	15 (44.11%)	0.453
Complications perforation	8 (23.52%)	9 (26.47%)	0.611
Gangrene formation	11 (%)	9 (26.47%)	0.732
Peritonitis	12 (35.29%)	13 (38.23%)	0.521
Abscess formation	4 (11.76%)	3 (08.8%)	0.476

WBC: White blood cell, CT: Computed tomography

Table 2: The laboratory data and operative data (*n*=68)

Observation	Group A	Group B	*P* value
Duration of surgery	73.45±1.10	52.95±2.15	0.032
Hospital stay	5.46±2.50	9.30±3.40 days	0.049
Histopathology report			0.165
Perforated appendix	12 (35.29%)	10 (29.41%)	
Gangrene formation	14 (41.17%)	15 (44.11%)	
Appendicular abscess	8 (23.52%)	9 (26.47%)	

The mean time of surgery in Group A was 73.45 ± 1.10 min and in Group B it was 52.95 ± 2.15 min. The other advantages of using laparoscopy for appendicectomy with complications were wide inspection of the peritoneal cavity, debridement, irrigation, and lavage under direct visualization, avoidance of large abdominal incisions, and fewer pulmonary complications.[28] The hospital stay in Group A was 5.46 ± 2.50 days and in Group B it was 9.30 ± 3.40 days. There was no increase in complication rate in Group A compared to Group B postoperatively. In accordance with other studies which propose to consider laparoscopy surgery in AA with complications, this study also gives observations favorable to consider laparoscopy as a first choice in complications associated with AA likewise in uncomplicated cases.

CONCLUSIONS

Laparoscopic surgery in AA with complications is safe and devoid of post-operative complications when the cases are selected properly. The study observes that there is statistical significance in the duration taken for the surgery and the hospital stay. This study demonstrated no increase in surgical complications between the groups of laparoscopy and OAS.

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