

Feasibility of Laparoscopic Appendicectomy in Complicated Appendicitis: A Prospective Single Center Experience

Vikesh Kumar¹, Sourabh Sharma², Hanuwant Singh³, Panth Gheewala⁴, Konark Thakkar⁵, Ambar Prakash⁶

^{1,3}Associate Professor, Department of General Surgery, Pacific Medical College and Hospital, Udaipur, Rajasthan

²Assistant Professor, Department of General Surgery, Pacific Medical College and Hospital, Udaipur, Rajasthan

^{4,5}Senior Resident, Department of General Surgery, Pacific Medical College and Hospital, Udaipur, Rajasthan

⁶General Surgery Registrar, Pacific Medical College and Hospital, Udaipur, Rajasthan

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Corresponding author: Dr. Panth Gheewala

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Abstract:

Introduction: The most frequent abdominal emergency in the world and the most frequent reason for abdominal surgery across all age groups is acute appendicitis. Laparoscopic appendicectomy is preferred treatment method for simple acute appendicitis though some people are still hesitant to utilize it in place of an open appendectomy in cases of complicated appendicitis.

Aim: This study aims to find the feasibility of laparoscopic approach for complicated appendicitis (perforated appendicitis & appendicular lump) in terms of successful completion, conversion to open, average operating time, post-operative complications and average hospital stay duration.

Method: This prospective study included 50 patients who underwent laparoscopic treatment for simple and complicated appendicitis. Conversion to open, average operating time, post-operative complications and hospital stay duration were the outcome variables noted.

Result: Out of these 50 patients, 14 patients were diagnosed with appendicular perforation, 6 patients with appendicular lump and 30 patients with acute appendicitis. Six patients were converted to open appendectomy in complicated appendicitis group while none in simple acute appendicitis. 4 out of 50 patients had post-operative complications. Patients who got converted to open procedure had a significantly longer hospital stay.

Conclusion: The laparoscopic appendicectomy can be used to safely remove both a perforated appendix and an appendicular lump when expertise available.

Keywords: Laparoscopic Appendicectomy, Complicated Appendicitis, Minimally Invasive Appendicectomy.

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Introduction

Vermiform appendix's inflammation is referred to as appendicitis [1]. The most frequent abdominal emergency in the world and the most frequent reason for abdominal surgery across all age groups is acute appendicitis [2]. Men have a lifetime risk of appendicitis of 8.6%, while women have a risk of 6.7% [2-3].

Among individuals who are initially diagnosed with acute appendicitis, 15 to 20% have a ruptured appendix [4]. Men are more likely than women to develop an appendix perforation (18%) [5]. The risk of perforation increases 24 hours following the onset of appendicitis symptoms, but the exact timing varies from case to case. Within 24 hours after the onset of symptoms, there is a 20% chance that the appendix may perforate [6]. Patients with

delayed presentation or recurrent episodes have a higher chance of lump formation.

Since McBurney first described it, an open appendectomy was the preferred treatment for acute appendicitis [7-8]. Since the invention of laparoscopy, the surgical field has seen a significant transformation [9]. The first laparoscopic appendectomy was developed by Semm [2]. Due to the use of minimally invasive procedures, it has become quite popular among surgeons, although some people are still hesitant to utilize it in place of an open appendectomy [8]. Laparoscopic appendectomy detractors point to the higher operation expenses of employing disposable tools. Other complaints about laparoscopic appendectomy focus on its longer recovery time

and higher risk of intra-abdominal abscesses, especially in people who have ruptured appendices [10–11]. Due to its ability to simultaneously identify and remove the appendix, laparoscopic treatment has now evolved to be the recommended method of treatment [14].

This study aims to find the feasibility of laparoscopic approach for complicated appendicitis (perforated appendicitis & appendicular lump) in terms of successful completion, conversion to open; average operating time, post-operative complications and average hospital stay duration.

Materials and Methods

Our research was a prospective, randomized study carried out from August 2022 to August 2023 at the Pacific Medical College and Hospital's Department of Surgery in Udaipur, India. There were total of 50 people in the trial. The research included patients of all age group who had an acute appendicitis, appendicular perforation and appendicular lump on ultrasound or computerized tomography (CT scan). Patients with ASA class three or above anesthesia fitness and those with any general contraindications to laparoscopic surgery, such as morbid obesity, pulmonary insufficiency, or a history of Tuberculosis, were also excluded from the study. Patients who met the criteria for inclusion were included after taking informed consent.

All patients undergoing open or laparoscopic surgery received a single intravenous antibiotic injection before to the procedure, and the same dosages were maintained in post-operative period as required. The three-port approach was used for laparoscopic appendectomy. All surgeries were performed by a single surgeon experienced in laparoscopic surgery. Conversion to open appendectomy was done based on the intraoperative difficulty and judgement of operating surgeon. A proforma was used to record all the data. Conversion to open, average operating time, post-operative complications and hospital stay duration were outcome variables. From the moment the port was inserted until the appendix

was removed, the operating time in minutes was recorded. From the time of admission to the time of discharge, the total number of days spent in the hospital was also noted. The presence of complications during postoperative hospital stay was also noted.

The gathered data were analysed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, US). Gender, age, conversion of laparoscopic to open appendectomy (relating with diagnosis), postoperative complications, length of the operation, length of hospital stay were quantified.

Results

There are a total of 50 patients included in our study, out of which were 27 males (Mean age – 27.96 years) and 23 (Mean age – 39.69 years) were females. Out of these patients, 14 patients were diagnosed with appendicular perforation, 6 patients with appendicular lump and 30 patients with acute appendicitis. All the patients underwent Laparoscopic appendectomy but only 6 were converted to open appendectomy (mean age – 48.5 years) among them 3 were diagnosed with appendicular perforation and 3 were diagnosed with appendicular lump. Patients diagnosed with acute appendicitis did not require conversion to open appendectomy.

The Average operative time for the laparoscopic appendectomy was 37.8 minutes as compared to 45.7 minutes for conversion to open appendectomy.

In our study, 4 out of 50 patients had post-operative complications. This included post-op ileus in 2 patients one with simple acute appendicitis and other one with appendicular perforation. 2 patients had pus discharge from wound site both of those were patients who were converted to open procedure.

The average hospital stay for patients who underwent laparoscopic appendectomy was 2 to 3 days and patients who underwent conversion to open were 5 to 7 days.

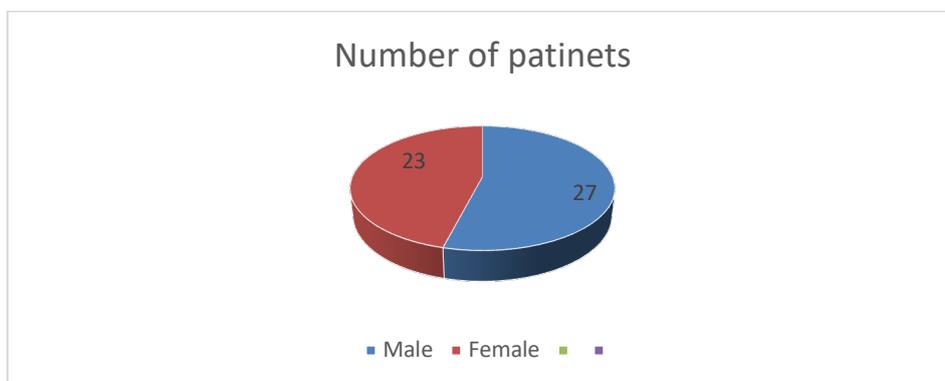


Figure 1: Number of patients

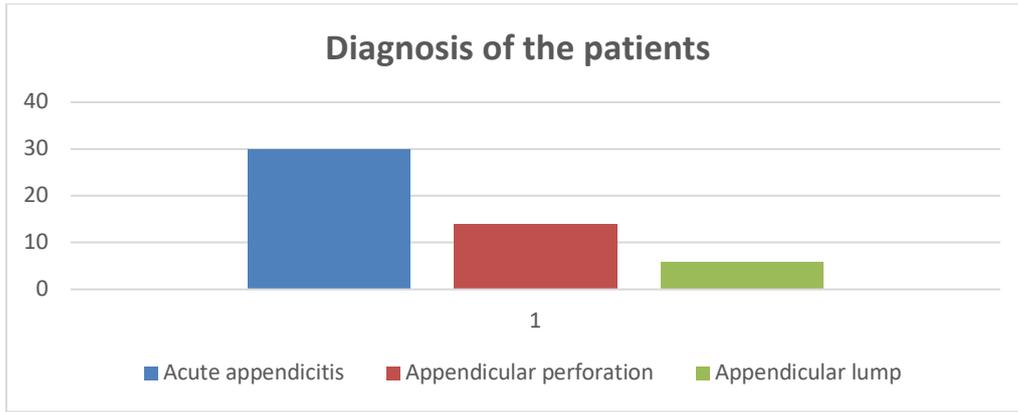


Figure 2: Diagnosis of patients

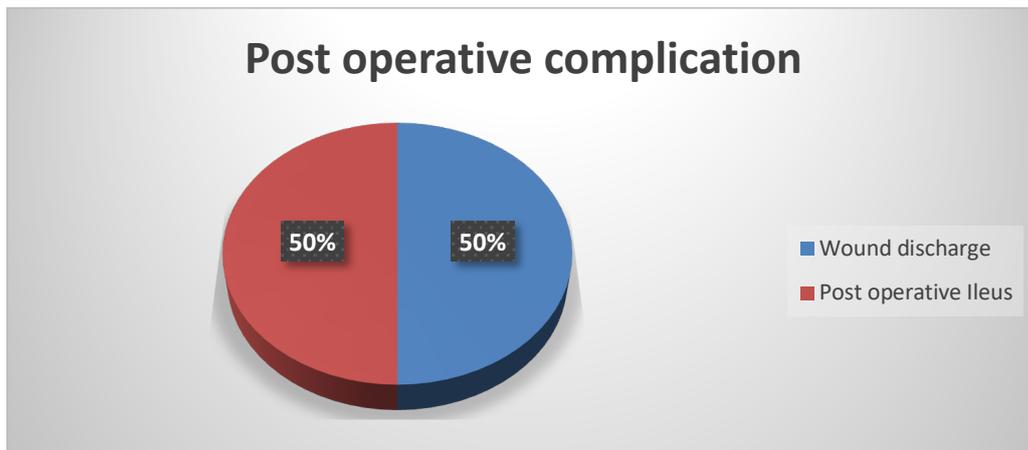


Figure 3: Post operative complication

Discussion

In complicated appendicitis, laparoscopy has been deemed a relative contraindication because of the elevated risk of postoperative complications [14-16]. This idea has been refuted by the results of several studies including ours that evaluated the effectiveness of laparoscopic appendectomy in situations of complicated appendicitis [17-19].

In contrast to Muhammad et al. [20] findings, which showed the mean operating time as 75 minutes for a laparoscopic appendectomy and 84 minutes for an open appendectomy, our study found a considerably lower mean operating time for laparoscopic as compared to open appendectomy.

Another research by Lin et al. [21] revealed that laparoscopic appendectomy takes longer to perform than open appendectomy (67.8 minutes; 96.1 minutes). Additional research indicates that a laparoscopic appendectomy takes longer to complete than an open appendectomy. [22,23] These results were at odds with what we found. However, Yau et al. [24] and Tiwari et al. [25] observed that the mean operating time for a laparoscopic appendectomy was 47.8 minutes and the mean operating time for an open appendectomy was 49.10 minutes. The discrepancy in mean

operating times reported in the literature may be caused by differences in laparoscopic technique proficiency and experience across various facilities.

Our findings of reduced mean operating times using the laparoscopic method are might be because patients who got converted to open procedure were first tried laparoscopically and then converted causing them to consume more time.

In our setting, the difference between the mean hospital stays for the two groups—laparoscopic appendectomy (2 to 3 days) and open appendectomy (5 to 7 days)—was statistically significant. However, Muhammad et al. [21] observed that the open appendectomy group's mean length of hospitalization was 7 days whereas the laparoscopic appendectomy group's mean length of hospitalization was 5 days. According to Tiwari et al. [26], there was a substantial difference in hospital stays between the two groups (4 to 5 days for laparoscopic appendectomy patients vs. 7 to 9 days for open appendectomy patients). According to Lin et al. [22], laparoscopic appendectomy patients required a considerably shorter hospital stay (3 to 6 days) than open appendectomy patients (8 to 9 days).

A total of six patients got converted to open procedure. All these patients belong to the

complicated appendicitis group making it 30 % conversion rate to open procedure for the said group while none of the patient in simple acute appendicitis group required conversion. Among the six patients three were diagnosed with appendicular perforation while other three had appendicular lump formation.

In terms of complications, we did not find any patient with the port site infection after laparoscopic appendectomy. We have found overall complications rate of 8% of in our patients. Among simple acute appendicitis patient (30 in number) only one patient had post-operative ileus (3.33%). Patients with complicated appendicitis shows complication rate of 15% (3 in number). Two patients had wound discharge of which one required secondary suturing while one patient had post-operative ileus.

Both the patients with wound discharge were among the patients who got converted to open procedure. Lin et al. [22] demonstrated that laparoscopic appendectomy had a much lower risk of infections (15.2%) than open appendectomy (30.7%). This could be explained by the fact that laparoscopic appendectomy involves less manipulation of the intestine by the surgeon's hands and instruments than open appendectomy does. Furthermore, laparoscopic provide better visualization of peritoneal cavity and lavage when compared to open procedure and might lead to lesser complication rate.

Conclusion

Minimally invasive approach for complicated appendicitis provides similar or better results when compared to open appendectomy in terms of post-operative complication and mean operative time with a reasonable risk of conversion to open surgery in experience hands. When completed successfully laparoscopic surgery shows significantly shorter stay and early recovery. To conclude, the laparoscopic appendectomy can be used to safely remove both a perforated appendix and an appendicular lump when expertise available and can be used a preferred method in these scenarios.

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