

# Laparoscopic Versus Open Appendectomy For Acute Appendicitis: A Comparative Study

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## ABSTRACT

**Objective** To compare laparoscopic versus open appendectomy procedures in terms of hospital stay, operative time, time to return to normal activity and complications.

**Study design** Retrospective comparative study.

**Place & Duration of study** Department of Surgery DHQ Abbottabad, from February 2019 to April 2020.

**Methodology** Patients of age group between 15 years to 55 years were included in the study. They were divided into two groups, laparoscopic appendectomy (LA) and open appendectomy (OA) groups. Groups were compared for postoperative complications, operative time, hospital stay, and time taken to return to normal activities.

**Results** Eighty patients were included in the study with 40 in each group. Mean duration of hospital stay in LA group was  $1.75 \pm 0.63$  days while in OA it was  $2.8 \pm 0.96$  days. Mean operative time in LA group was  $57.15 \pm 10.2$  min while in OA it was  $27.27 \pm 8.7$  min. Time to return to normal activity in LA group was  $13.4 \pm 1.63$  days while in OA group  $19.8 \pm 3.8$  days. Complications in LA group were reported in 2 (5%) patients and 7 (17.5%) in open group. Wound infection was the most common complication in open group found in 5 (12.5%) patients.

**Conclusion** In laparoscopic group there was less frequency of wound infection, shorter hospital stay, patients returned to normal activity early but with more operating time than in open appendectomy.

**Key words** Laparoscopic appendectomy, Open appendectomy, Appendicitis, Minimally invasive surgery.

## INTRODUCTION:

The most common cause of acute abdomen in young adults is acute appendicitis.<sup>1,2</sup> In males the life time risk of having acute appendicitis is 8.6 percent while in female it is 6.7 percent.<sup>3</sup> Appendectomy is the most commonly performed emergency general surgical procedure. The open technique of

appendectomy was used for decades till the advent of laparoscopic approach.<sup>4</sup> Laparoscopic appendectomy is known for safety and efficacy and is now in practice in all advanced and many developing countries.<sup>5</sup> It is now a standard approach in this condition.<sup>6</sup>

Laparoscopic appendectomy is considered safe and technique is easy to master. Laparoscopy has also decreased the rate of negative appendectomy. However, laparoscopic appendectomy is costly and requires sophisticated instruments and may not be cost effective.<sup>7</sup> This study was carried out to compare the postoperative outcome of open and laparoscopic appendectomy in terms of its application and outcome.

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**METHODOLOGY:**

This retrospective comparative study was carried out in the Department of Surgery in District Headquarter Hospital Abbottabad. The records of patients admitted with the diagnosis of acute appendicitis from February 2019 to April 2020 were retrieved and reviewed. Patients with palpable mass/abscess in right iliac fossa and in whom diagnosis was not certain, were excluded from the study. Patients with co-morbid medical conditions like cirrhosis, coagulation disorders, diabetes mellitus were also excluded. Decision about operative procedure was according to the preference and experience of the surgeons. Patients were divided into two groups for the purpose of this study, the laparoscopic appendectomy (LA) group and open appendectomy (OA) group.

Data were reviewed for demographic characteristics, mean operative time, hospital stay, time to return to normal activity and postoperative complications. Diagnosis was made on clinical history and examination that suggested acute appendicitis. Laboratory investigations findings like total leucocyte count of more than  $11,000 \text{ mm}^3$  that suggested inflammatory condition and ultrasound abdomen and pelvis findings were also noted. Both groups were given prophylactic 1gm dose of third generation of cephalosporin (ceftriaxone) at the time of induction of general anesthesia. Open appendectomy was performed using gridiron incision with conventional method. Mesoappendix was divided and transfixed. Appendix ligated and divided at the base. Laparoscopic appendectomy was performed using

standard three port technique.

All specimens were sent for histological examination. Patients were allowed clear fluid once they fully recovered from anesthesia and bowel sounds were audible. Soft diet was started after patients passed flatus and tolerated liquid diet. Patients were discharged once they were able to take regular diet. Patients were discharged on pain killers and oral antibiotic (amoxicillin with clavulanic acid 1gm twice daily) for 5 days. Patients were followed after 3 weeks. SPSS version software was used for data entry and analysis. Independent sample t test was applied to compare mean difference of two groups for operative time, hospital stay, time to return to normal activity and postoperative complications. A p value of  $<0.05$  was considered as significant.

**RESULTS:**

Eighty patients were included in study with 40 in each group. The demographic details are given in table I. Mean duration of stay in LA group was  $1.75 \pm 0.63$  days while in open group it was  $2.8 \pm 0.96$  days (table II). Wound infection was the most common complication in open group occurring in 5 (12.5%) patients and 2 (5%) in LA group. Paralytic ileus was documented in 2 (5%) patients in OA group.

**DISCUSSION:**

Many studies have shown that laparoscopic appendectomy is safe and patient returns to normal activities early with fewer postoperative complications. These findings are consistent with

**Table I: Demographic Characteristics**

Variables	Laparoscopic appendectomy (n=40)	Open appendectomy (n=40)
Age (years)	27.3 $\pm$ 8.67	23.83 $\pm$ 7
Gender		
Female	24 (60%)	18 (45%)
Male	16 (40%)	22 (55%)

**Table I: Comparison of Variables Between Laparoscopic and Open Appendectomy Groups**

Variables	Laparoscopic appendectomy (n=40)	Open appendectomy (n=40)	P value
Operative time (minutes)	57.15 $\pm$ 10.2	27.27 $\pm$ 8.6	<0.001
Hospital stay (days)	1.75 $\pm$ 0.63	2.8 $\pm$ 0.96	<0.001
Time to return to normal activities (days)	13.4 $\pm$ 1.63	19.8 $\pm$ 3.78	<0.001
Complications	2 (5%)	7 (17.5%)	

our study. In index study laparoscopic appendectomy required longer operating time compared to open appendectomy group. This finding is in agreement with other studies. Talha A et al study showed that mean duration of operation in OA group was  $94 \pm 10.4$  minutes while in LA group  $120.6 \pm 17.7$  minutes. In a study by Ali R et al mean operating time in LA was  $56 \pm 24$  minutes while in OA group it was  $39 \pm 8$  minutes.<sup>8,9</sup> However, long operative time as shown in some studies is considered as an outcome of learning curve because of less expertise.<sup>10</sup>

In current study we found that mean hospital stay in laparoscopic group was considerably shorter as compared to open group which was statistically significant ( $p < 0.001$ ). This is comparable with other studies.<sup>11,12</sup> Horvath P et al also showed that mean duration of hospital stay was significantly less in laparoscopic group. In a study by Seqsaqa M et al mean hospital duration of stay was 4.34 days in LA group and 5.13 days OA group. The longer stay in hospital may be due to the delay in early mobilization, intake of oral diet and psychological effect of incision in case of open appendectomy. However, some studies did not show the same outcome.<sup>13,14</sup>

In our study overall complication rate was 5 % and 17.5% for laparoscopic and open appendectomy group respectively. Wound infection was the only complication found in two patients of LA group. Laparoscopic wound infection occurred in specimen extraction port. Frequency of complications and wound infection rate was higher in open appendectomy group. The incidence of wound infection is less following laparoscopic appendectomy as specimen is removed using a bag and does not come in contact with wound.<sup>15</sup>

None of the patients in laparoscopic appendectomy group developed transient paralytic ileus while in open appendectomy group 5% patients developed paralytic ileus. A meta analysis also showed that LA has less incidence of postoperative paralytic ileus due to reduced manipulation of small and large bowel.<sup>16</sup> In our study, significant difference existed between time taken to return to normal activity between two groups. It was less in laparoscopic group than in open appendectomy group. Similar findings were observed by Biondi A et al where mean time to complete recovery was  $11.5 \pm 3.1$  days in LA group and  $16.1 \pm 3.3$  days in OA group.<sup>17</sup>

In contemporary times open appendectomy is still conventional method used in many developing countries where healthcare related facilities are

scarce. In actual clinical practice open appendectomy is widely performed procedure in developing countries because of cost effectiveness, unavailability of instruments, and lack of skills in laparoscopic surgery.<sup>18</sup> Both open and laparoscopic appendectomy have good recognition as a method of treatment for acute appendicitis and if proper equipment and expertise for endoscopic surgeries are available in a setup then laparoscopic appendectomy can be used as first line surgical procedure for acute appendicitis.

#### CONCLUSION:

In laparoscopic appendectomy group there was less wound infection, short duration of hospital stay, and early return to normal activities. The operative time was more in laparoscopic group which may be due less experience with this technique.

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