

Early Post-Operative Outcome of Open and Laparoscopic Appendicectomy for Uncomplicated Acute Appendicitis

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ABSTRACT

Background: Although both open and laparoscopic techniques have been used for appendicectomies, opinions on which is better are divided. In light of this context and the fact that there are many studies comparing laparoscopic and open appendicectomies in third-world nations like Bangladesh, this prospective study will record crucial variables and parameters to compare the therapeutic benefits of both procedures in defense personnel.

Methods: This was a cross-sectional study. This study was conducted in the surgery department of Combined Military Hospital, Dhaka from 1st January 2022 to 31st December 2022. 99 patients were included in this study where 50 patients were treated with open appendicectomy and 49 patients were treated with laparoscopic appendicectomy. Results were evaluated within 180 days. Results were correlated with Patient's Wound/port infection, Visual analogue score for pain daily till discharge, Hospital stay, Return to normal activity time, other complications.

Results: In the LA group, post-operative pain was mild (40%) but in the OA group, it was severe (38%) and moderate (34%). The open operation took longer (44.4 ± 20.3 min) than the laparoscopic technique (30.3 ± 12.4 min). It required less time (23.99 hours) to transition from parenteral to oral diet and medication following LA than it did during OA (39.38 hours). Compared to LA, OA patients experienced noticeably more postoperative problems. Compared to the LA group (3.45 ± 1.34 days; $p < 0.05$), the OA group's hospital stay was longer (6.82 ± 0.749 days). Compared to OA (19.16 ± 6.96 days), LA recovered and resumed full normal activity earlier (16.10 ± 3.429 days) ($p < 0.05$).

Conclusion: According to the results of this study comparing the early post-operative outcomes of open and laparoscopic appendicectomies, laparoscopic appendicectomies clearly outperform open appendicectomies in terms of early post-operative outcomes.

Keywords: Laparoscopic appendicectomy (LA) and Open appendicectomy (OA)

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INTRODUCTION

Since there is disagreement over the best technique, both open and laparoscopic approaches are still used for appendectomies, the most common surgical procedure in general surgery.¹ Since its introduction, laparoscopy has become increasingly popular as a treatment for acute appendicitis because of its three small ports, minimal pain, and speedy recovery. Each of these benefits is simply presented to the patient.² With a 6% lifetime risk, appendicitis is one of the most frequent surgical crises that necessitate appendectomy. Open appendectomy (OA) has a roughly 0.3% overall mortality rate and an approximately 11% morbidity rate.

The decision between LA and OA tends to have an impact on the short-term outcome of appendectomy patients. These factors include age, nutritional status, the gross appearance of the appendix during surgery, length of surgery, wound/port infection, intra-abdominal abscess, visual analogue score on the first postoperative day, hospital stay, etc. Since its introduction by McBurney in 1894, open appendectomies have been the preferred treatment for almost a century, and surgeons now perform them consistently.³ According to Azaro EM et al.'s findings, there was no statistically significant difference between the age of patients who were submitted for open surgery versus video laparoscopy. The majority of both male and female patients were able to have the video laparoscopic technique done. Regarding surgical risk, there was no significant difference between laparoscopic procedure or the traditional method.⁴

On average, 9.3% of laparoscopic appendectomy procedures have been converted to laparotomies (0 to 30.4%). The conversion averages mentioned by Cox et al. are 15%, McAnena et al. are 13.5%,

Schroder et al. and Attwood et al. are 7%, and Azaro Em is 5.4%.^{5,6}

Over time, the study would help identify recommendations for better management and better outcomes for defence personnel who have had appendectomies. It would also encourage others to report to the medical centre as soon as possible after exhibiting symptoms and to choose surgical treatment for acute appendicitis, whether it be LA or OA, to a clinically significant degree.

MATERIALS AND METHODS

This is a cross-sectional study carried out in surgery department, Combined Military Hospital, Dhaka from January- 2022 to December- 2022. Total 99 adult patients were included in the study aged above 12 years. Patients admitted with features of acute appendicitis in CMH-Dhaka were enrolled in the study. Patient aged below 12 years and presented with complicated appendicitis (appendicular lump, abscess, burst appendix etc) were excluded from the study. Selected patients were initially attended and admitted by the on-duty surgical specialist. The patient was attended within 12 hours of admission by the investigator, relevant history was recorded and clinical examination was conducted, necessary laboratory and imaging studies were performed.

Patients included in this study were followed up daily during their hospital stay period to assess postoperative course and relevant outcome variables were assessed and recorded. 50.5% of the patients underwent conventional appendectomy (OA), and in the other 49.5% the operation was performed laparoscopically (LA).

Following operation, patient's demography, wound/port infection, visual analogue score for pain daily till discharge, hospital stay, return to normal activity time and complications were

evaluated on follow-up visit at surgical outpatient department.

RESULTS

99 patients were included in the study. In Laparoscopic Appendicectomy group (n=49) 27 male and 22 were female. In Open Appendicectomy group (n=50) 24 male and 26 were female. Patients age between 14-60 were included in both group (TABLE-I).

TABLE-I: Demographic of 100 patients (Average age of patient)

Age (in year)	Laparoscopic Appendicectomy (n=49)		Open Appendicectomy (n=50)	
	Male	Female	Male	Female
14-25	12 (24%)	8 (16%)	7 (14%)	12 (24%)
26-40	12 (24%)	10 (22%)	11 (22%)	10 (20%)
41-50	3 (6%)	3 (6%)	5 (10%)	4 (8%)
51-60	–	1 (2%)	1 (2%)	–
Mean age	33yrs	33yrs	33yrs	33yrs

Nausea, fever dominates in terms of symptoms and rovsing sign remains most frequent among signs. Operative time was greater (44.4 ± 20.3 min) in Open procedure than Laparoscopic procedure (30.3 ± 12.4 min) shown at (TABLE-II).

TABLE-II: Operative time in OA and LA patient groups

Operative time (Min)	OA(n=50)	LA(n=49)
1-20	0	1
21-40	18	40
41-60	32	8
Mean	44.4 ± 20.3	30.3 ± 12.4
P value	<0.05	

Post-operative pain, assed by VAS (Visual Analogue Score), was mostly mild in severity in LA groups while in OA, most patients (38%) complained severe pain (TABLE-III).

TABLE-III: Distribution of patients by post-operative pain in LA and OA patient groups

Post-Operative pain	LA (n = 49)	OA (n = 50)	P value*
Mild	40%	28%	0.480
Moderate	36%	34%	0.450
Severe	24%	38%	0.023

Moreover, patients in OA group had more post-operative complications than LA group as shown in Table-IV. This is true for atelectasis (LA = 2%, OA = 4%), wound/port infection/dehiscence (LA = 12%, OA = 28%), RTI (LA = 8%, OA = 26%), sepsis (LA = 0%, OA = 4%), postoperative ileus (LA = 14%, OA = 42%), intra-abdominal abscess (LA=6%, OA = 4%), intestinal obstruction (LA = 0, OA = 2%). However, SSI (surgical site infection) rate is higher in OA than LA.

TABLE-IV: Distribution of patients by postoperative complications in LA and OA patient groups (n = 99)

Postoperative complication	Patient Group			
	Laparoscopic Appendicectomy		Open Appendicectomy	
	Count	%	Count	%
Atelectasis	1	2.0	2	4.0
Wound/Port infection/dehiscence	1	2.0	4	8.0
RTI	10	20.0	7	14.0
Postoperative ileus	7	14.0	12	24.0
Intestinal obstruction	0	0.0	1	2.0
Incisional / port site hernia	0	0.0	0	0.0
Hypertrophic scar	0	0.0	1	2.0

Duration of hospital stay after surgery is more in OA than LA. Open appendectomy led to a longer mean postoperative hospital stay (6.82 ± 0.749 days) than in the LA group (3.45 ± 1.34) days; $p < 0.05$.

TABLE-V: Duration of hospital stay after surgery

Duration of hospital stay (Day)	LA(n=49)	OA(n=50)
1-5	49	11
6-10	0	33
11-15	0	6
Mean	3.45 ± 1.34	6.82 ± 0.749
P value	<0.05	

In terms of resume to normal activity after operation, LA showed better outcome (16.10 ± 3.429 days) than (19.16 ± 6.96 days) OA (p=<0.05)

TABLE-VI: Post-operative time taken to return to normal work

Day for recovery	LA(n=49)	OA(n=50)
9-12	18	4
13-16	10	10
17-20	2	6
>20	19	30
Mean	16.10 ± 3.429	19.16 ± 6.96

DISCUSSION

The purpose of this study was to compare the results of laparoscopic and open appendicectomies at Combine Military Hospital in Dhaka. As judged by real skin-to-skin time, the laparoscopic group's total surgical time (mean ± SD, 30.3 ± 12.4 minutes) was significantly shorter than that of the open group (mean ± SD, 44.4 ± 20.3 minutes). The two groups' mean operating times differed by 14.2 minutes, which is statistically significant (p<0.05). The results of this study seemed rather different from those of other investigations.^{7,8,9}

The mean operative time for the procedures was 64 ± 27 minutes (OA), according a prospective, randomized trial conducted by Ortega.⁸. The laparoscopic group's operating duration was significantly longer (60 versus 35 minutes, P<0.01) in prospective randomized multicenter research by A. Hallberg.^{9,10}

The reason for these disparities in operating time outcomes is that, in a tertiary level hospital (academic hospital) such as CMH-Dhaka, the majority of OA was carried out by trainees, whereas the majority of LA was carried out by seniors (professor or associate professor). Shorter hospital stays can offset the greater costs associated with longer operating room stays. Since the study was carried out in a military hospital where patients receiving both procedures are exempt from paying, the cost was not included.

The hospital stay for the laparoscopic group in this study was just 3.45 ± 1.34 days, compared to 6.82 ± 0.749 days for the open group (P ≤ 0.05). Our results are consistent with early publications as well as recent studies that demonstrate a significantly shorter hospital stay. The mean hospital stay for the OA group was 2.97 days longer than that of the LA group, which is significant based on statistical analysis.^{1,11,12}

The study found that the laparoscopic group's mean time to full recovery, or time to resume work, was 16.10 ± 3.429 days, whereas the open appendectomy groups was 19.16 ± 6.96 days. The mean difference between the two groups was 3.75 days (P ≤ 0.05), which is statistically significant. This result is consistent with other randomized clinical trials and meta-analyses, as well as a related study by Hellberg et al. that shows the median time to full recovery was 13 days for the laparoscopic group and 21 days for the open group (P ≤ 0.001).⁹. Other research, however, finds no difference in the

time it takes to fully recover and the ability to do daily tasks.^{13,14}

Numerous studies have found that laparoscopic appendectomy has a lower rate of complications than open appendectomy.^{8,9} Our research concurs with these findings as well.

Most studies have found that laparoscopic appendectomy considerably reduces the risk of infection.^{1,9} Additionally, compared to open surgery, laparoscopic surgery is linked to higher immune system maintenance. As a result, the frequency of infection-related problems is reduced. Six patients (12%) in the laparoscopic group and fourteen patients (28%) in the open group experienced wound/port infections/wound dehiscence during our research. Infections from wounds were more prevalent in the open group.

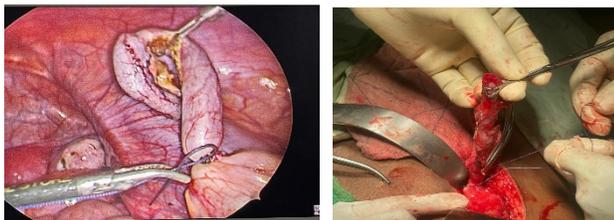


Fig-I: Per-operative picture of laparoscopic and open appendicectomy.

In the OA group, ileus (delayed peristalsis) was more than twice as high as in the LA group. This post-operative problem occurred in just 7 laparoscopic patients and 21 open group patients. In this study there is no intra-abdominal abscess occurred but some other studies showed some incidence of intra-abdominal abscess following laparoscopy appendicectomy as opposed to open surgery.^{11,15} This result is statistically significant, though.¹⁶ The sole side effect reported was bleeding at the port site. According to statistical analysis, the mean difference between these two groups was significant because the p-value for each parameter was less than 0.0001.

CONCLUSION

From this prospective study comparing early post-operative outcome of open and laparoscopic appendicectomy, we conclude that laparoscopic appendicectomy have clear advantages in respect to short term early post-operative period's results.

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