Comparison between Open versus Laparoscopic Appendectomy

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Original Research Article

Comparison between Open versus Laparoscopic Appendectomy

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ABSTRACT

Objective: To compare the outcomes of laparoscopic appendectomy and open appendectomy for treatment of acute appendicitis.

Study Design: Randomized control trial.

Place and duration: Trial was conducted at department of general surgery Nishtar hospital Multan from November 2019 to November 2020.

Methodology: Study was conducted on one hundred and fifty patients. Patients were divided into two groups, laparoscopic and open appendectomy groups. Hospital stay, duration of surgery and surgical site infection were main variables.

Results: The mean length of stay at hospital in laparoscopic appendectomy was slightly greater than the mean length of stay in hospital in open appendectomy, (p=0.000). Rate of surgical site infections in open appendectomy was significantly higher than laparoscopic appendectomy, 34.7% and 18.7%, respectively p=0.027.

Conclusion: Laparoscopic appendectomy is better than open appendectomy due to reduction in surgical site infection, shorter hospital stays and duration of surgery. Duration of surgery depends upon skills of surgeon and team.

Keywords: laparoscopic, open appendectomy, appendectomy, acute appendicitis

1. INTRODUCTION

Inflammation of vermiform organ (appendix) is called appendicitis (1). It is most common abdominal emergency in the world which is leading cause of surgeries of abdomen in every age group (2). Lifetime risk of acute appendicitis is 6.7% in females and 8.6% in males. It is also most frequent life-threatening emergency presented at tertiary care centres (3).

Among patients presented with appendicitis about 20% developed perforation (4). Literature shows that perforation of appendix is more common in men as compared to women 18% to 13% respectively (5). Time case of perforation varies from patient to patient, but usually eminent risk considered 24 hours after onset of appendicitis symptoms. Risk of perforation within 24 hours of symptoms is 20% (6).

First, McBurney et al. (7) has introduced open appendectomy and remains treatment of choice for long time. But introduction of laparoscopic technique for appendectomy has brought dramatic revolution in the field of general surgery. It was first introduced by Semm et al. (8) The laparoscopic appendectomy has gained significant popularity among general surgeons due to its minimally invasive nature. This method is consistently preferred over the traditional open appendectomy.

The utilization of disposable instruments and costly ports in laparoscopic appendectomy results in significantly higher costs (9). Many authors have voiced criticism towards laparoscopic appendectomy due to elevated risks of infra-abdominal abscesses and longer operating times in perforated cases. However, some studies advocate for laparoscopic appendectomy citing benefits such as faster wound healing, reduced post-operative pain, shorter hospital stays, and quicker return to regular activities (10).

The results of the study could help shape the creation of postoperative care recommendations specific to each surgical method. This could enhance patient outcomes and decrease complications by ensuring the proper management of postoperative care.

2. METHODOLOGY

Patients of radiologically diagnosed appendicitis were included in the study. Appendicitis was defined as pain in right iliac fossa, lower abdomen tenderness, and fever above 99F^{o}. On laboratory investigation leukocyte count was 10,000. Patients of perforated appendix, unfit for anaesthesia (ASA status), contradiction of laparoscopic appendectomy (respiratory insufficiency) and previous history of abdominal surgery were excluded. Group A treated with Open appendectomy

and group B treated with laparoscopic appendectomy. Main variables of study were hospital stay, duration for surgery and surgical site infection. Duration of surgery was defined as time form incision or port insertion to appendix retrieval. Time of admission to time of discharge from hospital was labelled as hospital stay and surgical site infection was defined as presence of inflammation (discharge and erythema) after surgery. Perioperative medicines include metronidazole 400mg, ceftriaxone 1g intravenously. In open technique a small incision was made on right iliac fossa, appendectomy was done, and wound was closed while in laparoscopic technique include three port insertion by creating pneumoperitoneum and appendectomy was done. Injection Ketorolac 30mg was given intravenously immediate after surgery at 8 hours and at 72 hours.

SPSS version 23 was used for data analysis and p value less than or equal to 0.05 was taken as significant.

3. RESULTS

One hundred and fifty patients were included in this study, n=75 (50%) in laparoscopic appendectomy and n=75 (50%) in open appendectomy. The mean age, gender, and ASA distribution of both the groups are represented in table 1. The differences were statistically insignificant.

Table 1: Demographic Characteristics of both the Groups

Variable	Laparoscopic Appendectomy n=75 (50%)	Open Appendectomy n=75 (50%)	P-value
Age (years)	45.42±5.48	45.95±5.66	0.609
Gender			
Male	n=47 (62.7%)	n=45 (60%)	0.737
Female	n=28 (37.3%)	n=30 (40%)	
ASA-I	n=41 (54.7%)	n=38 (50.7%)	0.624
ASA-II	n=34 (45.3%)	n=37 (49.3%)	

The mean operating time of open appendectomy was greater than the mean operating time of laparoscopic appendectomy, 57.53±4.16 minutes and 50.81±2.92, respectively p=0.000. The mean length of stay in hospital of laparoscopic appendectomy was slightly greater than the mean length of stay in hospital open appendectomy. Rate of surgical site infections in open appendectomy was significantly higher than laparoscopic appendectomy, n=26 (34.7%) and n=14 (18.7%), respectively (Table 2).

Table 2: Comparison of Outcome Variables of both the Groups

Variable	Laparoscopic Appendectomy n=75 (50%)	Open Appendectomy n=75 (50%)	P-value
Operating time (Minutes)	50.81±2.92	57.53±4.16	0.000
Length of hospitalization/Hospital stay (days)	5.61±1.56	3.85±0.92	0.000
Rate of surgical site infections	n=14 (18.7%)	n=26 (34.7%)	0.027

4. DISCUSSION

Appendicitis is a serious surgical condition that may lead to life threatening illness in perforated cases. Now these days' latest surgical management with laparoscopic technique is better choice with minimum complications as compared to traditional open appendectomy procedure (11). A study was conducted by Nazir A et al. (12) and reported laparoscopic appendectomy is better choice and associated with little complications like shorter hospital stay and shorter mean operating time.

In our study the mean age of patients in laparoscopic technique was 45.42±5.48 years and in open technique was 45.95±5.66 years. A similar study was conducted by Muhammad et al. (13) and reported mean age of patients in laparoscopic group was 32 ± 14 years and in open group it was 34 ± 13 years. Similar findings of age group were reported by Thomas et al. (14) because and concluded that appendicitis is more common in younger age. Our study also found younger age group presented with appendicitis at emergencies of tertiary care hospital.

The mean operating time in laparoscopic appendectomy group was 50.81±2.92 minutes in our study and mean operating time in group open appendectomy was 57.53±4.16 minutes. Another study was conducted by Lin et al. (15) in 2006 and reported mean operating time in laparoscopic group was 96.1 ± 43.1 minutes which is longer time duration as compared to open appendectomy time 67.8 ± 32.2 minutes. The results of this study were contradictory to our results. In a study by Yau et al. (16) observed shorter duration of surgery in laparoscopic surgery technique 47.8 ± 14.5 minutes and in open group it was 49.10 ± 12.5 minutes. These findings are identical to our study.

Hospital stay is another important variable of our study reported length of hospital stay in laparoscopic group 5.61±1.56 days and in open appendectomy group it was 3.85±0.92 days, difference is statistically significant. A study by Tiwari et al et al. (17) reported 4.34 ± 4.84 days' hospital stay in laparoscopic appendectomy and 7.31 ± 9.34 days in open appendectomy. This study is contradictory to our study findings. Similarly, Hayat et al. (18) reported shorter duration of hospital stay in laparoscopic appendectomy group.

Surgical site infection in our study was 18.7% in laparoscopic appendectomy group and 34.7% in open appendectomy group. Similarly, another study was conducted by Naraintran et al. (19) in 2018 and reported port site infection in 8% of patients and in open appendectomy group 26% surgical site infection was reported. Marzouk et al. (20) completed a study on comparison of infection rate in laparoscopic and open appendectomy and concluded that infection rate is much lower in laparoscopic group as compared to open appendectomy group. He observed 7.6% infection in open group and no case of infection observed in laparoscopic group. In a study by Dai et al. (21) reported surgical site infection 3.01% in laparoscopic group and 7.53% in open appendectomy patients. Infection rate is much lower in LA group as found in our study.

5. LIMITATIONS

The study may not adequately control confounding variables such as patient age, comorbidities, severity of appendicitis, and surgeon experience, which could influence the outcomes of the surgeries.

6. CONCLUSION

Laparoscopic appendectomy surpasses open appendectomy due to reduction in surgical site infection rates, shorter hospital stay duration, and surgical procedure time. The duration of surgery is contingent upon the proficiency of the surgeon and the team. Consequently, the laparoscopic technique is favored for appendicitis removal.

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