

Research Article

**A comparative study of laparoscopic appendicectomy and open
appendicectomy at DHQ Hospital, Hafizabad**

Seerat Un Nisa, Muhammad Iqbal

and Usama Ahmad

¹Woman Medical Officer

DHQ Hospital Hafizabad

²Medical Officer

BHU 155/WB Tehsil & District Vehari

³Medical Officer

BHU 16 EB Arifwala

ABSTRACT

Objectives of the study: Laparoscopic procedure for appendicectomy is compared with open surgical technique with respect to:

- Duration of surgery
- Post operative pain and duration of analgesic
- Post operative Complications
- Post operative length of hospital stay
- Return to routine work.

MATERIALS & METHODS: This is a prospective and comparative study done from March 2017 to September 2017 involved 100 cases, 50 open and 50 lap appendicectomy, which were randomly selected and were operated in DHQ Hospital Hafizabad.

Results: In present study pain score was 2.7 +- 0.9 for open group as compared to 1.3+- 0.5 in lap group (P<0.05) because of longer incision stretch of muscles and woundinfection. Duration of postoperative hospital stay was significantly low for lap group 2.8 +- 0.9 as compared to open group 4 +- 2.9. The return to normal activity was low for lap group 8+-3.15 days as compared to open group 13.7 +-3.15 days. Duration of surgery for open appendicectomy was 48.2+-12.4 and for lap appendicectomy was 68.5 +-20.3

Conclusions: Overall laparoscopic appendicectomy is better than open appendicectomy in selected patients with acute or recurrent appendicitis.

Key words: appendicectomy, laparoscopic appendicectomy, open appendicectomy.

INTRODUCTION

Appendicitis is the most common intra-abdominal condition requiring emergency surgery, with a lifetime risk of 6%¹. Appendicectomy continues to be one of the commonest procedures in general surgery, accounts for approximately 1% of all surgical operation².

Even though modern diagnostic facilities, surgery skills, fluids and antibiotic therapy have brought

down the mortality from 50% (before 1925) to less than 1/1,00,000 persons, still the morbidity is more than 5-8%, mainly due to woundinfection because of delayed diagnosis and treatment³.

Laparoscopic appendicectomy combines the advantages of diagnosis and treatment in one procedure with least morbidity⁴. Patients are likely to have less postoperative pain and to be

discharged from hospital and return to activities of daily living sooner than those who have undergone open appendicectomy⁵. The other advantages include decreased wound infection, better cosmesis, ability to explore the entire peritoneal cavity for diagnosis of other conditions and effective peritoneal toileting without the need for extending the incision⁴.

The laparoscopic appendicectomy is increasingly employed, particularly in young women of child – bearing age in whom the differential diagnosis of right lower quadrant pain is extensive and includes gynecologic pathology⁶.

The modern era of laparoscopic surgery has evoked remarkable changes in approaches to surgical diseases. That trend towards minimally invasive surgery has prompted general surgeons to scrutinize nearly all operations per possible conversion to laparoscopic techniques⁷.

METHODOLOGY

Total 100 (50 cases opened and 50 cases lap) patients having age range from 10-50 years either male or female admitted in surgical wards of DHQ Hospital Hafizabad, with clinical diagnosis of acute or recurrent appendicitis from March 2017 to September 2017 were selected.

Children <10Yrs, pregnant women, clinically appendicular mass, appendicitis with visceral pathology which needs open surgery and interval appendicectomy were excluded.

Patients who presented with abdominal pain, vomiting, fever, and on examination with tenderness in right ileac fossa with guarding or rigidity or some findings of them, were investigated with necessary investigation and were diagnosed of acute/recurrent appendicitis were posted for surgery.

Open appendicectomy were performed through a muscle splitting incision in the right iliac fossa. The base of the appendix was crushed ligated and stump of the appendix was not invaginated. Laparoscopic appendicectomy were done using a standardized approach involving a closed technique for trocar insertion and by 3port technique. The appendix was divided after ligation

of the base. Appendix extraction was performed using trocar sleeve to protect the wound from contamination during removal. Duration of surgery taken for lap is from the time of port site incision to closure of the port by suturing and for open its from skin incision to skin closure. All the cases were followed every day in the postoperative period till they were discharged and then later followed for a period of 4 weeks in the outpatient department.

The following parameters were observed during follow up in comparison between two procedures, post operative pain using a visual analogue pain scale and duration of analgesic used in number of days. Post operative complications like vomiting, ileus, abdominal abscess and wound infection. Patients in both studies

groups were discharged as soon as possible and duration of stay after surgery and duration of analgesics used after surgery in number of days is noted. Wound infection was defined as discharge of pus that required surgical drainage. Intraabdominal abscess was defined as a fluid collection diagnosed at Ultrasonography or computed tomography which contained pus at ultrasonographically guided aspiration. Presented proforma was used to collect the relevant information, and chi-square test and student t- test, is used for analysis.

RESULTS

The results of the analysis of data on 50 patients who underwent open appendicectomy and another group of 50 patients, who were operated laparoscopically are as follows.

In present study 30 (60%) patients of open appendicectomy and 20 (40%) patients of laparoscopic appendicectomy were males. 20 (40%) patients of open appendicectomy and 30 (60%) laparoscopic appendicectomy were females. The mean age of the patients in two groups was 24.0 and 21.2 years, respectively. (Table 1)

In the present study 50 (100%) in open group and 50(100%) in laparoscopic group complained of abdominal pain. History of vomiting was present

in 38(76%) in open and 44(88%) in laparoscopic group. The other complaints was fever 12(24%) in open group and 10(20%) in laparoscopic group. (Table 2)

In my study for open appendicectomy <30 min 3 cases were operated, 30 to 60 min 42 cases, 61 to 90 min 4 cases, 91 to 120 min 1 case were operated. The mean duration was 48.2+/- 12.4 min. For lap appendicectomy <30 min 3 cases, 31 to 60 min 27 cases, 61 to 90 12 cases, 91 to 120 min 6 cases and 121 to 180 min 2 cases were operated. Mean duration of surgery was 68.5+/- 20.3 min. So open appendicectomy is less time consuming than laparoscopic appendicectomy. (Table 3)

In present study average pain score was 2.7 (+/- 0.9) in open group as compared to 1.3 (+/-0.5) in laparoscopic group with p <0.05 which was significant. Duration of analgesics used parental and oral in days were on an average 6.9 (+/- 2.4) and 2.3 (+/- 1.0) for open and laparoscopic group respectively. Again this deference was significant (p <0.05). Above analysis reveled that both pain and analgesics used were significantly reduced in laparoscopic compared to open appendicectomy. (Table 4)

In present study postoperative complications were analyzed in detail: vomiting ileus, intra-abdominal abscess, and wound infection. The incidence of vomiting was higher following open appendicectomy (18%) than laparoscopic (8%) which is significant with P<0.05. Average post

operative ileus was 30.8(+/-8.9) hrs for open and 17.3 (+/-7.1) hrs for laparoscopic group was noted. When difference was noted 't' value 6.05 and P<0.05 which is significant. Wound infection were more common after open 8 (32%) than laparoscopic 1(4%) and the difference was significant (P<0.05). Intra abdominal abscesses developed in 8% of the open group and case in laparoscopic group. However this difference was not significant (P=0.23). (Table 5)

In open appendicectomy 6 cases had 3 days of stay, 33 cases had 4 days, 5 cases had 5 to 9 days and 6 cases had 10 to 15 days of postoperative stay in the hospital. With a mean of 4 +/- 2.95. In lap appendicectomy 6 cases had 1 day, 24 cases had 2 days, 14 cases had 3 days and 6 cases hsd 4 days of post operative hospital stay. With a mean of 2.8 +/-0.9. Which shows that laparoscopic appendicectomy significantly reduced the hospital stay (P<0.05). (Table 6)

In my study for open appendicectomy 5 patients had taken 6 to 8 days, 10 cases had taken 9 to 12 days, 30 cases had taken 13 to 16 days and 5 cases had taken 17 to 20 days of time to return to their routine work. With a mean of 13.7+/-3.15. In lap appendicectomy 24 cases had taken 6 to 8 days, 19 cases had taken 9 to 12 days, 5 cases had taken 13 to 16 days and 2 cases had taken 17 to 20 days to return to their routine work. With a mean of 8.4+/- 3.15. Again this difference was significant (P<0.05). (Table 7)

Table No.1: Age and Sex Distribution

Patients analysed	Appendicectomy			
	Open		Laparoscopy	
	No	%	No	%
	50	100	50	100
Sex				
Male	30	60	20	40
Female	20	40	30	60
Age (years)				
10-20	22	44	24	48
21-30	20	40	22	44
31-40	4	8	0	0
41-50	4	8	4	8
Mean age	24.0		21.2	
+/-SD	+/-8.9		+/- 7.5	

Table No. 2. Presenting complaints

Symptoms	Appendicectomy			
	open		Laparoscopy	
	No	%	No	%
Abdominal pain	50	100	50	100
Nausea/ vomiting	38	76	44	88
fever	12	24	10	20

Table 3: duration of surgery

Duration of surgery	open	lap
< 30 min	3	3
31- 60 min	42	27
61- 90min	4	12
91- 120 min	1	6
121- 180 min	0	2
MEAN	48.2+/- 12.4	68.5+/-20.3

Table No.4: Post operative pain score and medication:

Details	Appendicectomy		Significance	
	Open	Laparoscopic	T- value	P-value
Pain Score (0-4)	2.7 score (+/-) 0.5	1.3 score (+/-) 0.5	6.94	<0.05 sig*.
Duration of analgesics used Parental and Oral (days)	6.94 days (+/-) 2.4	2.3 days +/- 1.0	9.03	<0.05 sig*.

Table No.5. Post operative Complications:

Complications	Open N(%)	Laparoscopic N(%)	Significance p-value	t-value
Vomiting	9(18)	4(8)	_____	<.05,Sig*.
Abdominal abscess	2(4)	0(0)	_____	0.23,NS*.
Wound Infection	8(16)	1(2)	_____	<.05,Sig*.
Ileus (hrs)	30.8 +/- 8.9	17.3 +/- 7.1	6.05	<.05,Sig*.

Table No.6. Postoperative stay in hospital

Duration of hospital stay after surgery (days)	Appendicectomy	
	Open	Laparoscopy
1	0	6
2	0	24
3	6	14
4	33	6
5-9	5	0
10-15	6	0
MEAN	4+/- 2.94	2.8 +/- 0.9
P value	<0.05	< 0.05

Table 7: post operative time taken to return to normal work

Days for recovery	open	lap
6-8	5	24
9- 12	10	19
13-16	30	5
17-20	5	2
MEAN	13.7 +/- 3.15	8 +/- 3.15

DISCUSSION

Laparoscopic surgery is a major surgical advance that has enabled the general surgeon to stretch his hands in superspeciality era. The controversy that currently exists over the potential benefits of laparoscopic appendicectomy motivated us to analyse our experience with this procedure. The relative advantages of laparoscopic and open appendicectomy are measured primarily in terms of post operative pain score and duration of analgesics used in days. Post operative complications like vomiting ileus, intraabdominal abscess, wound infection, post operative recovery in the form of post operative duration of stay, and return to normal work were assessed. In the study comparison with respect to duration of surgery, laparoscopic appendicectomy has taken a mean of 68.5+/-20.3 min and open appendicectomy has taken a mean of 48.2+/-12.4 min ($p<0.001$). Similar observations have also been reported by other studies.⁸⁻⁹

In almost all the literature the operating time of laparoscopic appendicectomy was found to be more than that of open appendicectomy. In considering operating time, the exact identification of the timing of the start of the procedure and its conclusion vary. In general the time should be calculated from the insertion of first trocar to the end of skin suturing.

Generally all laparoscopic procedures are more time consuming for the following reasons.

- Inherent nature of slow manoeuvre of laparoscopic techniques
- Time taken by careful slow insufflations.
- Routine diagnostic laparoscopy before starting any laparoscopic procedure.

A meta-analysis of randomized controlled trial has been reported with outcomes for 2877 patients. The mean operating time was 16 minutes longer for laparoscopic appendicectomy.

In present study pain score was 2.7 +/- 0.9 for open group as compared to 1.3 +/- 0.5 in laparoscopic group ($P<0.05$) because of longer incision stretch of muscles and wound infection. Similar observations have also been reported by

other authors.¹⁰⁻¹¹ Thus the post operative analgesic required was more in open group as compared to laparoscopic group. Similar results have also been found in the following study.⁸

It is proved that laparoscopic procedures cause less postoperative pain than their conventional counterparts. In this study none of the literature reviewed found more pain after laparoscopic procedure. The postoperative narcotic use is less after laparoscopic appendicectomy. In one study done by Ortega et al¹²; linear analogue pain scores were recorded in 135 patients blinded to the procedure of operation by special dressing and pain score was very less in laparoscopic group compared to open. Another interesting observation has been the patient's perception of pain after appendicectomy. Those who underwent laparoscopic appendicectomy were more vocal of pain although it was of a lower intensity. However, after 48 hours they had a better sense of well-being and showed earlier postoperative food intake, ambulation and return to work and sport. This could have arisen from the expectation that laparoscopic procedures are painless or a lower level of endorphins released or the peritoneal injury from the pneumoperitoneum.

Post operative complications like vomiting was lower in laparoscopic group with 8% as compared with 36% in open group ($P<0.05$) and ileus was lower in laparoscopic group with 17.3 +/- 7.1 and for open group 30.8 +/- 8.9 with $P<0.05$ which were significant. The similar studies done showed the incidence of emesis was lesser and post operative ileus lesser in laparoscopic group.¹³

In present study there is significant reduction in incidence of post operative wound infection in laparoscopic group 4% as compared to open group 26% ($P<0.05$). A similar study done by others has also shown a significant reduction in wound infection rate^{14,15,16} Moreover, the small size of trocar incisions renders wound infections easier to manage, with prompter resolution than those following conventional appendicectomy. Similar

results have also been found in the following study.⁹

M. Marzouk et al⁹ in 2003, showed laparoscopic appendicectomy significantly improved the postoperative wound infection rate. There was no wound infection in the laparoscopic group, whereas in open group the infection rate was 7.6%. This is because with laparoscopic approach, the inflamed appendix was dissected without direct contact with the trocar wounds. Also, removal of the appendix was done completely within the trocar sheath, and there was no direct contact with the port opening.

Duration of post operative hospital stay was significantly low for laparoscopic group 2.8 +/- 0.9 as compared to open group 4 +/- 2.94. The longer hospital stay in open group compared to laparoscopic group also has been reported by others^{17, 13, 18}. In Nguyen N, Zainabadi K, Mavadadi S, Paya M, Stevens CM, Root J, et al, study stay was shorter for laparoscopic group (P<0.04).¹⁹ Similar finding with 2.5 days versus 3.4 days were found for open and laparoscopic groups.²⁰

In Chin J Dig Dis study reported the median length of stay was significantly shorter after laparoscopic appendicectomy (3 days versus 5 days, P<0.0001) than after open appendicectomy.²¹ A Yong J L, Law W L, Lo CY, Lam CM study reported the median hospital stay for patients in laparoscopic group and open group were 3.0 days (range, 1 to 47) and 4.0 days (range, 1 to 47), respectively which were comparable.²² The return to normal activity was early for laparoscopic group 8 +/- 3.15 days as compared to open group 13.7 +/- 3.15 days. Other studies have shown that laparoscopic group patients can return to normal work earlier.^{16,23}

It has been shown that those patients who underwent successful laparoscopic appendicectomy have a better postoperative recovery. The reduced trauma to the abdominal wall is a very significant factor in postsurgical discomfort. The better mobility of the abdominal musculature and the earlier ambulation, reduce the

risk of the early postoperative complications of pneumonia and embolism.

CONCLUSION

On analysing the data, we found a definite difference in outcome between open and laparoscopic appendicectomy in consecutively selected patients. The laparoscopic appendicectomy was better than the open appendicectomy with respect to pain score, lesser use of analgesics, post operative complications like vomiting, ileus and wound infection rate. Post operative recovery was good in respect with duration of hospital stay, return to normal work. The only drawback of laparoscopic appendicectomy was with the duration of surgery. However with the above mentioned advantages outweighs the time drawback for laparoscopic appendicectomy. Overall laparoscopic appendicectomy is better than open appendicectomy in selected patients with acute or recurrent appendicitis.

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