Original Research Paper

Volume - 12 | Issue - 04 | April - 2022 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Surgery

A COMPARATIVE STUDY ON LAPAROSCOPIC APPENDICECTOMY AND OPEN APPENDICECTOMY, A SINGLE CANTER

Dr. Furquan Ahmad*	Assistant professor, Department of General Surgery, Rama Medical college, and hospital, Hapur (UP). *Corresponding Author
Dr. Yogesh Yadav	Assistant professor, Department of General Surgery, Rama Medical college, and hospital, Hapur (UP).
Dr Deepak Chopra	Professor and HOD, Department of General Surgery, Rama Medical college, and hospital, Hapur (UP).

ABSTRACT

INTRODUCTION: Acute appendicitis accounts for the commonest indication for emergency visits during daily surgical practice, and appendectomy is the most common emergent operative procedure performed worldwide[1]. Although open appendectomy has been accepted as the standard treatment of choice for acute appendicitis with low mortality and morbidity rates, laparoscopic appendectomy has gradually gained acceptance [2], Short hospital stays, faster recovery and earlier return to full activity, decreased postoperative pain, improved wound healing, and lower wound infection rates have been offered to be the benefits of laparoscopic appendectomy[1,3-6].

OBJECTIVES OF THE STUDY: Laparoscopic procedure for appendicectomy is compared with open technique with respect to Post operative pain, Duration of surgery, post operative Complications, length of hospital stay

MATERIALS & METHODS: This is a prospective and comparative study from August 2020 to August 2021 involved 100 cases, 50 open and 50 lap appendicectomy, which were randomly selected and were operated in department of surgery, Rama medical college and hospital, Hapur.

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 wound infection. 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 lap group with 17.3 ± 7.1 and for open group 30.8 ± 8.9 with P <0.05 which were significant. There is significant reduction in incidence of post operative wound infection in lap group 4% as compared to open group 26% (P<0.05). Duration of post operative 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

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

KEYWORDS : Appendicectomy, Laparoscopic Appendicectomy, Open Appendicectomy.

INTRODUCTION

Acute appendicitis accounts for the commonest indication for emergency visits during daily surgical practice, and appendectomy is the most common emergent operative procedure performed worldwide[1]. Although open appendectomy has been accepted as the standard treatment of choice for acute appendicitis with low mortality and morbidity rates, laparoscopic appendectomy has gradually gained acceptance [2]. Short hospital stays, faster recovery and earlier return to full activity, decreased postoperative pain, improved wound healing, and lower wound infection rates have been offered to be the benefits of laparoscopic appendectomy[1, 3-6]. The application of laparoscopic appendectomy as "gold standard" in the treatment of acute appendicitis is still debated because of longer operative time, higher risk for postoperative intra-abdominal abscesses, and higher costs, as it was described by several authors who compared laparoscopic appendectomy to open appendectomy[7,8,9]. laparoscopic appendicectomy combines the advantages of diagnosis and treatment in one procedure with least morbidity[10]. 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 appendicectomy[11]. 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 incision[10].

Objectives of the study

Laparoscopic appendicectomy is compared with open appendicec tomy with respect to

1. post operative pain and duration of analgesic.
2. duration of surgery.
3. post operative complications.
4. post operative length of hospital stays.
5. time taken to return to resume routine work.

INCLUSION CRITERIA

Patients with clinical diagnosis of acute or recurrent appendicitis with necessary investigations.

EXCLUSION CRITERIA

Those not willing for the study, children less than 10 years, pregnant women, and those with Complicated appendicitis (perforated or a gangrenous appendix with or without peri appendicular pus, peritonitis or appendicular mass).

Analytical Table

1 . Patients Demographics:

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.

Table No.1: Age and Sex Distribution:

		Appendicectomy			
		Open		Laparoscopic	
		Number	Percentage	Number	Percentage
Patient analysed	50	100%	50	100%	
sex	Male	38	76%	35	70%
	female	12	24%	15	30%
Age (in years)	10- 20	20	40%	25	50%
	21- 30	22	44%	18	36%
	31- 40	03	06%	04	08%
	41-50	03	06%	02	04%
	51-60	02	04%	01	02%
Mean age	10		10		
±SD	±9		±9.6		

Table no. 2. Presenting complaints

symptoms	appendicectomy			
	open		laparoscopic	
	number	percentage	Number	percentage
Fever	40	80 %	44	88 %
Abdominal pain	50	100 %	50	100 %
Nausea/vomiting	10	20 %	12	24 %

Table No.3. Local Examination

Findings	appendectomy	
	open	laparoscopy
TENDERNESS		
+	50	50
-	0	0
GUARDING & RIGIDITY		
+	40	38
-	10	12

Table No.4. Ultrasound Findings:

Reports	appendectomy			
	open		laparoscopy	
	number	percentage	number	percentage
Normal	8	16%	16	32%
Abnormal pathology noted	42	84%	34	68%

Table 5: Duration of Surgery

Duration (in Minutes)	open	laparoscopy
< 30	3	3
31-60	42	27
61-90	4	12
91-120	1	6
121-180	0	2
Mean	48.2 ±12.4	68.5± 20.3

Table No.6: Post operative pain score and medication:

	appendectomy		significance	
	open	laparoscopic	t-value	p- value
Pain score	2.7 (±) 0.5	1.3 (±) 0.5	6.9	< 0.05
Analgesic duration (days)	6.94	2.3	9.03	<0.05
IV and oral (days)	±2.4	±1.0		

Table No.7. Post operative Complications:

complications	Open		Laparoscopic		significance	
	n	%	n	%	t - value	p- Value
Wound infections	8	16%	1	2%	-	<0.05
Ileus	30.8 ± 8.9	17.3 ± 7.1	6.05	<0.05		
Vomiting	9	18%	4	8%	-	<0.05
Intra-abdominal abscess	2	4%	0	0%	-	0.23

Table No.8. Postoperative stay in hospital:

Post operative hospital stay(in days)	appendicectomy	
	open	laparoscopic
1	0	6
2	0	24
3	6	14
4	33	6
5-9	5	0
10-15	6	0
Mean	4 ± .94	2.8 ± 0.9
p- value	< 0.05	<0.05

Table 9: Post-Operative time taken to return to normal work

Recovery (in days)	open	laparoscopy
6-8	5	24
9-12	10	19
13-16	30	5
17-20	5	2
Mean	13.7 ± 3.15	8 ± 3.15

RESULTS

In present study 38 (76%) patients of open appendicectomy and 35 (70%) patients of laparoscopic appendicectomy were males. 12 (24%) patients of open appendicectomy and 15 (30%) laparoscopic appendicectomy were females. The mean age of the patients in both groups were 10 years (Table 1). In the present study 40 (80%) in open group and 44 (88b%) in laparoscopic group complained of fever. History of abdominal pain was present in 50 (100%) in open and 50 (100%) in laparoscopic group. The other complaints were nausea /vomiting 10 (20%) in open group and 12 (24%) in laparoscopic group (Table 2).In present study all patient in both groups had right iliac fossa tenderness (100%) 40(80%) in open group and 38 (76%) in laparoscopic group had guarding / rigidity (Table 3).In my study abnormal pathology were noted in 42(84%) and 34(68%) in open and laparoscopic group respectively. Ultrasound was normal in 8(16%) of open group and 16(32%) in laparoscopic group (Table 4). In my study for open appendicectomy <30 mints 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 mints 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 (Table5). 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 revealed that both pain and analgesics used were significantly reduced in laparoscopic compared to open appendicectomy (Table6). In present study postoperative complications were analysed in detail: wound infection, ileus, vomiting intra-abdominal abscess. 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 infections were more common after open 8 (16%) than laparoscopic 1(2%) and the difference was significant (P<0.05). Intra-abdominal abscesses developed in 4% of the open group and none in laparoscopic group. However, this difference was not significant P=0.23 (Table 7). 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 15days of postoperative stay in the hospital. With a mean of 4 ± 2.95. In laparoscopic appendicectomy 6 cases had 1 day, 24 cases had 2 days, 14 cases had 3 days and 6 cases had 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 8). 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 9).

DISCUSSION

LA has become the approach of choice by many surgeons in the treatment of both simple and complicated cases of acute appendicitis. The rate of LA between 1998 and 2008 increased from 20.6% to 70.8%, becoming the prevalent approach to treat acute appendicitis since 2005 [12]. In addition to the clinical benefits described in several studies, the laparoscopic approach allows a full exploration of the peritoneal cavity [13], thus representing an important diagnostic tool in case there is only suspicion of acute appendicitis. Several diseases such as pelvic inflammatory disease, endometriosis, ovarian cysts, ectopic pregnancy, cholecystitis, and colonic perforation may mimic appendicitis [14]. In young fertile women 50% of the surgical procedures performed for suspected acute appendicitis turn out not to be acute appendicitis, unless proper imaging was performed [15]. A definite diagnosis is obtained in 96% of patients undergoing LA compared with 72% of those undergoing open procedures.

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[16,17]. 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 varies. 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 so many reasons like Inherent nature of slow manoeuvre of laparoscopic techniques time taken by careful slow insufflations, Routine diagnostic laparoscopy before starting any laparoscopic procedure.

A prospective randomized trial comparing laparoscopic

appendicectomy with open appendicectomy was conducted in 158 patients by Hansen et al. They reported that despite of longer operating time, (63 versus 40 minutes) the advantages of laparoscopy (such as fewer wound infection and earlier return to normal activity) make it a worthwhile alternative for patients with a clinical diagnosis of acute appendicitis. 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 [18,19]. 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.[16]

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 al; 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 17. 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 [20,21,22]. 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.[17]

M. Marzouk et al 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 [20,23,24]. In Nguyen N, Zainabadi K, Mavadadi S, Paya M, Stevens CM, Root J, et al, study stay was shorter for laparoscopic group (P<0.05) Similar finding with 2.5 days versus 3.4 days were found for open and laparoscopic groups[25]. 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 appendicectomy26. 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, 1to 47), respectively which were comparable 49 . 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 [20,18,21] 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

REFERENCES

1. Ingraham AM, Cohen ME, Bilimoria KY, Pritts TA, Ko CY,Esposito TJ. Comparison of outcomes after laparoscopic versus open appendectomy for acute appendicitis at 222 ACS NSQIP hospitals. Surgery. 2010;148(4):625-35; discussion 635-7. Epub 2010 Aug 24.
2. Tzovaras G, Baloyiannis I, Kouritas V, Symeonidis D, Spyridakis,M, Poultsidi A, et al. Laparoscopic versus open appendectomy in men: a prospective randomized trial. Surg Endosc. 2010;24(12):2987-92. Epub 2010 Jun 15
3. Li X, Zhang J, Sang L, Zhang W, Chu Z, Li X, et al.Laparoscopic versus conventional appendectomy - a metaanalysis of randomized controlled trials. BMC Gastroenterol. 2010;10:129.
4. Shaikh AR, Sangrasi AK, Shaikh GA. Clinical outcomes of laparoscopic versus open appendectomy. JSLS. 2009;13(4):574-80.
5. Sakpal SV, Bindra SS, Chamberlain RS. Laparoscopic appendectomy conversion rates two decades later: an analysis of surgeon and patient-specific factors resulting in open conversion.J Surg Res. 2012;176(1):42-9. Epub 2011 Aug 5.
6. McGrath B, Buckius MT, Grim R, Bell T, Ahuja V. Economics of appendicitis: cost trend analysis of laparoscopic versus open appendectomy from 1998 to 2008. J Surg Res. 2011;171(2):e161-8. Epub 2011 Jul 23.
7. Sauerland S, Lefering R, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev. 2010;10:CD001546. [PubMed] [Google Scholar]
8. Wei B, Qi CL, Chen TF, Zheng ZH, Huang JL, Hu BG, Wei HB. Laparoscopic versus open appendectomy for acute appendicitis: a metaanalysis. Surg Endosc. 2011;25:1199–1208. doi: 10.1007/s00464-010-1344-z. [PubMed] [CrossRef] [Google Scholar]
9. Krisher SL, Browne A, Dibbins A, Tkacz N, Curci M. Intraabdominal abscess after laparoscopic appendectomy for perforated appendicitis. Arch Surg. 2001;136:438–441. doi: 10.1001/archsurg.136.4.438. [PubMed] [CrossRef] [Google Scholar]
10. Britton J, Barr H, "Endoscopic Surgery". Chapter 13 in Oxford text book of Surgery, Morris PS, Malt RA Eds. Vol.1, 2nd Edn, Oxford Medical Publications, 1994;847-862.
11. Russell RCG, Williams NS, Bulstrode CJK. "The vermiform appendix".Chapter 67 in short practice of surgery, Bailey and Love's 25th Edn, Arnold Publication 2004; 1204-1218.
12. McGrath B, Buckius MT, Grim R, Bell T, Ahuja V. Economics of appendicitis: cost trend analysis of laparoscopic versus open appendectomy from 1998 to 2008. *J Surg Res.* 2011;**171**:e161–e168. doi: 10.1016/j.jss.2011.06.067. [PubMed] [CrossRef] [Google Scholar]
13. Loh A, Taylor RS. Laparoscopic appendectomy. *Br J Surg.* 1992;**27**:289–290. [PubMed] [Google Scholar]
14. Schreiber JH. Early experience with laparoscopic appendectomy in women. *Surg Endosc.* 1987;**1**:211–216. doi: 10.1007/BF00591150. [PubMed] [CrossRef] [Google Scholar]
15. Laine S, Rantala A, Gullichsen R, Ovaska J. Laparoscopic appendectomy: is it worthwhile? A prospective, randomized study in young women. *Surg Endosc.* 1997;**11**:95–97. doi: 10.1007/s004649900305. [PubMed] [CrossRef] [Google Scholar]
16. RK Mishra, GB Hanna, A Cuschieri "Laparoscopic versus Open Appendicectomy for the Treatment of Acute Appendicitis" World Journal of Laparoscopic Surgery, January-April 2008;1(1):19-28.
17. M. Marzouk, M. Khater, M. Elsadek, A. Abdelmoghny "Laparoscopic vs open appendicectomy A prospective comparative study of 227 patients" Surg Endosc (2003) 17: 721–724
18. Chung RS, Rowland Dy, Paul Li, Diaz J, Clevelan, Ohio, "A meta analysis of Randomized controlled trials of laparoscopic versus conventional appendicectomy," Am J Surg,1999;177:250-256.
19. Minne L, Varner D, Burnell A, Ratzer E, Clark J, Haun W, "Laparoscopic vs Open Appendicectomy Prospective Randomized Study of outcome", Arch Surg, 1997; 132: 708-712.
20. Ortega AE, Hunter JG, Peters JH, Swantrom LL, Schirmer B, "A prospective randomized comparison of laparoscopic appendicectomy with open appendicectomy." Am J Surg. 1995;169:208-273.
21. Pedersen AG, Petersen OB, Wara P, Ronnjng H, Qvist N and Laurberg S, "Randomized clinical trial of laparoscopic versus open appendicectomy" Br J Surg.2001;88:200-205.
22. Mehoff AM, Merhoff GC., Falls K., Oregon, Franklin ME., San Antonio., and "Laparoscopic versus open Appendicectomy" Am J Surg. 2000; 179:375-378.
23. McAnena OJ, Austin O, O'Connell PR, Hederman WP, Gorey TF, Fitzpatrick J, "Laparoscopic versus open appendicectomy: a prospective evaluation" Br J Surg, August 1992;79:818-820.
24. Martin LC., Puente I, Sosa JL, Bassn A, Breslaw R, McKenney MC,et al, "Open versus Laparoscopic Appendicectomy A Prospective Randomized Comparison", 1995;22 (3): 256-262.
25. Nguyen N, Zainabadi K, Mavadadi S, Paya M, Stevens CM, Root J, et al., "Trends in utilization and outcomes of laparoscopic versus open appendicectomy", Am J Surg, Dec 2004; 188(6):813-820.
26. Chin J Dig Dis., "Laparoscopic versus open appendicectomy in West Bengal, India", 2005;6(4):165-169.
27. Yong JL, Law WL, Lo CY, Lam CM, " A Comparative study of routine laparoscopic versus open appendicectomy", JSLS 2006 Apr-Jun;10(2):188-192.