Original Article

# Comparison of Laparocopic Appendisectomy (LA) Versus Open Appendisectomy (OA) (A Prospective Randomizing Audit of 1000 Cases)

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## ABSTRACT

**Objective:** In this Study Comparison between Laproscopic & Open Appendisetomy with regard the length of operation, complication, conversion rate, postoperative hospital stay and time of return to normal activity has been made in order to assess the benefits and feasibility of the procedures.

**Study Design:** Prospective Randomizing study.

**Place and Duration of study:** This study is carried out at Shaheed Mohtrama Benazir Bhutto Medical University (SMBBMU) Hospital and at Sachal Medical Centre Larkana with effect from Jan: 2002 to Jan: 2011.

**Patients and Methods:** All patients with diagnosis of acute appendicitis were enlisted and randomized to either laparoscopic appendisectomy (LA) or Open appendisectomy (OA). All patient received pre-operative antibiotic. The operative time was calculated beginning with incision or insertion of Trocar till the wound was fully closed. Patients those were converted from LA to OA were considered separately. Assessment regarding the return to normal activity and work determined by questioning during the postoperative follow-up.

**Results:** This randomized study of 1000 cases in which 450 cases underwent OA and 550 patients scheduled for the LA procedure but successfully performed 505 and remaining 55 underwent Lap-Converted open appendisectomy. From this study reveals that the common presentation of appendicitis is simple appendicitis next is perforated appendicitis, while the reasons for lap converted open cases were of appendicular mass, perforated appendicitis, gangrenous appendicitis but 2 cases were noted of having normal appendix with pelvic inflammatory disease (PID). The conversion rate remains higher in our study. Operative time in OA/LA remain 81/40minutes. Wound infection rate in OA/LA remain 5.4%/3.0% Hospital stay in OA/LA 5-6/1-2days. Patient return to normal activity in OA/LA group 14days/7days. However early return to job found in LA than OA group of patients.

**Conclusion:** After the long assessment of this study also compared with world literature that the LA is superior because of less pain, minimum wound infection, less operative time. Having the, cosmetically acceptable small scar, less hospital stay & early return to normal activity and job. Therefore this is mature time to say that LA is superior procedure in our setup while can replace open appendisectomy (OA).

**Key word:** Laparoscopic appendisectomy (LA) and Open appendisectomy (OA).

## INTRODUCTION

Laparoscopic cholecystectomy has been widely accepted as the treatment of choice for symptomatic cholelithiasis[1]but the laparoscopic appendisectomy is now recommended as the procedure of choice for the diagnosis and management if acute appendicitis[2] Appendicitis was first recognized as a disease entity in sixteenth century and was called perityphlitis. McBurne in 1889 described the clinical features of acute appendicitis. Though the open appendisectomy (OA) is used long ago but in 1983, a German Gynecologist Semm performed the first laparoscopic appendisectomy (LA)[3]. Minimal invasive surgery has a considerable impact in the common surgical technique so that after the laparoscopic cholecystectomy, laparoscopic approach for the treatment of acute appendicitis is becoming popular. It is safe, and efficient procedure for all forms of appendicitis[4]. Complicated appendicitis (CA) is a common surgical emergency in childhood, more so in developing countries with poor patient education and limited access to hospital with advance surgical facilities. In the era of minimal surgery there is still controversy regarding the modulatory of treatment for completed appendicitis, whether the open appendisectomy (OA) or laparoscopic appendisectomy (LA)[5]. The aim of this Prospective randomized comparative study is to evaluate the out come of OA versus LA, and also to compare the approach and results with recent international standard practice.

## PATIENTS AND METHODS

All patients from 6 year to 61 years of age with the presumptive diagnosis of acute appendicitis were randomized to have surgery performed using the OA or LA. Before randomization, patients were informed of the risks and benefits of each procedure and signed a consent form to participate in the study, which extended over a 9-year period (From Jan: 2002 to Jan: 2011. All patients received 1 g of ceftriaxone (Safe-one) preoperatively, and the antibiotics were continued based on the clinical course. Patients randomized to the OA group had a McBurney right lower quadrant muscle splitting incision. LA were done using a standardized

approach involving an open technique for trocar insertion. A 10-mm Hassan trocar was placed in the periumbilical area with a 12-mm trocar placed in the right midabdomen and a 5-mm trocar placed in the suprapubic location. The mesoappendix was divided using Endo-Clips and the appendix was divided using an Endo-GIA of yellow clip removed through the 12-mm port. The procedures were performed by consultants at Shaheed Mohtrama Benazir Bhutto Medical University (SMBBMU) Hospital & Sachal Medical Centre at Larkana. Operative time was calculated, from the time of incision until the time of wound closure. The postoperative course was monitored for number of hospital days, and complications. For determination of when patients returned to normal activity and work, they were questioned during follow-up visits.

# RESULTS

This study includes the 1000 patients while under the procedure of OA 450 cases while remaining 550 under went through LA procedure but successfully performed LA 495 while 55 cases were lap converted open. The age ranges from 6-61years but the mean age turn 27.5, while the Gender wise male 672 (67.2%) female 328 (32.8%),while the presentation of appendicitis were such that maximum number of simple appendicitis 570 (75%), perforated appendicitis were 157 (15.7%), appendicular abscess 53 (5.3%) appendicular lump 40 (4.0%) gangrenous appendicitis 74 (7.4%) while some patient were having normal appendicitis 106 (10.6%). Lap-converted open patients were suffering through either appendicular lump, perforated appendicitis or gangrenous appendicitis but two patients had normal appendix with evidence of pelvic inflammatory diseases (Table No.1).

The reasons for conversion to an open procedure included excessive bleeding, inadequate exposure secondary to adhesions in perforated appendix 22 while 16 patients due to appendicular lump 15 patients converted due to gangrenous appendicitis, while 02 patients converted due to pelvic inflammatory diseases where the appendix was within normal limits.

The mean operative time in the OA group was 81 minutes; for the LA group, 40 minutes. The lap converted open patients required 119 minutes for the completion of surgery.

The average hospital stay was 5-6 days in the OA and 1-2 days in the LA group. The operative times were short in the laparoscopic group with acute appendicitis than in the complicated appendicitis. The antibiotic in LA & OA received 2-3 days & 4-6 days respectively.

There were significant differences between the patients in the laparoscopic and open groups regarding time required for return to normal activity 7 days versus 14days, and time required to returned to work was 20 days versus 28 days overall or in any of the groups based on pathology.

The cost of the hospitalization is compared for each group. The overall cost was greater in the OA, but this was not statistically different. The costs in the perforated group were significantly more for those patients having an OA. That the cost in the open perforated group was almost double that in the LA group due to some longer length of stay for the patients in the OA group.

**Table No.1 Demographic characteristics of all appendisectomy patients (n=1000)**

| Parameters | Patients |
|---|---|
| **Age (years)** | |
| Mean | 32.7 |
| Range | 60-61 years |
| **Gender** | |
| Male | 672 (67.2%) |
| Female | 328 (32.8%) |
| **Types of operation** | |
| Open appendisectomy (OA) | 450 (45%) |
| Scheduled to perform (LA) | 550 (55%) |
| • Successfully Perform(LA) | 495 |
| • Converted to open | 55 |

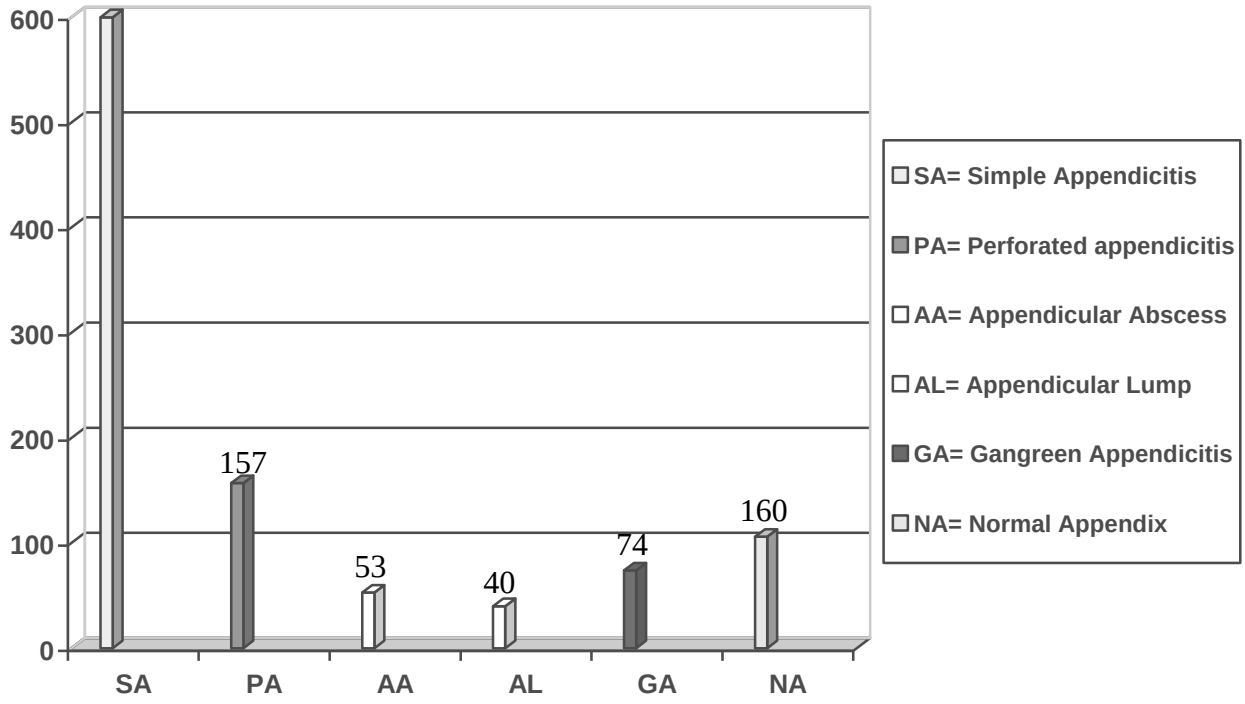
**Table No.2: Comprising of Complications, Mortality, Operative Time and Hospital Stay in OA and LA Group**

| Parameters | OA (505) | LA (495) |
|---|---|---|
| **Complications** | | |
| Wound infection | 28 (5.54%) | 15 (3.03%) |
| Traumatic injury | 03 (.59%) | 03 (.60%) |
| Intra abdominal abscess | 03 (.59%) | 03 (.60%) |
| Incisional Hernia | 03 (.59%) | Nil |
| Port hernia | Nil | 03 (.60%) |
| **Operative Time** | | |
| 35 mints | Nil | 45 (49.4%) |
| 45 mints | Nil | 250 (50.55%) |
| I Hour | 254 (50.2%) | Nil |
| > 1 Hour | 251 (49.7%) | Nil |
| Mean Time | 81mints | 40mints |
| **Hospital stay** | | |
| 1 day | Nil | 200 (40.4%) |
| 2 days | Nil | 295 (59.6) |
| 3-4 days | 222 (43.9%) | Nil |
| 5-6 days | 283 (56.2%) | |
| **Normal activity** | 14days | 7days |
| **Time to return job / work** | 25days | 20days |
| **Intra abdominal abscess** | 03 (.50%) | 03 (.50%) |
| **Wound infection** | 28 (5.54%) | 15 (3.01%) |

There was intra operative complication in the open group, consisting of small-bowel injury in three cases in each group but in LA group Diathermic serosal burns on small intestine wall. There were ten readmissions in

the OA group and nine in the LA group, an average of 4 days and 8 days after discharge, respectively. Reason for readmission was nausea and inability to tolerate a diet.

Wound infections occurred in 28 (5.4%) in OA and 15 (3.0%). Intra-abdominal abscesses occurred in three open and three laparoscopic patients. Each of the intra abdominal abscesses was treated successfully by percutaneous drainage, except for one pelvic abscess in a patient who had an open perforated appendix and underwent transrectal drainage without complication. The incision hernia in OA group 3 cases (.59), but in LA group patients 3 (.60%) cases of port hernia (Table No.2).




**Graph 1: Presentation of Different Types of Appendicitis**

# DISCUSSION

Appendectomies can be performed by open or laparoscopic technique, but to select it which procedure is superior. In this study, we report trends in the surgical treatment of appendicitis at Shaheed Mohtrama Benazir Bhutto Medical University (SMBBMU) Hospital and Sachal Medical Centre Larkana. Most of our patients were underwent open appendisectomy 50.5% while, 49.5% underwent laparoscopy. The age incidence in our study the mean age 27.2 years study by Mustafa Khalid[3] 25.7 Zahoor[8] in his study mentioned 32.7 Soomro el al the mean age is 44 years, Soomro[11] in his other study 45 years.

Incidence of appendicitis ratio, in our study of male and female is 2.1:1. In study of atta male female ratio 1.2:1, larry mention male female ration 1.4:1, study of Zahoor[8] male female ratio 2.1:1, Deepak[6] et al mentioned male female ratio 2.3:1.9, Soomro[5] has mentioned male female ratio 1.2:1.

The conversion rate was 10%. While conversion rate by Zahoor[8] Al is 1.8%, conversion rate by Deepak[6] is 3.3% in early experience of Soomro[10] the conversion rate 8.97% in other study of Soomro[5] conversion rate is 4.4%. In study of Holecz[14]rate is 7.7% while 10% is conversion rate in study byCervini[15].

Wound infection is significantly higher in OA 5.54% versus LA group 3.03%. While compare to world literature in study of larry[7] C, reveals wound infection rate in OA 4.4% versus LA 3.6% but in study of Deepak[6] reveals the wound infection in OA group 43.8% but in LA group 11.5% study of Mustafa[3] Khalid reveals non in LA group versus in OA 5.6%. In study of Saudi Arabia, Zahoor[8] reveals, in OA 2.4% and LA 1.7%. Golub[9] and Colleague found a wound infection rate for LA was less than half of rate in OA group. The reduction on number of wound infection is possible due to small size of port site wound compare with large wound in OA patients. Mean operative time in our study in cases of OA is 81minutes but in LA is 40minutes. Study of Soomro[5] and colleague is 48minutes in LA patients, study of Mustafa Kamal[3] the mean operative time by OA is 55minutes while in LA group is 25minutes another study of Deepak[6] in the mean time of OA is 90.3minutes while in LA patients 86.7mintues. In study of Zahoor[8] mentioned that average time in OA is 84mintues while in LA average time requires 35mintues. In experience of larry[7] C

reveals average time require in OA is 81mintues but in LA group time is 102mintues. In the study of Lorenz [12] time taken 46minutes, Ehleeta[13] by LA 40minutes.

Post operative Stay in our study in OA group minimum 3days maximum 6days (3-6 days) in LA group minimum 1day and maximum 2days (1-2) in study of Soomro[5] mean hospital stay is 24hours, in study of Mustafa Khalid[3] hospital stay in OA patient remains 3days and in LA patients for 24hours. Study of Deepak[6] length of hospitalization in OA group 7.3days while in LA 5.4days. Zahoor[8] mentioned that study in OA patients 2.6days while in LA group 1.89 days. Alvarez[17] discharged his patient in less than 24hours while Soomro[5] in his study mentioned 1day postoperative hospitalization in LA group. Minimum complication and short hospital stay is a clear advantage. Heinzeimann[16] Haleczy[14] similar results were found by several investigation vallina[18], Attwood[19], Anena[20], Tate[21]. Complication other than wound infection like Incisional hernia seen in OA .59% while in LA port hernia is .60%, in study of Soomro[5], Mustafa Khalid[3], Deepak[6], Larry[7] & Zahoor[8] all has mentioned non of the case of Incisional hernia noted in their studies, LA in complicated appendicitis has seen reported after increasing safty, shorter length of hospital stay, less pain and quicker return to normal activity by with fewer complication. Lintula[22], Prasad[23.]

# CONCLUSION

While comparing both of procedure it is observed that in LA there is less operative time, small scar, which is more cosmetic and acceptable, with minimum hospital stay, and early return to normal activity compare to open appendisectomy. But the operative room cost for LA is considerably higher and experience is important. While in OA which can be performed even by a Junior Surgeon, Finally author is of opinion that LA is superior can replace to OA.

# REFERENCES


1. Doubles F, Lard P, Barkat G. Laparscopy-cholecystectomy primary report of 36 cases. Ann Surg 1990;211(1):60.
2. Qzmen MM, Ouglar ZB, Tanik, et al. Laparoscopic versus open appendisectomy randomized trial. 1999;9(3):187-189
3. Mustafa Khalid Hussein Qurishe. laparscopic versus open appendisectomy. Pak J Med Res 2003; 42:35-40.
4. Scott, Corner CEH, Hall TJ, Augtin BL, Maukkassa FF. Laparoscopic initial experiencein training programme. Am Surg 1992;215:660-8.
5. Soomro AH, Memon AA, Dholia KR, et al. An audit of 45 laparoscopic appendisectomies. J LUMHS 2003;2(1):18.29.
6. Deepak, Paekash Agarwal RK, Bagdi S, et al. Lap appendisectomy is a favour alternate for complicated appendisectomy in children. J India associat of Paed Surg 2008;13(3):97-100.
7. Larry C, Martin, Ivan Puenta, et al. Open versus laparoscopic appendisectomy. Annals of Surg 1995;222(3): 256-262.
8. Zahoor Al, et al. Lap versus surgery for clinically diagnosed appendicitis, experience of a single academic institution in western region S.A. Egypt J of Surg 2009;28(4):148-155.
9. Golub R, Siddiqi F, Pohl D. Laparoscopic versus open appendisectomy meta analysis. Am Col Surg 1998;186:545-553.
10. Soomro AH, Kheoram, Saleem M, el al. Experience of 1st 100 cases of laparoscopic surgery. JSP Int 2002;7(3):47-49.
11. Soomro AH. Creation of pneumopertonium by a new technique prior to laparoscopic procedure. J LUMHS 2004;3(1):17-20.
12. Lorenz EP, Ehren G, Schmrdl M, et al. Laparoscopic appendisectomy as slandered procedure/ technique and out come of 409 patients. Zentralbe-chiri 1988;123suppl 4:97-100.
13. Ehleeta HG, Fielit J, Neuman U. Laparoscopic appendisectomy as a routine operation for the treatment of inflammatory disease of appendix. Analysis of 733 Lap-appendisectomies. Zentralbe-chiri 1988;122suppl 4:101-3.
14. Holeczy P, Malia J, et al. Laparoscopic appendisectomy in acute appendicitis. Bratish lek, listy 1999;100(6):321-3.
15. Cervini P, Smith LC, Urbach DR. The surgeon on call is a string factor determining the use of laparoscopic approach for appendisectomy. Surg Endos 2002;16(12):1774-7.
16. Heizeimann M, Schob O, Gianom, et al. Role of Laparoscopic surgery in management of acute appendicitis. Zentralbe-chiri 1999;124(12):1130-6.
17. Alvarez C, Votik AJ. The road to Amibnlatosy laparoscopic management of perforated appendicitis. Am J Surg 2002;179(1):63-6.
18. Vallina VL, Velasco JM, MC Celloch CS. Laparoscopic versus convertial appendisectomy. Ann Surg 1993;218:685-92.
19. Attwood SEA, Hill ADK, Murpshy PG, Thornton J, Stephens RB. A prospective randomized trial of lap versus open laparoscopic appendisectomy. Surg 1992;112:497-501.
20. MC Anena OJ, Austin Q, Connel PR, Hederman WP, Gorey TF, Fitzpatrick J. Laparoscopic versus open appendisectomy, a prospective evaluation. Br J Surg 1992;79:818-20.
21. Tate JJ, Dawson JW, Chung SC, Lavwy, et al. Laparoscopic versus open appendisectomy prospective randomized trial. Lancet 1993;342:633-7.
22. Lintula H, Kokki H, Vanamo K. Single spind randomized clinical trial of laparsocpic versus open appendisectomy in children. Br J surg 2001;88: 510-4.
23. Prasad TR, Chvich, Tacobsen AS. Paediatric laparoscopic appendisectomy safe and effective for stage of appendicitis and concurrent lesion. laparoscopic J Surg 2005;951-77.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