

## **Evaluation of Laparoscopic Appendectomy vs. Open Appendectomy: A Retrospective Study at Aga Khan University Hospital, Karachi, Pakistan**

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### **Abstract**

**Objective:** To compare open and laparoscopic appendectomies and to evaluate the level of efficacy of both types of appendectomy performed at Aga Khan University Hospital (AKUH).

**Methods:** Based on this strong study rationale, a clinical audit of patient's records was performed to evaluate the significance of this technique as a treatment modality. The study population comprised of patients with appendicitis admitted in the Department of Surgery from January 2004 to December 2004. The patients' charts were reviewed to ascertain whether the procedure was done as an acute case or as an elective procedure. The predictor variables explored in this study were: age, gender, ultrasound and CT focused procedure, operative time, post-operative stay, number of hours required for the return of bowel function, use of narcotic analgesia and the total hospital bill of the respective patients.

**Results:** A total of 49 patients' clinical charts were reviewed. Of these, 29 patients had had laparoscopic appendectomies and the remaining 20 had open appendectomies. The mean post-operative stay in days was relatively shorter for laparoscopic appendectomy ( $1.97 \pm 2.3$ ) compared to open appendectomy ( $3.1 \pm 1.8$ ). The average time for the return of bowel movement was remarkably lesser for laparoscopic appendectomy ( $10.6 \pm 8.2$ ) hours than open appendectomy ( $21 \pm 13$ ) hours. Two of the independent variables: CT focused (P-value: 0.01) and operative times in minutes (P-value: 0.06) were found to be significantly associated with the types of appendectomy. Hence our study found that laparoscopic appendectomy, although relatively expensive, is a safe and effective procedure for the removal of appendix over open appendectomy (JPMA 59:605; 2009).

### **Introduction**

Open appendectomy has been a safe and effective operation for acute appendicitis for more than a century. According to the literature, approximately 7% of the population develop appendicitis in their life time, with peak incidence between the ages of 10 and 30 years, thus making appendectomy the most frequently performed abdominal operation.<sup>1</sup> Recently, several authors proposed that the new technique of laparoscopic appendectomy should be the preferred treatment for acute appendicitis. However, unlike laparoscopic cholecystectomy, laparoscopic appendectomy has not yet gained popularity.<sup>2</sup> Furthermore, laparoscopic appendectomy is a new procedure as compared to laparoscopic cholecystectomy. Laparoscopic cholecystectomy is now considered a standard method of performing cholecystectomy and has mostly replaced the old method throughout the world, while appendectomy has yet to achieve such popularity.<sup>3</sup> Since its introduction by Mcburney in 1984, appendectomy has been a treatment of choice for acute appendicitis.<sup>4</sup> Appendicitis is the most common intra-abdominal condition requiring emergency surgery, with a lifetime incidence of six percent. For more than a century, open appendectomy remained the gold standard of treatment

of acute appendicitis and for interval appendectomy. With the advent of new surgical techniques the quest has been raised for minimally invasive techniques for treatment of various surgical ailments. In this respect the most popular ones have been the procedures with minimum hospital stay, less surgical trauma and a better quality of life.<sup>5</sup> This idea is the driving force behind the use of laparoscopic surgery to perform appendectomy. In 1981, Semm, a German gynecologist performed the first laparoscopic appendectomy.<sup>6</sup> Despite its use predating laparoscopic cholecystectomy by 4 years, laparoscopic appendectomy has not gained the same wide spread popularity and enthusiasm. Laparoscopic appendectomy has emerged as a safe procedure, and its potential advantages of shorter hospital stay, early mobilization, early return of bowel function, acceptable complication rate along with the recent enthusiasm of minimally invasive surgery, has led some authors to advocate this approach as the procedure of choice for uncomplicated appendicitis.<sup>7,8</sup> According to a study conducted in Pakistan, in Asian society there is usually one bread earner in the family. If illness befalls him then early return to normal productive life is important.<sup>3</sup> According to another author, laparoscopic appendectomy is associated with less post-operative pain and a shorter post-operative stay than the open technique.<sup>9</sup>

However, the open technique is faster and less expensive than the completely laparoscopic method.

Literature search has revealed that laparoscopic appendectomy was associated with less post-operative pain and a smaller requirement of post-operative narcotic analgesia. In a study done by Ortega et al, a linear pain score was recorded in 135 patients blinded to the procedure of operation by special dressing. This pain score was much less in cases of laparoscopic appendectomy.<sup>10</sup> There have been numerous retrospective and uncontrolled series of laparoscopic appendectomy (LA), as well as 16 prospective randomized studies published to date. Although most of these have concluded that the laparoscopic technique is as good as open appendectomy (OA), there has been considerable controversy as to whether LA is superior or not.<sup>11-14</sup> This study was conducted to compare the outcomes of laparoscopic appendectomy versus open appendectomy in patients with suspected acute appendicitis in the surgical ward of our institution; moreover, to evaluate the effectiveness and safety of laparoscopic appendectomy and conventional "open" appendectomy in the treatment of acute appendicitis.

### Patients and Methods

All adult patients' (> 20 years of age) charts with ICD codes for laparoscopic appendectomy between 1st Jan 2004 to 31st Dec 2004 were reviewed and data was used in this study. The information reviewed also included; age, sex, operation time, qualification of the surgeon (to note whether specialized training was absolutely necessary for this kind of technique or not), time taken for bowel function to restore, use of analgesia, post-operative stay and total charges. Patients operated by all general surgery faculty and residents for appendicitis were included. The procedure was performed both as an elective case for missed and interval appendectomy, and for acute appendicitis. Complete data of all patients who were admitted through the Emergency Department for surgery, with no known co-morbidities, and no previous lower abdominal surgeries were included for chart review. Patients who were identified to be at high risk for general anaesthesia, had a past history of lower abdominal surgeries, signs of perforation, or pre-existing diseases were excluded.

Data was collected by reviewing patient records, hospital charts, hospital bills and patient formulary record. Each patient chart, file and bill was checked by a second year surgery resident and personally by the author; separately to assure quality and validation of the data collected. This data was then merged and entered in SPSS by the second year resident and further validation of the results was done and results were rechecked. For categorical variables, frequencies and proportions were calculated whereas for continuous variables the mean and standard deviation were calculated. We also conducted t-test and chi-square in order to assess the

association of certain variables with the type of appendectomy.

### Results

Information was collected on 49 patients from the records. Of these 20 underwent open appendectomy and 29 patients were subjected to laparoscopic appendectomy. The descriptive characteristics of both groups are shown in Table-1. The mean age for open appendectomy was 23.85 ±

**Table-1: Descriptive characteristics of Lap appendectomy vs. Open appendectomy done in Adult surgical unit, AKUH (01 January 2004 to 31 December 2004).**

Characteristics	n (%)
<b>Lap Appendectomy V/S Open Appendectomy</b>	
<b>Age in years</b>	
Mean (SD)	
(1)	23.8 (2.98)
(2)	32.9 (2.48)
<b>Gender (1)</b>	
Male	21 (42.8%)
Female	08 (16.3%)
<b>Gender (2)</b>	
Male	13 (26.5%)
Female	07 (14.2%)
<b>U/S of pelvis/RIF</b>	
(1) Done	12 (41.3%)
Not Done	17 (58.6%)
(2) Done b	11 (55.1%)
Not Done	09 (45%)
<b>Focused CT for Appendix</b>	
(1) Done	12 (41.3%)
Not Done	17 (58.6%)
(2) Done	02 (10%)
Not Done	18 (90%)
<b>Operative time in minutes</b>	
(1) Mean (SD)	83.17 (25.13)
(2) Mean (SD)	71.4 (18.07)
<b>Number of bowel function return</b>	
(1) Mean (SD)	10.68 (8.26)
(2) Mean (SD)	21.0 (13.05)
Post op stay	
(1) Mean (SD)	1.97 (2.32)
(2) Mean (SD)	3.10 (1.83)

1. Laparoscopic; 2. Open.

13.3 years whereas, for laparoscopic appendectomy it was 32.9 ± 13.3 years. There were younger people in the group of open appendectomy compared to laparoscopic appendectomy. Overall, there were more male patients who had undergone both the surgeries (34 out of 49 patients). Among open appendectomy group, 65% of patients were males, as compared to 72% of laparoscopic appendectomy patients. There was higher number of laparoscopic appendectomy patients who had gone through Focused CT i.e. 41% as compared to open appendectomy i.e. only one percent. The mean number of hours for bowel function to return was higher for open appendectomy as compared to

laparoscopic appendectomy. Moreover, the mean numbers of days of post-operative stay was greater for open appendectomy patients in comparison to laparoscopic appendectomy patients. When conducting a chi-square and t-test, only two of the independent variables CT focused ( $P = < 0.01$ ) and Operative times in minutes ( $P = < 0.06$ ) were found to be significantly associated with the types of appendectomy (Table-2). Overall, there was no significant

**Table-2: Inferential Statistics of Lap appendectomy vs. Open appendectomy done in Adult surgical unit, AKU (01 January 2004 to 31 December 2004).**

Characteristics	P values
Lap Appendectomy V/S Open Appendectomy	
Gender	0.403
Age	0.946
U/s pelvis/Rif	0.259
Focused ct	0.017
Operative time in minutes	0.063
Number of hours for bowel function return	0.136
Post-operative stay	0.952

statistical difference in demographics, operative timings and clinical presentation between laparoscopic and open appendectomy groups.

### Discussion

To our knowledge based on published literature, few studies have been conducted to date in Pakistan on the comparison between laparoscopic appendectomy versus open appendectomy. Laparoscopic appendectomy was found to be safer than open appendectomy, in our review. Multiple studies have shown laparoscopic appendectomy to be safe for both acute and perforated appendicitis, but there have been conflicting reports as to whether it is superior from a cost perspective.<sup>12-14</sup> The findings of this study on the effectiveness of laparoscopic appendectomy over open appendectomy are consistent with previous research. A study performed in Jamshoro also concluded that in comparison to open appendectomy, laparoscopic appendectomy was associated with a shorter hospital stay, decreased wound infection rate, decreased analgesic requirement, earlier return to normal activity and better cosmetic results. Therefore, laparoscopic appendectomy can be safely recommended for acute appendicitis unless laparoscopy itself is contraindicated.<sup>1</sup> Our study showed that laparoscopic appendectomy takes longer to perform with approximately a total of 90 minutes taken in all surgeries done, however; the recovery time is shorter than open appendectomy. A more comfortable post operative course, and lower wound infection rate has been proven. Our findings were consistent with previous study<sup>15</sup> which claimed, that this procedure has less postoperative pain and return to work in less than one week. The results of a meta analysis comparing LA and OA in Pakistan, shows clearly that LA

results in significantly less post operative pain, shorter hospital stay and quick resumption to work.<sup>3</sup>

The hospital costs of laparoscopic appendectomy are higher; however, laparoscopic appendectomy offers significant savings to patients due to quick recovery time. Our study has certain strengths like it was inexpensive and time saving. We utilized the already present data for our study. However, the limitations are the small sample size due to which we were not able to see the statistical significance of some of the potential variables like number of hours to bowel return and post-op stay. Moreover, we did not control the confounding effect of some of the independent variables in our analysis.

### Conclusion

This comparative retrospective patient chart review showed that laparoscopic appendectomy is a safe and effective procedure as compared to open appendectomy. It decreases the length of post-operative hospital stay, earlier resumption of normal bowel movement, and less narcotic analgesia administration. Although the cost associated with laparoscopic appendectomy is higher than open appendectomy, the recovery and outcomes are more pronounced for laparoscopic appendectomy.

### Acknowledgements

We thank Dr. Khurshid Khowaja, Director Nursing, for encouragement and guidance, Dr. Sanah Baig, Writer-in-Residence; we would also like to express our utmost gratitude towards the patients whose charts were reviewed for this paper.

### References

1. Kumar B, Samad A, Khanzada TW, Laghari MH, Shaikh AR. Superiority of Laproscopic appendectomy over open appendectomy: The Hyderabad experience. *Rawal Med J* 2008; 33: 165-8.
2. Peiser JG, Greenberg D. Laparoscopic versus open appendectomy: results of a retrospective comparison in an Israeli hospital. *Isr Med Assoc J* 2002; 4: 91-4.
3. Kehagias I, Karamanakos SN, Panagiotopoulos S, Panagopoulos K, Kalfarentzos F. Laparoscopic versus open appendectomy: which way to go? *World J Gastroenterol* 2008; 14: 4909-1.
4. McBurney C. IV. The Incision Made in the Abdominal Wall in Cases of Appendicitis, with a Description of a New Method of Operating. *Ann Surg* 1994; 20: 38-43.
5. Chung RS, Rowland DY, LiP, Diaz J. A meta-analysis of randomized controlled trials of laparoscopic versus conventional appendectomy. *Am J Surg* 1999; 177: 250-6.
6. Semm K. Endoscopic appendectomy. *Endoscopy* 1983; 15: 59-64.
7. Gross E, et al. Laproscopic versus conventional appendectomy - a comparison with reference to early postoperative complication. *Zentralbl Chir* 1998; 123: 858-62.
8. Tranoff M, Atabek U, Goodman M, Alexander JB, Chrzanowski F, Mortman K, et al. A comparison of laparoscopic and open appendectomy. *J Soc Laparoendosc Surg* 1998; 2: 153-8.
9. Nicholson T, Tiruchelvam V. Comparison of laparoscopic-assisted appendectomy with intracorporeal laparoscopic appendectomy and open appendectomy. *J Soc Laparoendosc Surg* 2001; 5: 47-51.
10. Ortega AE, Hunter JG, Peters JH, Swanstorm LL, Schirmer B A prospective,

- randomized comparison of laparoscopic appendectomy with open appendectomy. Laparoscopic Appendectomy Study Group. *Am J Surg* 1995; 169: 208-12.
11. Golub R, Siddiqui F, Pohl D. Laparoscopic versus open appendectomy: a metaanalysis. *J Am Coll Surg* 1998; 186: 545-53.
  12. Katkhouda N, Mason RJ, Towfigh S. Laparoscopic versus open appendectomy: a prospective, randomized, double-blind study. *Adv Surg* 2006; 40: 1-19.
  13. Katkhouda N, Mason RJ, Towfigh S, Gevorgyan A, Essani R. Laparoscopic versus open appendectomy: a prospective randomized double-blind study. *Ann Surg* 2005; 242: 439-48.
  14. Ignacio RC, Burke R, Spencer D, Bissell C, Dorsainvil C, Lucha PA. Laparoscopic versus open appendectomy: what is the real difference? Results of a prospective randomized double-blinded trial. *Surg Endosc* 2004; 18: 334-7.
  15. Hashimoto D, Nayeem SA, Hoshino T. *Abdominal Wall Lifting and Advanced Techniques in Laparoscopic Surgery: Abdominal Wall Lifting With Subcutaneous Wiring*, 1995. World Scientific: New York.
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