

A COMPARATIVE STUDY OF LAPAROSCOPIC APPENDICECTOMY VERSUS OPEN APPENDICECTOMY**Pramod D. Nichat, Sanjtkumar M. Sant, *Dr. Kavita V. Jadhav, Rukmini Waghmare**

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ABSTRACT

Appendicitis is one of the best known medical entities often requiring removal of the inflamed appendix. It is sometimes confusing and often a treacherous cause of acute abdomen at all ages, which requires utmost skill and care of the attending surgeon besides good clinical evaluation.^[1] **Aims and objectives:** To compare the effectiveness of laparoscopic and conventional open appendicectomy in the treatment of acute appendicitis over duration of procedure, post operative pain, complications, wound infection, return to bowel activity, subjective full recovery and return to normal activity, post operative length of hospital stay, cost analysis, cosmetic benefit. **Material & methods:** Present study is prospective observational comparative type of study. It was conducted at tertiary hospital of Mumbai. Total 100 patients were included with clinical features suggestive of acute appendicitis with alvarado score >7. They were divided in two groups as to be operated with laparoscopy and to be operated with open approach. Patients with <12 years of age, patients with appendicular mass or lump or abscess or with pregnancy were excluded from study. **Results:** Laparoscopic appendicectomy was found to be better than open appendicectomy with respect to lesser postoperative pain, lesser duration of postoperative hospital stay, lesser rate of wound infection and post operative complications, earlier return to normal day to day activities and better cosmesis. However, these advantages outweighs drawbacks of more operating time and cost for laparoscopic appendicectomy. **Conclusion:** The change in the surgical approach from open to laparoscopic appendicectomy in management cases of uncomplicated appendicitis is safe and effective even in emergency.

KEYWORDS: Laparoscopic Appendicectomy, Open Appendicectomy.**INTRODUCTION**

Acute appendicitis is one of the most common surgical emergency and appendicectomy is most commonly performed emergency surgery worldwide. Appendicectomy carries a complication rate of 4-15%, as well as associated costs and the discomfort of hospitalization and surgery.^[2] Therefore, the goal of the surgeon is to make an accurate diagnosis as early as possible.

Delayed diagnosis and treatment account for much of the mortality and morbidity associated with appendicitis. The overall mortality rate of 0.2-0.8% is attributable to complications of the disease rather than to surgical intervention. The mortality rate in children ranges from 0.1% to 1%; in patients older than 70 years, the rate rises above 20%, primarily because of diagnostic and therapeutic delay.^[3]

For almost a century, open appendicectomy (OA), first described by Charles McBurney in 1889, has remained the gold standard treatment for acute appendicitis.

It is considered a safe, effective procedure with a low morbidity rate.

Laparoscopic appendicectomy was first described by Kurt Semm in 1983,^[4] and the application of the laparoscopic approach for acute appendicitis was first reported by Schreiber in 1987.^[5]

With advances in technology and the surgical technique, laparoscopic appendicectomy has become the novel alternative in the treatment of appendicitis in the last 3 decades. Despite the publications of numerous randomized trials, which compared open and laparoscopic appendicectomy, the indications for laparoscopy in patients with suspected appendicitis remain controversial.

This study aims at comparing the efficiency of open and laparoscopic appendicectomy for the treatment of acute and recurrent appendicitis and to arrive at a conclusion as to the best modality of treatment after comparison morbidity in relation to standard published material.

AIMS AND OBJECTIVES

To compare the effectiveness of laparoscopic and conventional open appendicectomy in the treatment of acute appendicitis over duration of procedure, post operative pain, return to bowel activity, wound infection, complications, subjective full recovery and return to normal activity, post operative length of hospital stay, cosmetic benefit, cost analysis.

METHODS AND MATERIAL

It was a prospective observational Comparative study. Study cases are to be selected from In Patient Department (IPD) and Out Patient Department (OPD) of Department of General Surgery, tertiary care hospital of Mumbai.

Patients with age >12 years with a clinical presentation, examination and sonographic findings consistent with the diagnosis of appendicitis or Patients with ALVARADO score >7 were included in study. Patients with <12 years of age, patients with appendicular mass or lump or abscess or with pregnancy were excluded from study.

As per inclusion criteria, subjects with written consent form were included in study.

They were divided into 2 groups with 50 patients in each group as:

- Group 1: Patients operated with laparoscopic appendicectomy (LA)
- Group 2: Patients operated with open appendicectomy (OA)

Patient data was collected according to information in case record sheet and Preoperative, intraoperative and post operative findings were noted. Each subject underwent following routine investigations as hemoglobin, total leukocyte count, differential leukocyte count, blood sugar level, erythrocyte sedimentation rate, renal and liver function tests, chest radiograph and electrocardiogram and ultrasonography of abdomen and pelvis.

A single dose of pre operative antibiotic was given followed by same for 3 days postoperatively or less. Analgesic like diclofenac injection was given postoperatively for 2 days or less or sos.

The patients were discharged when tolerated oral feed and deemed fit and were asked to come for regular follow up after 7 days then 1,3,6 months postoperatively.

Outcome measures in terms of duration of surgery, post-operative pain at the incision site, complications such as rate of wound infection, return of bowel peristalsis and starting of oral liquids, duration of hospital stay, functional index, cosmetic benefit (scar size & external appearance).

All observations were analyzed statistically. Multiple linear and logistic regression analyses were used to assess the endpoints. All values are expressed as the mean value. The significance of differences between the groups was tested using Students *t* test and standard error of difference between two means was calculated ($P < 0.05$) was considered significance. The observation and inference are drawn from only those cases that were evaluated, investigated, and followed up.

RESULTS AND DISCUSSION

In present study the average duration of laparoscopic appendicectomy (LA) is 59.69 min and open appendicectomy (OA) is 40.08 min ($p < 0.001$). Biondi *et al* (2016)^[6] in his study found that operative time was significantly shorter in the open group (31.36 ± 11.13 min in OA and 54.9 ± 14.2 in LA). Heikkinen T.J *et al*,^[7] also concluded that the duration for laparoscopic appendicectomy is significantly longer than open appendicectomy. Ortega AE *et al*,^[8] in his study found out that the only disadvantages to the laparoscopic approach were slightly increased operative time.

An average post operative pain visual analogue scale (VAS) of laparoscopic surgery as 2.57 and open surgery as 4.14 ($p < 0.001$). This was because of longer incision, stretch of muscles and wound infection in OA group. Moses Ingty *et al*,^[9] in his study had pain score Of 2.72 +/- 0.89 for open group as compared to 1.28 +/- 0.46 in laparoscopic group ($P < 0.05$).

In present study, return to bowel activity is within 1.72 days in lap and 1.90 in open cases (p value < 0.02). Kehagias Ioannis *et al*,^[10] observed Bowel movements in the first postoperative day were observed in 92% patients subjected to laparoscopic appendicectomy and 67% in the open group ($P < 0.001$). Biondi *et al*⁶ found that hospital stay was significantly shorter in laparoscopic group ($P = 0.015$) with a concomitant earlier bowel movements in patient managed laparoscopically, leading to earlier feeding and discharge from hospital.

In present study, wound infection was seen in 2(4%) Laparoscopic cases and 7(14%) in Open cases. (p value < 0.05). Gundavda MK *et al*,^[11] found The risk of wound infection is less in laparoscopic appendicectomy compared to the open procedure.

Ortega *et al* 137 concluded that wound infection is greater in open appendicectomy cases as compared to laproscopic procedure. Marzouk M. *et al*,^[12] got result in which wound infection was significantly higher in the open group than in the laparoscopic group.

In present study, complications developed in 4 cases (8%) after laparoscopic surgery and in 9 cases (18%) after open surgery. The complications which were observed were paralytic ileus, diarrhoea, urinary tract infection. No cases of intra abdominal abscess was found

in any of the group. Azaro EM et al (1999),^[13] in his study found that (6.9%) presented with postoperative complications who underwent LA, while (18.3%) from OA presented with postoperative complications.

In present study subjective full recovery and return to normal activity time was 7-12 days in laparoscopic surgery with mean duration of 9.52 days and 15-23 days with mean of 19.22 days in open surgery. Time required for full recovery in laparoscopic surgery is less and found to be significant. ($p=0.005$). Moses Ingty et al,^[9] study revealed that the return to normal activity was early for laparoscopic group 13.52 +/- 2.24 days as compared to open group 20.80 +/- 6.28 days.

The average post operative length of hospital stay is 2-3 days in LA with mean duration of 1.94 ± 0.62 and 2-6 days in OA with mean of 3.70 ± 1.01 ($p < 0.001$). Moses Ingty et al,^[9] found duration of post operative hospital stay was significantly low for laparoscopic group 2.84 ± 0.9 as compared to open group 7.68 ± 2.38 .

Cosmetic benefit is defined in terms of scar size (cm) and external appearance. In present study cosmetic

benefit ranges from 1.5-2.5 cm and average of scar size is 2.026 cm in laparoscopic surgery and 5-7.5 and average of scar size is 6.192 cm in open surgery. Scar size for laparoscopic surgery is less and found to be significant ($p=0.05$). Gundavda MK et al,^[11] concluded that regarding cosmetic benefit, most patients in the LA group were highly satisfied by their scar size (almost hidden) as compared to the OA group.

In our study cost of laparoscopic surgery ranges from 5000-7000/-Rs and average cost is 5960/-rs. Cost of open surgery ranges from 3500-5500/-Rs and average cost is 4350/- Rs. ($p < 0.001$). R.J. Kurtz and T.M. Heimann,^[14] in his study concluded that the hospital cost of laparoscopic appendectomy was greater than that for open appendectomy but the extra expenditure in the operating room was offset by the longer length of stay of the patients having open surgery.

This reduction of length of hospital stay has a direct impact on costs. So, though the cost of LA is higher than OA, the difference in total cost between the two procedures is decreased by shorter length of stay and earlier return to work life.

| Type of Surgery | Avg. Duration of procedure | Avg. Post operative pain VAS | Return to bowel activity | Complications | Wound infection | Avg. Post operative length of hospital stay | Subjective Full recovery and return to normal activity | Cosmetic Benefit | Cost analysis |
|-----------------|----------------------------|------------------------------|--------------------------|---------------|-----------------|---|--|----------------------------|---------------|
| LAP | 59.69 mins | 2.57 | 1.98 days | 4 patients | 5 patients | 1.94 | 7-12 days (average 9.52 days) | Range 1.5-2.5 Avg 2.026 | Avg 5960/-rs |
| OPEN | 40.08 mins | 4.14 | 1.98 days | 9 patients | 7 patients | 3.7 days | 15-23 days (average 19.22 days) | Range 5-7.5 Avg 6.192 | Avg 4350/-rs |

CONCLUSION

Laparoscopic appendectomy was found to be better than open appendectomy with respect to postoperative pain, lesser rate of wound infection and post operative complications, earlier return to normal day to day activities, lesser duration of postoperative hospital stay and better cosmesis. These advantages definitely outweigh the time and cost drawback for laparoscopic appendectomy.

So, we conclude that the change in the surgical approach from open to laparoscopic appendectomy in management of cases of uncomplicated acute appendicitis is safe and effective, even in emergency.

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