

Comparative Study of Laparoscopic Appendicectomy versus Open Appendicectomy

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Abstract

Introduction: Acute appendicitis is a common indication for abdominal surgery with a life time incidence between 7% and 9% and appendicectomy is one of the most common surgical procedures.

Aims and Objectives: It is a stratified randomized comparative study. To study and compare laparoscopic (LA) and open appendicectomy (OA) with respect to duration of operation, post-operative pain, resumption of bowel sounds, post-operative complications, and duration of hospitalization.

Materials and Methods: This study is done in the Department of General surgery, Mahatma Gandhi Memorial Hospital, (Kakatiya Medical College), Warangal, Telangana, from January 2013 To September 2014. The total study sample consisted of 60 subjects. These subjects were randomly divided into two groups underwent OA and other group underwent LA. It was stratified randomized comparative study.

Results: In this study sample size is 60. (Lap - 30, open -30). All study samples had met inclusion criteria for acute appendicitis. The mean duration of surgery in OA is less when compared to LA. Wound infection was found to be more in OA than LA. Mean pain score was found to be more in OA than LA. Resumption of bowel sounds was earlier in LA than in OA. The mean duration of hospital stay in LA is less when compared to OA.

Conclusion: On analyzing the data, we find difference in outcome between laparoscopic and OA in selected patients. The LA was better than OA with regards to post-operative pain, resumption of bowel sounds, post-operative complications, and duration of hospital stay. Even though, the duration of surgery was more than the OA.

Key words: Appendicectomy, Appendicitis, Laparoscopy

INTRODUCTION

Acute appendicitis is a common indication for abdominal surgery with a life time incidence between 7% and 9% and appendicectomy is one of the most common surgical procedures.¹

Open appendicectomy (OA) performed through the right lower quadrant incision was first described by Charles McBurney in 1894 and has been safe and effective

operation for acute appendicitis for more than a century.^{2,3} With the advent of new surgical techniques, the quest has been raised for minimally invasive techniques for treatment of various surgical ailments for minimum hospital stay, less surgical trauma, and a better quality of life.

In 1981, Semm, a German gynecologist performed the first laparoscopic appendicectomy.⁴ Since, then, this procedure has been widely used. LA has emerged as safe procedure, and its potential advantages^{5,6} are short hospital stay, early mobilization, early return of bowel function, less complication, and less post-operative pain. On the contrary, laparoscopic appendicectomy consume more operating time^{7,8} and associated with increased costs.⁹

Few studies had found no such benefits¹⁰ or even favored OA.

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Laparoscopic appendectomy (LA) has gained popularity in recent years and has become one of the most performed procedures using the laparoscope globally. However, it has not become the universal gold standard for acute appendicitis as laparoscopic cholecystectomy has become for acute cholecystitis.

This study was done to compare the results of OA with laparoscopic appendectomy in terms of duration of operation, post-operative pain, wound infection rate, and hospital stay.

Aims and Objectives

- To study and compare laparoscopic and OA with respect to
 1. Duration of operation.
 2. Post-operative pain.
 3. Resumption of bowel sounds.
 4. Post-operative complications.
 5. Duration of hospitalization.

MATERIALS AND METHODS

This study is done in the Department of General surgery, Mahatma Gandhi Memorial Hospital, (Kakatiya Medical College), Warangal, Telangana, from January 2013 to September 2014.

Methodology

Written informed consent was taken from all patients of appendicitis. Complete history was taken, thorough general examination, physical examination with necessary investigations such as complete blood examination, ultrasound abdomen, and other routine investigations were done.

After confirmation of the diagnosis, the case was posted for open or laparoscopic.

Appendisectomy as per randomized allocation of two groups. Intraoperative parameters such as type of anesthesia, operative time, intraoperative complications, and reasons for conversion of LA to OA were noted.

Post-operative parameter such as post-operative pain and post-operative ileus, wound complications such as dehiscence, seroma formation, surgical site infections, and duration of hospital stay was checked. All the data were entered into pre-structured proforma and results were analyzed.

The total study sample consisted of 60 subjects. These subjects were randomly divided into two groups underwent OA and another group underwent LA. It was stratified randomized comparative study.

The study sample age was between 15 and 60 years and both the sexes were included in the study. The diagnosis of appendicitis was made on the following criteria:

- History of right lower quadrant pain or periumbilical pain migrating to the right lower quadrant with nausea and/or vomiting.
- Fever of more than 99°F
- Leukocytosis above 10,000 cells per mL.
- Right lower quadrant tenderness and guarding on examination.

The following patients were excluded from the study:

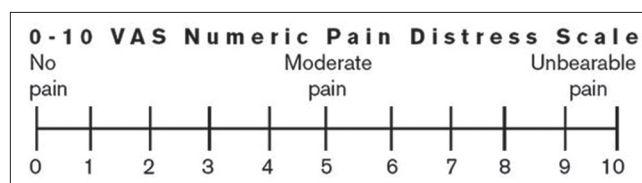
- Patients excluded if diagnosis of appendicitis was not clinically established.
- Appendicular mass.
- A palpable mass in the right lower quadrant, suggesting an appendiceal abscess treated with antibiotics and possible percutaneous drainage.
- Patients with Meckel's diverticulitis were excluded.
- Previous history of abdominal surgeries.
- Contraindication to general anesthesia (severe cardiac and/or pulmonary disease).
- Appendicitis in pregnant patients.

Tools

- Self-structured intake proforma to collect necessary details.
- Pain scale - visual analog scale (VAS).

VAS

- A VAS¹⁰ is a measuring instrument that subjectively measures the amount of pain that a patient feels.
- Scores range from 0 to 10 and are interpreted as “no pain” to “worst possible excruciating pain.”



- Resumption of bowel sounds was checked using stethoscope.

Post-operative complications - wound infection was recognized by erythema or purulent discharge from surgical site.

RESULTS

In this study, 59% are males and 42% are females.

In this study, 73% inflamed appendix in LA group and all cases in OA group.

Table 1: Age wise distribution n=60

Age (in years)	n (%)		Total
	OA n=30	LA n=30	
15-20	8 (26.66)	6 (20.00)	14 (23.33)
21-30	14 (46.66)	20 (66.66)	34 (56.66)
31-40	4 (13.33)	4 (13.33)	8 (13.33)
41-50	3 (10.00)	0 (0)	3 (5.00)
51-60	1 (3.33)	0 (0)	1 (1.66)
	30 (100)	30 (100)	60 (100)

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 2: Gender wise distribution n=60

Sex	n (%)		Total
	OA n=30	LA n=30	
Male	18 (60.00)	17 (56.66)	35 (58.33)
Female	12 (40.00)	13 (43.33)	25 (41.66)
	30 (100)	30 (100)	60 (100)

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 3: Ultrasound findings n=60

Results	n (%)		Total
	OA n=30	LA n=30	
Normal	0 (0)	8 (26.66)	8 (13.33)
Abnormal (appendicular mass, abscess)	0 (0)	0 (0)	
Inflamed	30 (100)	22 (73.33)	52 (58.66)
	30 (100)	30 (100)	60 (100)

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 4: Results of surgery n=60

Details	n (%)		Total
	OA n=30	LA n=30	
Pathology noted			
Normal	1 (3.33)	4 (13.33)	5 (8.33)
Inflamed	29 (96.66)	26 (86.66)	55 (91.66)
	30 (100)	30 (100)	60 (100)

OA: Open appendectomy, LA: Laparoscopic appendectomy

8% showed normal appendix in LA group were operated because the patients were having tenderness in McBurney's point.

As per the reports of histopathology, inflamed appendix was noted in 86% of LA group and 96% in OA group.

Only one case was converted from LA to OA. The reason was intraoperative bleeding.

The mean pain on day 1 in OA group was 2.46 on VAS, whereas in LA group, it was 2.36.

The mean duration for return of bowel sounds in OA group was 53 h, whereas in LA, it was 44 h.

Table 5: Duration of surgery n=60

Parameter	OA n=30	LA n=30
Duration of surgery (min)	90.67	99.00
Range (in min)	60-120	60-150

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 6: Conversion to open n=60

Parameter	Number of cases (%)
Conversion from LA to OA	1 (3.33)

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 7: Pain score n=60

Details	n (%)	
	OA n=30	LA n=30
Pain score 0 to 4	28 (93.33)	29 (96.66)
Pain score 5 to 10	2 (6.66)	1 (3.33)
Mean scores	2.46	2.36

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 8: Return of bowel sounds n=60

Parameter	OA n=30	LA n=30
Time taken to return of bowel sounds (in hrs)	53.33	44.67

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 9: Wound infection n=60

Treatment	n (%)	
	OA n=30	LA n=30
Wound infection present	7 (23.33)	2 (6.66)

OA: Open appendectomy, LA: Laparoscopic appendectomy

Table 10: Duration of hospital stay n=60

Parameter	OA n=30	LA n=30
Total duration of hospital stay (days)	8.03	4.26

OA: Open appendectomy, LA: Laparoscopic appendectomy

Wound infection in OA group is 23% and in LA group is 7%.

The mean duration of hospital stay in OA group was 8.03 days, whereas it was 4.26 days in LA group (Tables 1-10).

DISCUSSION

In this study, the mean duration for OA was 90 min, whereas for LA it was 99 min. It is comparable with other studies. Duration of surgery was dependent on competency and skill of the surgeon, availability of the equipment, trained staff, in most of the other studies including this study. However, one study is showing less time for LA (57.3 min)

than OA (62.4 min) as it was conducted in a well-equipped laparoscopic center. LA was associated with less pain in post-operative period in most studies. LA has less pain on VAS in post-operative period because the tissue handling, muscle cut, and nerve damage are less when compared to OA in other studies including this study.

Bowel sounds returned earlier in LA than in OA. LA allows early return of bowel sounds and early acceptance of solids.

Resumption of bowel sounds was earlier because there was less handling of bowels and nil exposure to external environment in LA when compared to OA.

Hence, acceptance of oral feeds will be earlier in LA (1.5 days) than OA (2.5 days) in this study and in other studies.

Wound infection is higher in OA group because of bacterial contamination, whereas they are less in LA group as appendix after separation from the base was placed in glove bag and was removed out. The infection rate is higher in OA group in this study as well as in other studies.

Wound infection is less in LA group in all studies. This helps in faster recovery of the patient and decreased hospital stay.

OA (8.03 days) has long duration of hospital stay because resumption of bowel movements is late, postop pain is more, wound infections are more when compared to LA (4.26 days) in this study and other studies.

LA patients are discharged earlier than OA group. This helps in earlier return to work.

Only one case was converted from LA to OA as there were adhesions and intraoperative bleeding and failure to progress in this study.

The most common reason for conversion was failure to progress due to adhesions.

CONCLUSION

On analyzing the data, we find difference in outcome between LA and OA in selected patients.

The LA was better than OA with regards to post-operative pain, resumption of bowel sounds, post-operative complications, and duration of hospital stay. Even though, the duration of surgery was more than the OA.

All the above-mentioned are the advantages for the laparoscopic patients to resume back to their working hours at the earliest when compared to OA cases.

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