



A Comparative Study of Open Versus Laparoscopic Appendicectomy in Acute Appendicitis

KEYWORDS

Acute appendicitis, open appendicitis, laparoscopic appendicitis

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ABSTRACT The present study was conducted in order to compare safety, efficacy and treatment benefits of Laparoscopic appendicectomy versus traditional Open appendicectomy in acute appendicitis. 100 patients of acute appendicitis admitted in surgical wards of government hospital were included in this study and alternately allotted to open and laparoscopic appendicectomy. The mean age of patients undergoing open and laparoscopic appendicectomy was 25.78 and 24.06 yrs. The male to female ratio for open appendicectomy group was 2:1 whereas it was 1.5:1 for those who underwent laparoscopic appendicectomy. The mean duration of operation was 35 minutes for open group and 45 minutes for laparoscopic appendicectomy. The laparoscopic group had significantly less requirement of analgesia post operatively (4 doses of Diclofenac Sodium Vs 7.76 doses) as compared to the open appendicectomy group. The time required for resumption of oral fluids (1 Vs 3 days), solid diet (2 vs 4 days), hospital stay (3 vs 5 days) and return to full working activity (7 vs 15 days) was significantly less in the laparoscopic appendicectomy group than in open appendicectomy group. We conclude that laparoscopic appendicectomy is a safe, efficient and feasible option for open appendicectomy.

Introduction

Acute appendicitis is the most common cause of an acute abdomen in young adults and as such the associated symptoms and signs have become a paradigm for clinical teaching. Appendicitis is sufficiently common that appendicectomy is the most common performed emergency abdominal operation and is often the first major procedure performed by a surgeon in training. Lawson Tait was the first surgeon to do deliberate appendicectomy. Claudius Amyand operated on a 11 year old boy with long standing scrotal hernia with perforated appendix in it.¹ Dekok performed the first laparoscopic guided appendicectomy utilizing a mini laparotomy to extract appendix in 1977.² In 1983, Semm introduced the laparoscopic technique of appendicectomy.³ The potential for laparoscopic appendicectomy to improve patient outcomes and reduce healthcare costs led to several randomized trials for open and laparoscopic appendicectomy, demonstrating that laparoscopic approach is safe and could shorten hospital stay.⁴ The present study was conducted in order to compare safety, efficacy and treatment benefits of Laparoscopic appendicectomy versus traditional Open appendicectomy in acute appendicitis.

Material and Method-

The study was conducted in a Government medical college and hospital over a period of eighteen months as a hospital based prospective study. The aim of the study was to compare laparoscopic appendicectomy with open appendicectomy in acute appendicitis for: Duration of operation, Post Operative analgesic requirement, post operative complications, time required for resumption of oral and solid intake, hospital stay and return to full work activity. 100 patients of acute appendicitis admitted in surgical wards of government hospital were included in this study.

A detailed clinical examination was carried out of all patients with respect to cardinal symptoms & signs for acute appendicitis.

Symptoms – Sudden onset pain, generally starting in periumbilical area & radiating to Right Iliac fossa, Nausea, Vomiting, Fever.

Signs – Tenderness in Right Iliac fossa, rebound tenderness, localized guarding, tachycardia.

Each case was thoroughly investigated with routine laboratory

investigations (TLC, DLC among others) and Radiological investigations (Chest X ray in patients >35 yrs age, USG abdomen & Pelvis – to rule out urinary calculus, complications of appendicitis like appendicular lump/abscess)

Exclusion criteria was – 1. Patients with appendicular mass or abscess.

2. Pregnant female patients.
3. History of previous laparotomy.

Patients selected for the study were alternatively posted for open and laparoscopic appendicectomy. All cases were done by senior surgeons with experience in laparoscopic and open surgery of minimum 3 years. All patients were given Injection Cefotaxime 1 gm pre operatively. Open appendicectomy was done using McBurney's Incision (Grid iron muscle splitting incision), External oblique aponeurosis incised, internal oblique and transverses abdominus muscle fibres split and peritoneum opened. Mesoappendix was divided between ligatures to reach appendix base. Appendix was crushed and transfixed at base with silk and cut leaving behind a stump of 1 cm which was buried using purse string suture in caecum. Distal 2 feet of ileum was traced to rule out meckels diverticulum. Wound was closed in layers (peritoneum and muscles with vicryl, aponeurosis and skin with Nylon).

Laparoscopic appendicectomy was done in supine position with 20° right side up position. The first trocar (10mm) was introduced with open technique in infraumbilical region. Pneumoperitoneum was created using CO2 insufflator. 30° telescope was used for visualisation through infraumbilical port. Second 10 mm port was passed in suprapubic region in mid-line and third 5 mm port was introduced in right iliac region. Suprapubic port was used as camera port and infraumbilical and iliac port were used as dissecting ports. Mesoappendix was cauterized using bipolar forceps and cut to reach base of appendix. Base of appendix was ligated using 2 preformed catgut loops, cutting it above the 2 knots. Appendix was removed carefully via 10mm port. Hemostasis was confirmed, Pneumoperitoneum evacuated, trocars removed and ports sutured with nylon. Operating time was recorded and defined as time required from incision to closure of incision. In addition to the routine proforma each case was also evaluated for – 1. Procedure done – open/ laparoscopic appendicectomy, 2. Operative time. 3. Intraoperative complications. 4. Post operative complications. 5. No of doses of Diclofenac

Sodium required for pain relief. 6. Time to resume liquids and solid food. 7. Wound complications – serous discharge, pus discharge, wound gaping. 8. Hospital stay. 9. Follow up at 10th, 15th and 30th day. 10. Histopathology report. 11. Return to full activity.

Discussion-

Laparoscopic Appendectomy predates laparoscopic cholecystectomy. Many studies have demonstrated that laparoscopic appendectomy has all the potential benefits of minimal access surgery and lower complication rates, shorter hospitalization and rapid recovery and return to normal activity.^{2,5,6,7,8} However some studies have failed to show any advantages of laparoscopic appendectomy over open appendectomy.^{4,9,10,11} The cost of laparoscopic appendectomy has shown to be much higher than open appendectomy.^{5,6,9} The incidence of pelvic abscess formation is also more in laparoscopic appendectomy than in open procedure. Both open and laparoscopic groups were comparable in terms of demographic profiles. The range of age of patients in the present study was between 10 years to 45 years. The highest incidence 61.60% was found between the age of 16 and 40 years. The mean age of patients in both groups was comparable.

Table 1

Procedure	Mean Age (S.D) years
Open Appendectomy	25.78 (7.46)
Laparoscopic Appendectomy	24.06 (8.28)

In the present study male were found to have a higher incidence 63% of appendicitis as compared to the females (37%) giving male to female ratio of 1.7:1. In the Open group the male to female ratio was 2:1 whereas it was 1.5:1 in the Laparoscopic appendectomy group.

Table 2

Procedure	Male	Female	M:F ratio
Open Appendectomy	33	17	2:1
Laparoscopic Appendectomy	30	20	1.5:1

The Mean duration of operation for laparoscopic appendectomy was longer than open appendectomy group which was 45 and 35 minutes respectively. The average operating times for laparoscopic appendectomy ranges between 20 minutes to 104 minutes in different studies. The minimum time required is by Pier et al 12(1991) who performed 625 laparoscopic appendectomies and required average 20 minutes. Kum et al 7(1993) and Schriener et al 12(1993) found no significant difference in operating time between the two groups. In the present study the comparatively less time required for laparoscopic appendectomy as compared to other studies may be because in our series all the cases were done by senior surgeons having experience of doing advanced laparoscopic surgeries.

McAnena et al ¹⁴(1991), Kum et al ⁷(1993) and Tate et al ⁶(1993) observed that the number of doses of intramuscular analgesic were significantly lesser in laparoscopic appendectomy group than those undergoing open surgery. Hellberg et al ¹⁵(1999) found post operative pain to be lesser in laparoscopic appendectomy patients than open appendectomy patients. Klinger et al ¹⁶(1998) found no significant difference in consumption of analgesic medication between the two groups. In the present study the analgesic requirement for laparoscopic appendectomy group (4.4 doses of intramuscular Diclofenac Sodium) was significantly lesser than that for open group patients (7.76 doses).

The conversion rate of laparoscopic appendectomy to open appendectomy ranges from 2.24 % to 31% in different series.^{6,12,13,15} Most of the conversions were due to difficulty in

mobilization due to formation of mass or perforated gangrenous appendicitis. The conversion rate in the present study was in the above range of 4 % (2 out of 50 laparoscopic appendectomies). One case was converted to open because of difficulty in separating adhesions and mobilizing appendix and the other was converted to open because of inability to control the bleeding during laparoscopic appendectomy.

In the present study there was a significant difference between open and laparoscopic groups for time required for resumption of fluids. The time for resumption of fluids and solid food was 3rd day & 4th day in open appendectomy group whereas it was 2nd & 3rd day in laparoscopic appendectomy group.

McAnena et al ¹⁴(1992) noted significant decrease in hospital stay after laparoscopic appendectomy. Similar results were obtained by different authors. In the present series the postoperative hospital stay for laparoscopic appendectomy patients was significantly shorter than open appendectomy patients (3.86 Vs 5.44 days).

Many studies have demonstrated lower incidence of wound infection after laparoscopic appendectomy than open procedure.^{6,7,13,14} The higher incidence of wound infection in open appendectomy is suggested to be due to contamination of wound as the excised appendix is removed through it. Laparoscopic removal avoids contamination of wound as the excised appendix is removed through one of the ports without being in contact with the wound edge. In the present series there was wound infection in 5 patients (10%) in open group and in 1 patient (2%) in laparoscopic group. In the present series although the incidence of wound infection was higher in open group as compared to the laparoscopic group, this difference was not statistically significant.

In the present series the patients in open group required 15 days to return to full work activity whereas the patient in laparoscopic appendectomy group resumed their full work activity in 7 days. The findings of significant difference between open and laparoscopic group to return to full work activity is consistent with findings noted by Kum et al⁷ and Reiertsen et al¹⁷. Larissa Temple et al 18(1999) in their meta analysis conclude that operating time is longer, hospital stay is unchanged but return to normal activity is significantly earlier with laparoscopic appendectomy. In the present series operating room was longer, analgesic requirement was significantly less, resumption of fluids and diet was significantly earlier, hospital stay shorter and return to full activity was significantly earlier with laparoscopic appendectomy, however there was no significant difference in the incidence of wound infection as compared to open appendectomy.

Various Authors have demonstrated that laparoscopic appendectomy is costlier technique than open appendectomy.^{4,8,9} As the present study was conducted in a government hospital cost analysis could not be done. However earlier return to work by laparoscopic appendectomy patients may save productive human days and in turn may indirectly save costs.

All the appendices removed were histopathologically proven to have recurrent appendicitis or acute appendicitis. Cosmetic results were not formally assessed in this study.

Conclusion

In conclusion duration of operation for laparoscopic appendectomy is longer, post operative analgesic requirement is significantly less, resumption of liquids and solids earlier, hospital stay shorter and return to full activity was earlier than with open appendectomy but there was no significant difference in incidence of wound infection as compared to open appendectomy. Thus Laparoscopic appendectomy is a safe and feasible option for open appendectomy.

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