

# A Prospective Study of Laparoscopic Appendicectomy for the Treatment of Acute Appendicitis

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## Abstract

**Aims and Objective:** To study the efficacy, safety and clinical outcome of patients undergoing laparoscopic appendicectomy in the treatment of acutely inflamed appendix. **Materials and Methods:** Laparoscopic Appendicectomy is used as day to day procedure for acute appendicitis. Case study of 42 patients undergoing laparoscopic appendicectomy is studied in prospective data analysing duration of intraoperative time, complications during surgery, after surgery complications, time until resumption of orals, joining back to work, postoperative debility and length of hospital admission. **Results:** Total 42 patients underwent laparoscopic appendectomy 21 were male and 21 were female with the mean age of patient undergoing laparoscopic appendicectomy was 26.66 years. Pain in abdomen was most common symptom followed by nausea. All patients were discharged at around second day. **Conclusion:** Laparoscopic appendicectomy patients were admitted for lesser duration and their post operative pain was of less intensity. Patients of laparoscopic appendicectomy were started oral diet earlier.

**Keywords:** Acute Appendicitis, Laparoscopic Appendicectomy (LA)

## 1. Introduction

In 1889 McBurney elaborated appendicitis as point tenderness in the right lower abdominal quadrant, and described grid iron the muscle-splitting incision<sup>1</sup>. For more than 100 years McBurney's technique of removing appendix was basic treatment of acute appendicitis. Now recently with evolution of laparoscopic surgery, little in the diagnosis and treatment of acute appendicitis has changed. Laparoscopic appendicectomy for a non-acute condition was first done in 1983 by the gynaecologist Semm<sup>2</sup>.

In 1987 Schreiber did a laparoscopic assisted appendicectomy for removal of acutely inflamed appendix<sup>3</sup>. After that laparoscopic appendicectomy has become a safe surgery<sup>2-5</sup>.

As compared to laparoscopic cholecystectomy, laparoscopic appendicectomy did not establish as standard surgery or method of choice quickly as open appendicectomy still a simple operation that can be performed by a young surgeon without much experience.

Laparoscopic appendicectomy, requires some expertise in field of laparoscopic surgery and expensive setup.

Benefits, such as lesser wound infections, decreased hospital stay, better and quick return to regular activities are most often accompanied by a longer operative procedure and higher costs<sup>4-6</sup>. The time taken for the surgery decreases as surgeon gets experience with more number of surgeries.

In this, the efficacy, safety and clinical outcome of patients undergoing laparoscopic appendicectomy in the treatment of acute appendicitis are studied.

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## 2. Materials and Methods

Descriptive study was carried out at the Department of surgery, Dr Vasantrao Pawar Medical College Hospital, Nashik from Aug 2011 to December 2013. Study population includes adult male and female who were confirmed cases of acute appendicitis.

### 2.1 Inclusion Criteria

Patients presenting with clinical features of acute appendicitis with pain in right lower quadrant of abdomen or pain around umbilicus migrating to the right lower quadrant, nausea, vomiting, fever, tenderness in right lower quadrant of abdomen, guarding in right lower quadrant of abdomen, raised white blood cell count.

Patients presenting with pain in abdomen with radiological evidence of acute appendicitis either on ultrasonography or on CT scan of abdomen and pelvis.

### 2.2 Exclusion Criteria

Patients presenting with palpable tender lump in right iliac fossa suggesting appendiceal abscess.

Patients with systemic diseases like liver cirrhosis, blood coagulation disorders, generalized peritonitis, shock on admission.

Patients having contraindications to laparoscopic appendicectomy like large ventral hernia, history of laparotomy done for small bowel obstruction, ascites with abdominal distension.

Patients with contraindications for general anesthesia like severe heart disease, severe pulmonary pathology, pregnant patients.

#### Total 42 patients were included in the study.

Ethical clearance from college Institutional Ethics Committee was obtained. Informed verbal and written consent was obtained from patients to take part in the study. The patients were assured of confidentiality of the information. A structured assessment form was used to obtain the clinical history regarding abdominal pain including clinical symptoms and signs. The patients were assessed for their demographic features (age/sex etc.) and clinical profile, various signs and symptoms as mentioned in the proforma.

The study was conducted in the Tertiary Health Care Centre, during 3 years of duration. (August 2011 to December 2013).

The study was approved by the ethical and research committee of the Tertiary Health Care Centre.

Once patients were eligible as per inclusion and exclusion criteria, they were enrolled for the study and told about the scope of the study, the methods used and the written informed consent was taken.

Afterwards, data of the participants like name, age, sex, detailed history, was obtained by questioning them and examination findings were recorded on predesigned and pretested proforma.

Necessary investigations like complete blood count, blood urea, serum creatinine, urine routine microscopy HIV, HBsAg and ultrasonography, X-ray abdomen, CT scan abdomen were performed accordingly.

All patients were kept nil by mouth overnight prior to surgery and received antibiotic prophylaxis one hour before the surgery (intravenous Cefotaxime). After creating pneumoperitoneum with CO<sub>2</sub>, the appendix is held and dissected and separated from mesoappendix. Appendix is held by the grasper and appendicectomy done. Specimen was retrieved through the 10 mm umbilical port.

Once the patients were reversed from anaesthesia, they were shifted to recovery room for observation for an hour and then shifted to the post operative ward. All patients were administered non opioid (Diclofenac sodium injection for first twenty four hours following surgery and further analgesic were given based on patient perception of pain) and anti-emetics as required. Patients were allowed liquids once bowel sounds returned.

Following the surgery, the post operative pain was evaluated using a Visual Analogue Scale (VAS). On the VAS the person is asked to identify how much pain they are having by choosing a number from zero (no pain) to 10 (the worst pain imaginable)<sup>7</sup>. Post operative pain was assessed at various intervals of time that is at sixth, twelfth, eighteenth, twenty fourth and thirty sixth hour of surgery. Pain score of 5 was taken as significant level of pain for comparison.

Length of hospital stay was also assessed in terms of days. Duration of hospital stay is defined as the difference between the date of indoor admission and date of discharge of the patient.

The operative time was recorded from skin incision to skin closure.

Patients were relieved from the hospital as soon as they were ambulated and accepted normal diet and were pain free.

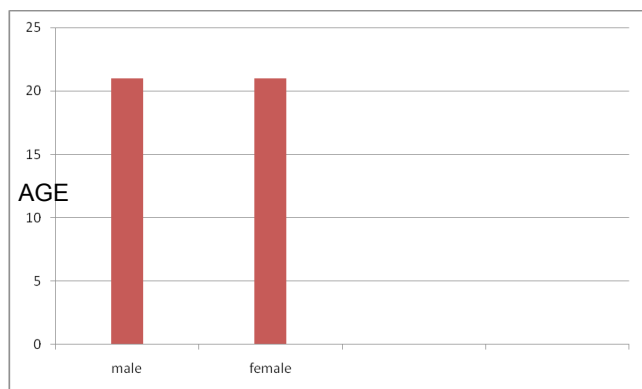
At the end of the study the data was tabulated and analyzed using rates, ratios and percentages.

### 3. Results

The results were-

**Table 1.** Gender distribution

Gender	Number	Total	Percentage
Male	21	42	50 %
Female	21	42	50 %
Total			100 %

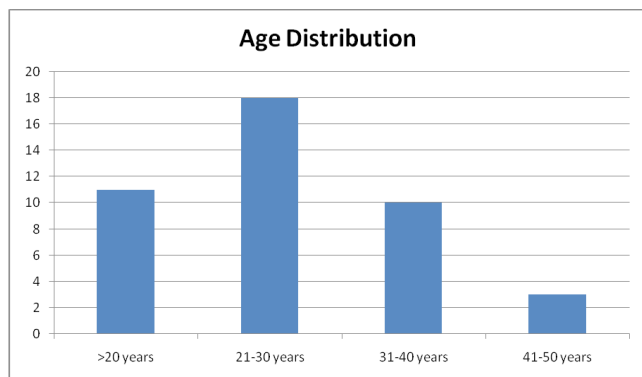


**Graph 1.** Gender distribution.

21 male and 21 female patients underwent laparoscopic appendicectomy (Table 1, Graph 1). In this present study mean percentage of males underwent laparoscopic appendicectomy is 50% and mean percentage of females is 50%.

**Table 2.** Age distribution

Age Group (years)	Number	Total	Percentage
10-20 years	11	42	26.19 %
21-30 years	18	42	42.85 %
31-40 years	10	42	23.80 %
41-50 years	03	42	07.14 %
Total	42		100 %

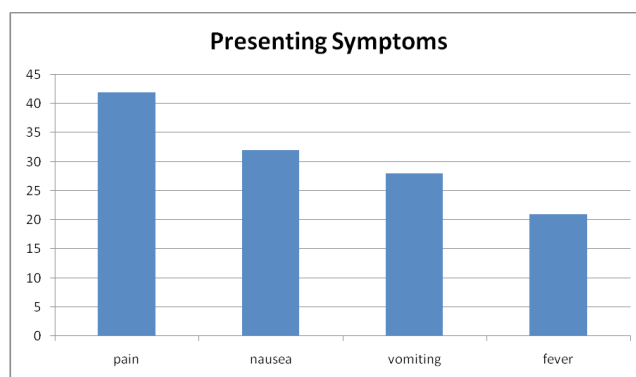


**Graph 2.** Age distribution.

The mean ages of patient undergoing laparoscopic appendicectomy is 26.66 years (Table 2, Graph 2).

**Table 3.** Presenting Symptoms

Symptoms	Number	Total	Percentage
Pain in abdomen	42	42	100%
Nausea	32	42	76.19%
Vomiting	28	42	66.66 %
Fever	21	42	50 %

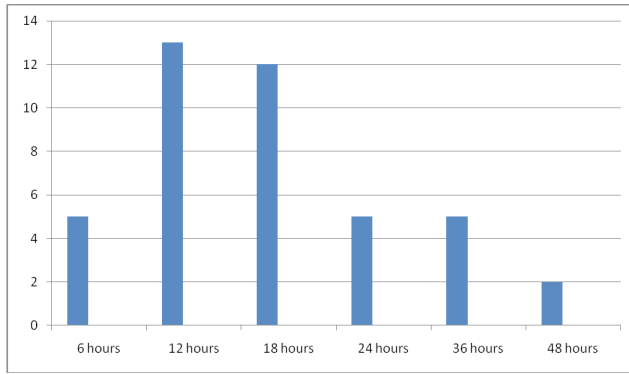


**Graph 3.** Presenting symptoms.

All the 42 patients presented with pain in the right lower quadrant (100%). Nausea was next common complaint present in 32 patients (76.19%). Vomiting was present in 28 patients (66.66 %). Fever was present in 21 patients (50%) (Table 3, Graph 3).

**Table 4.** Post operative pain (Visual Analogue Scale) Level of 5 and above

Duration (hours)	Number	Total	Percentage
06 hours	05	42	11.9 %
12 hours	13	42	30.9 %
18 hours	12	42	28.5 %
24 hours	05	42	11.9 %
36 hours	05	42	11.9 %
48 hours	02	42	04.7 %

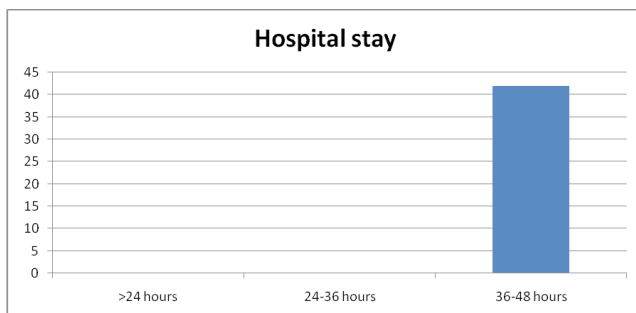


**Graph 4.** Postoperative pain.

The mean pain score on VAS of 5 and above in laparoscopic appendectomy was 16.6% (Table 4, Graph 4).

**Table 5.** Duration of hospital stay

Hospital stay (hours)	Number	Total	Percentage
>24 hours	00	42	00 %
24-36 hours	00	42	00 %
36-48 hours	42	42	100 %



**Graph 5.** Duration of hospital stay.

The average duration of hospital stay was 48 hours post operatively after laparoscopic appendectomy (Table 5, Graph 5).

Operating time: The mean operating time in laparoscopic appendectomy was 51.76 minutes.

## 4. Discussion

The mean age for laparoscopic appendectomy was 26.66 years.

The male to female ratio was same (1:1).

The evaluation of pain for the patients involved in the study was based on Visual Analogue Scale. It was observed that the post operative pain of level 5 and above on VAS scale measured at 6 hours, 12 hours, 18 hours, 24 hours,

36 hours was significantly low. Outcomes of these studies are consistent with the earlier studies in the literature<sup>8-11</sup>. All the studies which were evaluated in the review did not find significant pain after laparoscopic appendectomy.

During the study, it was seen that the patient who underwent minimally invasive laparoscopic appendectomy had uneventful recovery. Most significant factor which was associated with decreased abdominal pain was due to decreased muscle trauma, which was more with open surgery. As laparoscopic appendectomy was associated with decreased abdominal pain, patients could be ambulated earlier and easily. This avoided post operative complications like deep venous thrombosis and lung complications.

Few questions whether laparoscopic appendectomy has really shortened the hospital stay has always been in controversy<sup>8,12</sup>. The available data has always given conflicting results. Majority of the data has indoor admission duration of two to five days whether it is laparoscopic or open approach. Few new retrospective cohort studies or chart studies have shown that, minimally invasive laparoscopic appendectomy to be associated with significant lesser duration of hospital stay<sup>13</sup>. Sauerland<sup>14</sup> and associated have published the results of 28 randomised trials and around 3000 patients and have found significant lesser duration of indoor admission days in patients undergoing laparoscopic appendectomy. The data available today explains that the difference between laparoscopic and open appendectomy is influenced by hospital effect or social habits rather than due to differences out of operative technique<sup>15</sup>. The present study showed lesser duration of hospital admission for patients undergoing laparoscopic appendectomy.

The difference in the operating time was variable from different studies<sup>8,13,15</sup>.

During the study it was noticed that the patients who underwent laparoscopic procedure developed bowel sounds earlier. This allowed for the early resumption of diet in laparoscopic group.

There were no such cases that were required to be converted to open from laparoscopy in current data.

In the literature the conversion rate from laparoscopic appendectomy to open appendectomy varies from 1% to 22%<sup>10,11</sup>. The reasons for conversion to open appendectomy are strong infiltration and adhesion around caecum, haemorrhage from the appendicular artery and difficult location of appendix such as retrocaecal position.

Additional benefit of laparoscopic procedure is the ability to visualize the abdomen (diagnostic laparos-

copy), if the diagnosis is in doubt. Laparoscopy gives 360° visualisation of the peritoneal cavity that is not possible with standard grid iron incision. The procedure allows through and quick look of the paracolic gutters of the pelvic cavity that is not possible with open McBurney's incision. It plays an important role in young females where at times it is nearly impossible to differentiate between acute appendicitis and gynaecological clinical condition like pelvic inflammatory disease, twisted ovary and ectopic pregnancy.

In the present study the post operative complication and the expenses incurred were not included. Our follow up was limited to, till the patient got discharged from the hospital.

## 5. Conclusion

Laparoscopic appendectomy was associated with lesser duration of hospital admission and lesser post operative pain. Resumption to the diet was earlier after laparoscopic appendectomy. Resumption to work after laparoscopic appendectomy found to be earlier.

There were no morbidities after laparoscopic appendectomy. Hence, laparoscopic appendectomy can be treated as method of choice for removal of acutely inflamed appendix if laparoscopy is not contraindicated.

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