



Original Research Article

Laparoscopic Versus Open Appendectomy: Our Experience in Rural India

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ABSTRACT

Background: Laparoscopic Appendectomy though widely practiced has not gain universal approval. Laparoscopic Appendectomy in India is relatively new and literature is scant.

Aim: Our aim is to compare the safety and benefits of laparoscopy versus open appendectomy in prospective randomized study.

Methods: 120 patients were analyzed, following either laparoscopic or open appendectomy. Surgical technique was standardized among 3 surgeons. 60 patients underwent laparoscopic appendectomy (LA) and 60 patients underwent open Appendectomy (OA). Comparison was based on Length of Hospital stay, operating time, post operative morbidity, requirement of post operative analgesia as well as resumption of regular diet. The goodness of fit of the enumerated data was analyzed using Mann Whitney test and hypothesis was determined conventionally ($P < 0.05$).

Results: There was no mortality. The rate of wound infection and overall complications (LA: 3%, OA: 8%, $P < 0.05$) was significantly lower in patients undergoing LA. The median length of stay was shorten after LA which was 3 days where as in OA, it was 5 days ($P < 0.05$). The operative time was shortened {OA: 25minute (median), LA: 30 minute (median) with ($P = 0.29$)} for patients undergoing open appendectomy compared to laparoscopic appendectomy which is not significant. The patients undergoing LA require less postoperative analgesia, early resumption to routine diet and lesser duration for resuming full activity as compared to OA.

Conclusion: Laparoscopic Appendectomy is associated with less morbidity as compared to Open Appendectomy. LA is associated with increased clinical comfort in terms of fewer wound infections, faster recovery, earlier return to regular work and lesser analgesic requirement.

Key Words: Appendicitis, Appendectomy, Laparoscopic

INTRODUCTION

Since its first description by Reginald Fitz in 1986,^[1] acute appendicitis remains the most common intra abdominal condition requiring emergency surgery, with lifetime risk of about 8%.^[2] since its initial

description by Semm^[3] in 1983, laparoscopic appendectomy (LA) has struggle to prove its superiority over the open technique. This is contrast to laparoscopic cholecystectomy which has promptly become the gold standard for

gallstone disease despite little scientific challenge.^[4] Open Appendectomy (OA) has withstood the test of time for more than a century since its introduction by McBurney:^[5] unlike cholecystectomy, OA is typically completed using a small right lower quadrant incision and postoperative recovery is usually uneventful. The overall mortality of OA is around 0.3% and morbidity, about 11%.^[6] Despite numerous randomized trials,^[7-9] several metanalysis^[10-13] and systematic critical reviews^[14-15] Comparing the two techniques, the relative advantage of each procedure have yet to be established. This randomized prospective study highlight the advantage of this procedure and proves it to be superior over open appendectomy.

MATERIALS AND METHODS

Inclusion Criteria:

Using non probability convenience sampling method 60 patients were taken for open appendectomy and 60 patients for laparoscopic appendectomy, who present to emergency department of Government Medical College, Miraj and Padmabhushan Vasantdada Patil Government Hospital, Sangli (Maharashtra, India) with features of acute appendicitis from July 2010 to September 2012. The diagnosis of appendicitis was made on following criteria, history of Right iliac fossa pain (RIF) or peri-umbilical pain migrating to the RIF with nausea and / or vomiting, fever more than 38^oc and/or Leukocytosis above 10,000 cell/ml & RIF tenderness and guarding on physical examination. All patient included were 15yr age or older.

Exclusion Criteria:

Patients were excluded if the diagnosis of appendicitis was not clinically established and if they had a history of symptoms for more than 5 days and/or a palpable mass in right iliac fossa, suggesting an appendiceal abscess, patient with the

following conditions are also excluded, history of cirrhosis and coagulation disorder, generalized peritonitis, shock on admission, absolute contraindication to laparoscopic surgery (Large ventral hernia), history of laparotomies for small bowel obstruction, ascites with abdominal distension, contraindication to general anesthesia (severe cardiac or pulmonary disease), inability to give informed consent due to mental disability and pregnancy.

Randomization and Ethical clearance:

The qualifying patients were informed of the risk and benefits of each operation and asked to sign a detailed informed consent in their respective native language. This study is approved by institutional ethical committee. Computer generated random numbers were used to assign the type of Surgery (laparoscopic / open) which were written on a card sealed in a completely opaque envelope.

Surgery:

Operation were performed by 3 surgeons experienced in open and advanced laparoscopic techniques. OA used a McBurney muscle – splitting incision 1.5 inches in the RIF. A double ligation of the stump was performed with an absorbable suture.

For laparoscopic appendectomy, two hand laparoscopic appendectomy using 3 ports, umbilical (10mm), suprapubic (5mm) and right iliac fossa (5mm) was performed. The appendicular artery was dissected and divided between haemostatic clips. The Appendix was secured at the base with the loop ligature divided between the two distal ligatures and removed through 10mm umbilical port using laparoscopic beg.

Post operative Course:

Strict criteria were followed for reintroduction of nutrition. Bowel sounds were checked every 12 hours. Once present, the patients were started a clear liquid diet and advanced to regular diet when liquid

diet was tolerated and flatus observed. Patients were discharged when they tolerated a regular diet, had a normal white blood cell count under 10,000 cell/ml and were febrile for 24 hrs.

Outcome parameters:

The following parameters were recorded:

- Operating time skin to skin in minutes.
- Post operative complication (i.e. wound / port infection, intra peritoneal abscess, hematoma, fecal fistula etc.)
- Time until resumption of regular diet.
- Hospital stay in day
- Time require to return to normal work
- Duration of analgesia requirement.

While discharging, the patients were given discharge cards and were asked to come for follow up after two week and finding were recorded. They were further interviewed and examined six weeks after the operation. Then on, the regular follow ups were made at the intervals of one month to three months.

RESULTS

- Male: Female ratio was 7:3 in OA & 2:3 in LA with mean age of 25.3 years in OA & 24 in LA.
- In patient who opted for open appendectomy, inflamed appendix was noted in 39 patients, there were adhesions in 18 patients while perforation was found in 3 patients. In patients who opted for laparoscopic appendectomy inflamed appendix was noted in 45 patients, there were adhesions in 15 patients while there was no perforation. (Table – I).

Table No. 1: Gross pathology of Appendix noted during operation.

Gross Pathology	LA (n=60)	OA (n=60)
Inflamed Appendix	45	39
Adhesion	15	18
Perforation	0	03
Lump	0	0

- There was shorten operating time in patient undergoing open appendectomy (25 minute median) compared to laparoscopic appendectomy (30 minute median) which was not significant. (P=0.29)
- The rate of wound infection was significantly higher in patients undergoing open appendectomy than laparoscopic appendectomy, 8% vs. 3% respectively. (P <0.05) (Table - II).

Table No. 2: Post operative complication.

Complication	LA (n=60)	OA (n=60)
Wound / port infection	3%	8%
Intra peritoneal abscess	-	-
Intestinal obstruction	-	-
Hematoma	-	-
Ulcers	-	-
Bowel / Bladder injury	-	-
Fecal fistula	-	-

- Length of hospital stay ranged from 2 days to 7 days. The median length of stay was shortened after LA which was 3 days where as in OA it was 5 days. (P < 0.05)
- The total analgesia requirement in LA was significantly less as compared to OA group (median 2 days vs. 7 days). (P < 0.05).
- Time required for resumption of regular diet was less for LA (median 1 days) as compared for OA (median 3 days). (P < 0.05).
- The time to return to normal activities delayed for open appendectomy group (median 7 days) as compared to LA group (median 5 days.) P < 0.05.

- The overall morbidity in Patients undergoing laparoscopic appendectomy was much less as

compared to OA group patients (Table-III).

Table No. 3: Comparison of Major Parameters.

Valuable	LA (n=60)	OA (n=60)	P
Operative time (hours)	0.5 hr	0.42 hr	P = 0.29
Nil per oral to General diet (days) Median	1	3	P < 0.05
Analgesic requirement in days (parenteral + oral)Median.	3	9	P < 0.05
Hospital stay (Days) Median.	3	5	P < 0.05
Complication rate	3%	8%	P < 0.05

DISCUSSION

The enormous continuous development of minimally invasive surgery is justified by the many advantages, this method provides: minimal surgical trauma, less post operative pain, rapid post operative recovery, exploration of entire abdominal cavity, management of unexpected finding and better cosmetic results, with rapid return of activities. Despite all proposed advantage and increasing popularity LA has not yet been demonstrated to have a clear advantages over its open counterpart over the past two decades.^[10] On the other hand, it has also been argues that the advantages of LA are marginal compared to OA performed by an experienced surgeon through a short cosmetically accepted incision, which is associated with minimal complication and shorter hospital stay.^[16-20] The results of our study indicated that patients who underwent LA has significantly lesser requirement of analgesics with better post operative outcome.

The median operative time in our study was 30 minutes for LA and 25 minutes for OA. This is comparable with study conducted by Utpal De.^[21] However study conducted by Euler et al^[22] and A G Pederson et al^[23] has longer operating time both for LA and OA.

In accordance with other studies there were significantly fewer wound infections in laparoscopy group^[21,24,25] (In our study LA:3%, OA:8%, P < 0.05). A

reduction in wound infection can be achieved by extraction of specimen through a port or using endobag. This finding has also been highlighted in recent Cochrane review which consisted of more than 5000 patients.^[15] According to their findings, patients undergoing LA were half as likely to have wound infection as after OA. This seems to be a significant advantage because wound infection is the commonest complication after open appendectomy. On the other hand same reviewers noted that the incidence of intra abdominal abscess was threefold higher after LA as compare to OA.^[15] we didn't have any post operative intra abdominal abscess in our study population.

The question of whether laparoscopic appendectomy decreases the length of hospitalization has been matter of great debate over the past decade.^[18-20,26,27] In our study length of hospital stay was comparable with study conducted by Utpal De.^[21] Development of standardized protocols for discharge of patients from the hospital after LA may further optimize the care and reduce the morbidity at our hospital.

We quantitatively assessed the post operative pain by means of requirement of analgesia. The requirement of analgesia was significantly less in LA groups; Meta analyses by Li et al^[28] in 2010 also supported this study, mainly due to the less invasive nature of the procedure. This study

was not blinded (as the patient knowing the type of operation they will be undergoing after opening the envelope carrying type of operation) and so the assessment of the pain may not be accurate.

Patient undergoing LA shows earlier resumption to regular diet and normal routine activity as compared to patients undergoing OA. This is comparable with other studies also.^[21,22,24]

It has been suggested that beside the therapeutic effect of LA, Laparoscopy per se may offer valuable diagnostic opportunities. The issue of removal of a non inflamed normal looking appendix has also been debated and it has been proposed not to remove appendix in those situation when other pathologies can be diagnosed during laparoscopy. Some surgeons, therefore have used laparoscopy as a diagnostic tool only, and perform conventional appendectomy after laparoscopy in those patients where the appendix macroscopically has an abnormal appearance. However it is not yet clarified in which situation a normal looking appendix should be left in place, although non randomized study indicates this.^[29]

CONCLUSION

Our study concluded that the change in surgical approach in suspected appendicitis i.e. from open to laparoscopic appendicitis is safe and effective. LA was found to be superior to OA with respect to postoperative pain, hospital stay, early recovery, wound infection, early resumption to oral diet and full activity. The added advantage of laparoscopic appendectomy is its improved diagnostic accuracy.

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