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Original Research Article

A retrospective study on laparoscopic appendectomy versus open appendectomy

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ABSTRACT

Background: Appendectomy is the most common surgical procedure performed in emergency surgery. Open appendectomy is the "gold standard" for the treatment of acute appendicitis. Laparoscopic appendectomy though widely practiced has not gained universal approval. Our aim is to compare the safety and benefits of laparoscopic versus open appendectomy in a retrospective study.
Methods: The study was done as a retrospective study among 387 patients diagnosed with appendicitis for a period of 18 months in the Dept of General Surgery. All patients included were 16 years and above and followed up for 3 weeks. In this study, 130 patients diagnosed as acute appendicitis - underwent open appendectomy and 257 patients diagnosed as sub-acute cases of appendicitis - underwent laparoscopic appendectomy. These two groups (open & laparoscopic) were compared for operative time, length of hospital stay, postoperative pain, complication rate, early return to normal activity.
Results: Laparoscopic appendectomy was associated with a shorter hospital stay (around 4.5 days), with a less need for analgesia and with an early return to daily activities (around 11.5 days). Operative time was significantly shorter in the open group (35 mins), when compared with laparoscopic group (around 59 mins). Total number of complications was less in the Laparoscopic group with a significantly lower incidence of post-op pain and complications.
Conclusions: The laparoscopic approach is a safe and efficient operative procedure and it provides clinically beneficial advantages over open appendectomy (including shorter hospital stay, an early return to daily activities and less post-op complications).

Keywords: Acute appendicitis, Open appendicectomy, Laparascopic appendicectomy, Gold standard, McBurney incision

INTRODUCTION

Acute appendicitis is a common cause of acute abdominal pain with a life-time incidence between 7–9%.[1] Appendicitis is defined as inflammation of the vermiform appendix, the most common surgical emergency in children and young adults with abdominal pain. There are two methods of treatment modality based on history and clinical examination it differs. A non-operative strategy with antibiotics is favourable in some cases. Diagnosis is based on history, clinical examination and laboratory tests, although 30–45% of patients exhibit atypical signs and symptoms on presentation. Where the diagnosis remains ambiguous, ultrasound and CT scans are the

most widely used imaging modalities.[2] The open approach to appendectomy was originally described by McBurney in 1894.It has become the standard treatment of choice for acute appendicitis, remaining mainly unchanged for nearly 100 years due to its favourable efficacy and safety. Mc Burney described a new technique in 1894 (Mc Burney's procedure) for the treatment of acute appendicitis: this method is still used when an open approach is required.[3] Mc Burney's procedure for open appendectomy (OA) dominated the surgical arena and was considered the Gold Standard Surgery for acute appendicitis until 1980. When the first fully laparoscopic appendectomy (LA) was carried out by Semm in 1980, a big storm shook the surgical world because a revolutionary general surgical method was discovered by a gynecologist.[4,5] Appendectomy is age old surgical procedure and it is done for the removal of an inflamed symptomatic appendix to cure acute appendicitis or chronic appendicits, the commonest surgical emergency world over. There are two type of appendectomy procedures: 1) open and 2) laparoscopic. OA dominated the surgical word for about 85years and in 1980 was challenged by the LA. Sicne the invention of LA, the contraversy between OA and LA continues as to which is a better choice despite a lot of literature to support LA. In a prospective non-randomized trial 500 appendectomies were studied, 362 children underwent open procedure and 138 underwent LA. There was no mortality in either group. Major complications were 3% in open group, but no major complications were seen in the laparoscopic group. Minor complications were 20% in open and 13% in LA. Here again LA scored over OA.[6] Similarly Sweeney et al, predicted that laparoscopic appendicectomy was all set to become the choice of therapeutic modality for appendicitis. It has been proved that LA causes less postoperative pain than its conventional counterpart.[7] The current standard of care for patients with appendicitis is the surgical appendicectomy, either laparoscopic or open. However, it has not become the universal gold standard for acute appendicitis. So a comparative study was planned between open and LA.

Objectives

- To compare the open and LA procedures for the patients presenting with appendicitis in terms of operative time, length of hospital stay, postoperative pain, complication rate, early return to normal activity.

METHODS

A retrospective study of patients admitted to the Dept of General Surgery (Kanyakumari Govt Medical College) between January 2016 and June 2017 with the diagnosis of appendicitis was conducted. All patients included were 16 years of age or older. We analyzed these 387 patients who went appendectomy, were divided into two groups: OA group and LA group. The diagnosis was made clinically with history (right iliac fossa or periumbilical pain, nausea/vomiting), fever of more than 38°C and/or leukocytosis above 10,000 cells per mL, physical examination (tenderness or guarding in right iliac fossa). In patients where a clinical diagnosis could not be established, imaging studies such as abdominal ultrasound or CT were performed. Both groups of patients were given a prophylactic dose of third-generation cephalosporin and metronidazole at induction of the general anesthesia as part of the protocol. OA was performed through standard McBurney incision. After the incision, peritoneum was accessed and opened to deliver the appendix, which was removed in the usual manner. A standard 3-port technique was used for laparoscopic group. Pneumoperitoneum was produced by a continuous pressure of 12–14 mmHg of CO_2 via a verres canula, positioned in infra-umbilical site. The patient was placed in a trendelenburg position, with a slight rotation to the left. The abdominal cavity was inspected in order to exclude other intra-abdominal or pelvic pathology. After the meso-appendix was divided with bipolar forceps, the base of the appendix was secured with two legating loops, followed by dissection distal to the second loop. Then, the distal appendicular stump was closed to avoid the risk of enteric or purulent spillage. The specimen was retrieved through a 10-mm infra-umbilical port. All specimens were sent for histopathology. The patients were not given oral feed until they were fully recovered from anaesthesia and had their bowel sounds returned when clear fluids were started. Soft diet was introduced when the patients tolerated the liquid diet and had passed flatus. Patients were discharged once they were able to take regular diet, afebrile, had good pain control & were followed up for 3weeks.

RESULTS

Out of 387 patients admitted with appendicitis, 130 patients underwent OA and 257 patients underwent LA. There were no significant differences with respect to age and associated co-morbidities. Gender difference is not much seen in LA group whereas in OA group males outnumber the females who underwent this procedure (Figure 1). In LA group less than 25 years and more than 55 years were majority, whereas in OA group almost all the age group populations were evenly distributed (Table 1). In our study, the average operative time of 59 mins for the laparoscopic group was longer than the average operative time of 35 mins for open appendectomy. Bowel movements in the first postoperative day were observed in 96% patients' subjected to LA and 72% in the open group. As a result, 88% patients in the laparoscopic group and 65% in the open group were able to tolerate a liquid diet within the first 24 postoperative hours. Hospital stay was significantly shorter in the laparoscopic group with an average of 3days compared with an average of 5days for the OA group (Table 2). We found that the patients having LA recovered more quickly than their open counterpart, but interestingly there was no significant difference in sick leave than after laparoscopic operation.

We observed an overall greater incidence of complications in OA than in LA. Wound infections may not be serious complications per se but it represents a major inconvenience to the patient. Incidence of wound infections was similar in both groups. This is in contradiction with the majority of studies.

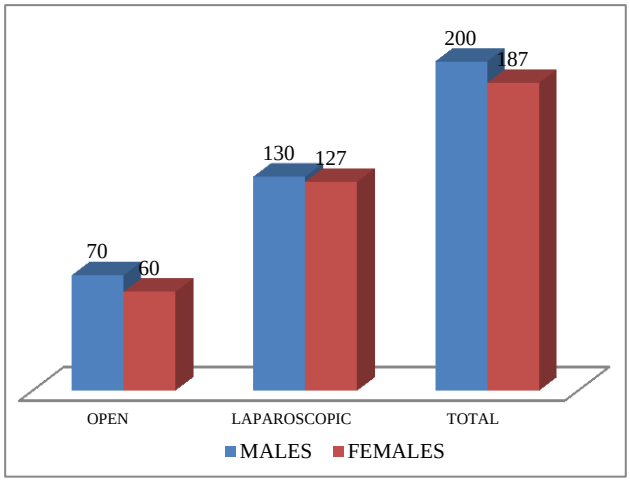

Figure 1: Gender and surgical procedure group among the study population.

Table 1: Age group distribution.

Age group (in years)	Open appendectomy	Laparoscopic appendectomy
16-25	28	90
26-35	32	58
36-45	19	43
46-55	28	17
56 & above	23	49
Total	130	257

Table 2: Comparison of OA and LA procedures.

Variables	Open appendectomy	Laparoscopic appendectomy
Duration of procedure	59 mins	35 mins
Bowel movements	72%	96%
Hospital stay	5 days	3 days
Total	130	257

DISCUSSION

A recent systematic review of meta-analyses of randomised controlled trials comparing laparoscopic versus OA concluded that both procedures are safe and effective for the treatment of acute appendicitis. Even though LA has been claimed to reduce postoperative pain, length of hospitalisation, analgesic doses and surgery associated complication, many surgeons do not advocate this procedure on men because they do not find any superiority of laparoscopy over the open procedure. The risk of wound infection is less in LA compared to the open procedure. A meta-analysis of randomised controlled trials has been reported with outcomes of 2877 patients included in 28 trials.[8] Overall complication rates were comparable, but wound infections were definitely reduced after laparoscopy. In our study, the average operative time of 59 mins for the Laparoscopic group was longer than the average operative time of 35 mins (approx) for open appendectomy. Hospital stay was significantly shorter in the laparoscopic group with an average of 3days compared with an average of 5 days for the OA group. Similarly a study conducted by Rbihat et al showed that the mean time for laparoscopic and OA group was 55 minutes and 22 minutes respectively with the duration of stay was two days in open surgery group whereas the laparoscopic group was only one day and 8 out of 159 had wound infection in OA group.[9] The study done by Vellani et al, the mean post-operative stay in days was relatively shorter for LA (1.97±2.3) compared to OA (3.1±1.8). The average time for the return of bowel movement was remarkably lesser for LA (10.6±8.2) hours than OA (21±13) hours. (10) Many studies elicited that on average after 12 hours the patients were fully mobilized and did not need any analgesics where as in OA group this average time was 36 hours which was presented similar pattern.[11-13] But our study has presented the first post operative day bowel movements as the indirect measure of patient mobilization which 96% in Laparoscopic group than open surgery group. A study conducted among 593 patients by Biondi et al in abroad showed that the LA was associated with a shorter hospital stay with a less need for analgesia and with a faster return to daily activities. Operative time was significantly shorter in the open group (31.36±11.13 min in OA and 54.9±14.2 in LA). Total number of complications was less in the LA group with a significantly lower incidence of wound infection (1.4 % vs 10.6 %, $p<0.001$).[14] Lesser hospital stay and the lesser incidence of complications were demonstrated and supported by many studies.[15,16] This contradicts to our study, where it is almost similar incidence of wound infection in both groups. It should be cautioned that the definition of wound infection varies between studies. A study done by Adams et al, concluded that OA and LA are comparable with regards to length of hospital stay which is 3 days in both groups, a finding in line and little contrary with many studies where the mean hospital stay was more for OA group than LA group.[17]

CONCLUSION

LA is equally safe, and can provide less postoperative morbidity in experienced hands, as open appendectomy. Most cases of acute appendicitis can be treated by laparoscopic approach. LA is a useful method for reducing hospital stay & post-op complications, but more operative time is required. We found a considerable preference (during the collection of consent) of patients and a high satisfaction after the surgery in the laparoscopic group.

Limitations

- Only the patients above the age of sixteen or more were included in the study.
- 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 the right lower quadrant, suggesting an appendiceal abscess treated with antibiotics and possible percutaneous drainage.
- Complicated cases of appendicitis were excluded.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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