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Original Research Article

A randomized prospective comparative study of laparoscopic appendicectomy versus open appendicectomy

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ABSTRACT

Background: Acute appendicitis is the most frequent cause of persisting progressive abdominal pain in all ages. However, there is no way to prevent the development of appendicitis, the only way to reduce the morbidity and to prevent the development of appendicitis, is to perform appendicectomy before perforation or gangrene has occurred. In this study, we have done a randomized, prospective comparative study of laparoscopic appendicectomy versus open appendicectomy in the Department of Surgery, Sri Guru Ramdas Hospital and Research Institute, Sri Amritsar from August 2014 to December 2016 a period of two years and four months.
Methods: This prospective randomized controlled study was carried out in the department of General Surgery. The total population group included 144 patients with a mean age of 39 years (Age group between 18-60 years). Patients between 18 years and 60 years of age were candidates for randomization. The study was carried out as an open randomized single centre study.
Results: In the present study patients were not blinded to the surgical technique employed but were equally informed to resume normal activity and work as soon as possible at their discretion. The results show that time to return to heavy work was significantly reduced by the laparoscopic approach. Less pain in the post-operative period was the major contributing factor. In the present study, laparoscopic appendicectomy was associated with improved cosmesis when compared with open appendicectomy ($P < 0.01$).
Conclusions: Laparoscopic appendicectomy is a safe procedure with lower morbidity it is also an excellent training tool in laparoscopic technique and with sufficient experience takes no longer than open appendicectomy.

Keywords: Appendicectomy, Laproscopic

INTRODUCTION

Acute appendicitis is the most frequent cause of persisting progressive abdominal pain in all ages. However, there is no way to prevent the development of appendicitis, the only way to reduce the morbidity and to prevent the development of appendicitis, is to perform appendicectomy before perforation or gangrene has occurred. Open appendicectomy has been safe and effective for acute appendicitis for more than a century. Recently, several authors proposed that the new technique of laparoscopic appendicectomy should be the treatment for acute appendicitis.[1] Laparoscopic appendicectomy has been shown to be both feasible and safe in randomized comparisons with open appendicectomy, in addition to improve diagnostic accuracy.[2] Laparoscopic appendicectomy confers advantages to the patient in terms of fewer wound infections, less pain, faster recovery and earlier return to work.[2-15] However, laparoscopic appendicectomy is more time consuming and is associated with increased hospital costs. It has been argued that the advantages of

laparoscopic appendicectomy achieved by experienced laparoscopic surgeons are marginal compared with open appendicectomy which can also be performed by surgeons in training through a short, cosmetically acceptable incision with minimal complications and a short hospital stay.[16,17] Following a calculations of sample size based on the results of a pilot study, a randomized trial was undertaken to compare the outcome of laparoscopic appendicectomy with that of open appendicectomy. This was based on the hypothesis that laparoscopic appendicectomy would prove superior to open appendicectomy in terms of hospital study, post-operative morbidity like pain, complication like wound infections, intraabdominal abscess, ileus, cosmesis, operating time, earlier return to normal activity and work.

METHODS

This prospective randomized controlled study was carried out in the department of General Surgery.

The total population group included 144 patients with a mean age of 39 years (Age group between 18-60 years). Patients between 18 years and 60 years of age were candidates for randomization.

The study was carried out as an open randomized single centre study. For randomization, a stratified random sampling method was used. Every patient coming to the OPD who was diagnosed as acute appendicitis and planned for operation was numbered 1, 2, 3, 4, 5 and so on. Every 3rd number and 4th number were selected irrespective of sex, co-morbid factors. Every 3rd patient was planned for open appendicectomy and every 4th patients were planned for lap appendicectomy. The patients were explained in detail about the operative modalities both laparoscopic and open appendicectomies. Thus, the patient was not given the opportunity to voluntarily opt for the operative procedure they would like to undergo and this was probably the main cause in the exclusion criteria. Out of 144 patients the total number of patients after randomization were 73. Of these, 33 patients underwent laparoscopic appendicectomy and 40 patients underwent open appendicectomy finally. The two treatment groups were well matched with regard to age, sex but not for severity of appendiceal pathology. Histological examination was performed on all removed specimens. Cases were scored by Alvarado scoring system during admission and later reviewed after 6-8 hours for a second scoring when the laboratory tests reports were available the final scoring were taken for evaluation. All the patients underwent thorough pre-anesthetic checkup for general anesthesia. All the patients were thoroughly explained preoperatively likely post-operative pain and methods of analgesia available.

Statistical analysis

The end point data was analysed according to intention to treat principle. And χ^2 test (Chi-square test) was used to compare categorical data. Post - operative morbidity, wound infection, intra-abdominal abscess, cecal leak, adhesive ileus, pneumonia. Mann-Whitney U test was used to compare ordinal data: Operating time, Time to return to - normal activity - Heavy work, VAS score - pain at 12 hours and 24 hours, cosmesis and Hospital stay.

RESULTS

A total of 144 patients attended the outdoor who were suspected for appendicitis during the period of study. remaining 71 patients could not be randomised the main reason was stratified sampling was done.

However, a total of 10 patients from the study population could have been randomized by stratified sampling. But these patients were not selected due to certain contraindications (n = 2), patient's refusal for procedure (n = 3), age limitations (n = 3) and other diagnosis (n =2).

Table 1: Comparison of intraoperative factors between laproscopic and open appendicectomy.

Randomized	Laparoscopic appendicectomy (n=33)	Open appendicectomy (n=40)	Probability value
Operation time	60 (15-100) minutes	30 (30-60) minutes	< 0.001
Post - operative morbidity			
Wound infection	3	8	<0.05
Intra-abdominal abscess	3	1	<0.05
Caecal leak	0	1	Non-significant
Adhesive ileus	2	1	<0.05
Pneumonia	0	0	Non-significant
Cosmesis (VAS) *	1 (0-3)	2 (1-8)	<0.01
Pain (VAS)*			
After 12 hours	12 (MCSD) (12-20)	11 (MCSD) (9-15)	>0.05 not significant
After 24 hours	10 (5-20)	10 (5-25)	> 0.05 not significant

The study group (n = 73) included 50.6% of the population group. Out of 73 patients, 33 patients were randomized to laparoscopy the procedure was successfully completed in 29 patients while 2 patients had the procedure. converted to open. Reasons for conversions were mainly difficulty in defining the anatomy and dissection due to extensive adhesion following previous abdominal operation eg. TAH BSO and LSLS. In one case, it was due to caecal perforation so plan to do Right hemicolectomy by open procedure and due to extensive hemorrhage in another case. In 4 patients; laparoscopy revealed non- inflamed appendix. 3 were left in place and one underwent laparoscopy appendicectomy to compare its advantages over open apppendicectomy. Of the 40 patients randomized to open appendicectomy 10 patients had a non- inflammed appendix that was removed.

Table 2: Comparison of post-operative factors between laproscopic and open appendicectomy.

Randomized	Laparoscopic appendicectomy (Days)	Open appendicectomy (Days)	Probability value
Hospital stay*	3 (3 - 8)	5 (3 -10)	<0.1
Convalescence			
Normal activity*	5 (4 - 14)	5 (2 - 10)	<0.05
Heavy work*	10 (10 - 21)	9 (2 - 20)	<0.01
Death	Nil	Nil	Nil

DISCUSSION

Acute appendicitis is one of the most frequent causes of abdominal emergency in nearly all age groups and is notorious in its ability to stimulate other conditions.[1] Also, in our hospital laparoscopic and open Appendicectomy is performed routinely on patients with acute appendicitis so, I took the opportunity to take up the prospective comparative study of laparoscopic appendicectomy and open appendicectomy in suspected cases of acute appendicitis. The study was conducted on 73 patients of 144 patients who were randomly selected through surgical out door or emergency department. Most studies report a median hospital stay of 2 - 5 days of laparoscopic or open surgery. Although, some recent retrospective cohort studies or chart reviews found laparoscopic appendicectomy associated with significantly shorter hospital stay. Other retrospective investigations reported non- significant difference. Similarly, some randomized controlled trials associated laparoscopic appendicectomy with decreased hospital stay.[4] However, others report no significant difference between laparoscopic appendicectomy and open appendicectomy.[9] Even meta-analysis report controversial findings. The present study revealed a significantly shorter hospital stay for patients undergoing laparoscopic appendicectomy (P <0.1).

In this study, we have done a randomized, prospective comparative study of laparoscopic appendicectomy versus open appendicectomy. The aim of this study was to evaluate and compare the advantages and disadvantages between laparoscopic appendicectomy and open appendicectomy in general surgical practice. The objectives were divided into categorical data and ordinal data. The categorical data included ÷ post- operative wound infections, intraabdominal abscess, adhesive ileus, caceal leak, pneumonia. The ordinal data included ÷ operation time, hospital stay, time to return to normal activity and heavy work, post-operative pain after 12 hours and 24 hours and cosmesis. The categorical data was statistically analysed by χ^2 test (chi-square test) and the ordinal data by Mann–Whitney U test.

Having completed the analysis and discussion we finally present the following observations before arriving at the conclusion:

- Wound infections in LA group (9%) and OA group (20%) P < 0.05.
- Intra-abdominal abscess in LA group (9%) and OA group (2%) P <0.05.
- Adhesive ileus in LA group (6%) and OA group (2%) P < 0.05.
- Caecal leak was seen only in LA group.
- Pneumonia was not reported in both the groups.
- Operation time in LA group: 60 mins and OA group: 30 mins P <0.001.
- Duration of Hospital stay in LA group (3days) OA group (5 days) P <0.1.
- Mean duration of return to normal activity: in LA group (5.4 days) and OA group (7.1 days) P <0.05. Mean duration of return to heavy work was: (12.2 days) in LA group and OA group (16.8 days) P < 0.01.
- Post-operative pain after 12 hours P > 0.05 and pain after 24 hours P > 0.05 assessed by VAS.
- Cosmesis according to assessment by VAS in LA group: 1 in OA group: 2 P < 0.01.

There was no rate of mortality noted all the patients followed up in OPD after discharge or earlier if any emergency.

CONCLUSION

From the present study, we concluded that laparoscopic appendicectomy has been shown to be both feasible and safe in comparison with open appendicectomy. Laparoscopic appendicectomy and open appendicectomy are comparable for complications, post-operative pain control, length of hospitalization and recovery time. Laparoscopic appendicectomy is associated with increased operating time. The general perception is that it has marginal advantages and may not be worth the trouble.

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