

Original Research Article

Clinical outcome of appendectomy: laparoscopic vs open technique

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ABSTRACT

Background: Acute appendicitis is a common abdominal surgical emergency. Appendectomy has been proven to be the standard care for the treatment of acute appendicitis. Objective of the study was to compare laparoscopic and open appendectomy in terms of clinical outcome and complication rates.

Methods: This was a single centric, retrospective study conducted at SKIMS, Soura from May 2018 to April 2021. Open and laparoscopic appendectomy patients were compared in terms of operative times, conversion rate, complication rates and duration of hospital stay.

Results: Total 120 patients were included in this study with 40 in laparoscopic group while 80 patients in the open group. Increased operative time in laparoscopic group ($p=0.033$) and longer duration of hospital stay ($p=0.021$) with open group while as comparable complication rate in both procedures were observed. Higher rates of intra-abdominal collection in laparoscopic group as compared to open group

Conclusions: Both laparoscopic and open appendectomy procedures can be performed routinely for acute appendicitis without the additional risks of complications.

Keywords: Appendicitis, Appendectomy, Laparoscopic, Open

INTRODUCTION

Acute appendicitis is a common abdominal surgical emergency. In most of the surgical centers conventional surgical approach for appendectomy is adopted.¹ Almost 6-7% of population may develop acute appendicitis during their lifetime. Appendectomy has been proven to the standard care for the treatment of acute appendicitis since its introduction 1894 by McBurney.² Laparoscopic surgery has many advantages like fast recovery, less pain at the site of surgery and shorter hospital stay.³ In complicated appendicitis, laparoscopic appendectomy has major advantages like decreased risk of wound infection and better vision of peritoneal cavity.⁴ Whereas laparoscopic cholecystectomy is an established gold standard method of performing cholecystectomy and has replaced open method long ago; laparoscopic

appendectomy has yet to achieve this popularity.⁵ The purpose of present study is to compare the advantages and disadvantages of 2 modes of surgery i.e., open and laparoscopic appendectomy for this most common type of abdominal emergency.

METHODS

This was a retrospective study carried out on a data of patients who were operated by open or laparoscopic approach for acute appendicitis from May 2018 to April 2021 in SKIMS soura. All patients of either sex with the diagnosis of acute appendicitis who underwent appendectomy during this period with either of the approach were included in study. Open appendectomies performed via midline incision for associated peritonitis or diagnostic doubt were excluded from the study. Also excluded patients in whom preoperative diagnosis of any

other pathology other than acute appendicitis was recognized. Severity of acute appendicitis was classified according to the disease severity score (Table 1). The cases were reviewed with regards to age, gender, severity of acute appendicitis, operative time, complications and hospital stay. Extension of surgical exposure was also compared (i.e., conversion to open for the laparoscopy group; while extension of incision for the open group). Open appendectomies were carried out via gridiron/ Lanz incision. Laparoscopic appendectomy was carried out via three ports (one 10 mm port above umbilicus, other one 5 mm port in the midline just above the pubis and third 10 mm port in left iliac fossa. Remaining procedure remain same which includes performing appendicectomy after sealing of appendicular artery and retrieval of appendix via endo bag in laparoscopic approach.

Statistical analysis

Retrospective data was collected over a period of 3 years. All data was collected on preformed proforma for above mentioned variables and compiled. Data was entered and analyzed in SPSS version 23.

Sampling method

Simple random sampling method was used in the study.

RESULTS

A total of 120 patients who underwent appendectomy during the specified study period were finally included in the study. Among these, laparoscopic appendectomy was performed in 40 (33.33%) patients while open appendectomy in 80 (66.66%) patients. The patient groups were compared in terms to age, gender and severity of appendicitis (Table 2). Average operative time was 38±8 minutes in laparoscopic group while it was 29±7 minutes in open appendectomy (Table 3). Two (5%) patients of laparoscopic group were converted to open technique while in 5 (6.25%) patients of open appendicectomy procedure was converted to midline approach due to diffuse peritonitis. Mean hospital stay was 3±0.75 days in open appendectomy group and it was 2±0.50 days in laparoscopic group. Wound infection was the most common complication noticed in 6 (7.5%) patients of open surgery group. Two (2.5%) patients developed post op collection. While 04 (10%) patients of laparoscopic surgery group developed postoperative complications. It includes port site infection in 2 (5%) patients and abdominal collection in 2 (5%) patients.

Table 1: Disease severity score.

Grades	LAP (%)	Open (%)
1	10 (25)	18 (22.5)
2	8 (20)	12 (15)
3	16 (40)	28 (35)
4	5 (12.5)	13 (16.25)
5	1 (2.5)	9 (11.25)

Grade 1: Inflamed, grade 2: Gangrenous, grade 3: Perforated with localized free fluid, grade 4: Perforated with regional abscess and grade 5: Perforated with diffuse peritonitis.

Table 2: General patient characteristics.

Variables	Lap appendectomy (%)	Open appendectomy (%)
Age (years)	25±7	28±6
Male	17 (42.5)	42 (52.5)
Female	23 (57.5)	38 (47.5)

Table 3: Comparison between laparoscopic appendectomy and open appendectomy.

Variables	LAP (%)	Open (%)	P value
Operative time (min)	38±8	29±7	0.033
Hospital stays (days)	2±0.5	3±0.75	0.021
Conversion	2 (5)	5 (6.25)	>0.001
Complications	4 (10)	8 (10)	>0.001
Intra-abdominal collection	2 (5)	2 (2.5)	0.013
Wound Infection	2 (5)	9 (11.25)	0.027

DISCUSSION

Acute appendicitis is one of the commonest abdominal surgical emergencies worldwide. Its most common differential diagnosis includes right ureteric colic, mesenteric lymphadenitis, Meckel's diverticulitis, perforated peptic ulcer, ruptured ectopic pregnancy and torsion of right ovarian cyst etc.⁶⁻¹⁰ Diagnosis of this disease is usually made clinically, however certain investigations like total leukocyte count with neutrophilic shift and ultrasound abdomen are commonly employed investigations to certify diagnosis (MANTRELS). In case of doubt, CT scan abdomen is advised. If not diagnosed at early stages, it may lead to severe peritonitis and sepsis.¹¹⁻¹² Appendectomy is considered as simple and safe procedure. Despite this, it is associated with certain complications. Literature reports that laparoscopic appendectomy is associated with a higher complication rate and high cost as compared to the conventional open procedure.¹³ Although laparoscopic appendectomy has the advantages of optimal abdominal cavity exploration, less hospital stay and less post-operative pain which is in line with our study.³ The difference of the technique in both methods may transform the consequences in term of complication and costs.¹⁴ Three ports laparoscopic approach for appendectomy can be adapted for all grades of severity of acute appendicitis including diffuse peritonitis.¹⁵ Furthermore, use of handmade endo loop reduces the cost in comparison to the use of a linear stapler.¹⁶ Laparoscopic approach allows an optimal image of the operative field compared to open incision. Also, possible complications of an abdominal incision, if large and contaminated, are significantly reduced in laparoscopic approach.¹⁷ Our study also suggests low rate

of wound related complications in laparoscopic approach as compared to open approach. Furthermore, post-operative intra-abdominal collection or abscess formation was observed in 2 (5%) patients of laparoscopic approach which was higher in comparison to 2 (2.5%) patients in the open appendectomy group which is also noticed in study by Salmone et al.¹⁸

Limitations

This study has a relatively small sample size and the study was retrospective. Further studies which are prospective, with well-defined study parameters and higher sample size need to be done to further consolidate the above findings.

CONCLUSION

Laparoscopic appendectomy is an advanced and feasible approach for the operative treatment of acute appendicitis. Present study elaborates that an experienced surgeon can effortlessly perform laparoscopic appendectomy. The overall complication rate and length of hospital stay was found to be less in laparoscopic appendectomy but operative time was slightly higher. However, a slight rise in the intraabdominal collection among the laparoscopic group is observed which did not have any major impact on the surgical outcome.

Recommendations

Laparoscopic appendectomy should be encouraged as it further allows us to explore the whole abdominal cavity and determine the associated pathology.

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

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