

Laparoscopic Management of Complicated Appendicitis

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Abstract:

AIMS The aims of this study are to evaluate the effectiveness, feasibility and safety of Laparoscopy for managing complicated appendicitis and to look for postoperative complications as well as morbidity, in a tertiary care hospital.

OBJECTIVES

To study the Laparoscopic Appendicectomy in cases of Complicated Appendicitis with respect to:

1. Mean duration of the surgical procedure.
2. Number of days of antibiotics given, post operatively.
3. Post-operative day-start of oral feeds.
4. The incidence of Postoperative morbidity.
5. Analgesics required.

MATERIALS AND METHODS

This prospective study was conducted in a tertiary care hospital at Ahmedabad on 50 patients who underwent Laparoscopic appendicectomy between June 2022 to March 2023

CONCLUSION

- ❖ Our study has shown results encouraging the use of laparoscopic appendicectomy in cases of complicated appendicitis, having found less post-operative morbidity along with early start of post-operative oral feeds and decrease requirement of post-op antibiotics.
- ❖ Although the laparoscopic method can be technically challenging, but the results have demonstrated its feasibility and safety.
- ❖ Although the number of patients enrolled in this study is far too small, preliminary results show that our experiences with Laparoscopic appendicectomy in Complicated Appendicitis has been encouraging, although technically demanding, but with proper surgical technique, it can be done without much of post-op complication.
- ❖ As laparoscopic approach is having less morbidity in our study, we recommend the use of laparoscopy even with complicated appendicitis.

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KEYWORDS:- LAPROSCOPIC APPENDICECTOMY COMPLICATED APPENDICITIS**INTRODUCTION**

It is a well-known adage that abdomen is a temple of surprises and a magic box as well. Since the abdomen accommodates innumerable viscera and other anatomical compliments, diseases of the abdomen constitute a topic full of clinical curiosity.

- A meticulous examination of abdomen is one of the most rewarding diagnostic procedures available to the doctor, especially the surgeon and plans an ideal treatment.
 - As had been said by Bailey "A correct diagnosis is the hand maiden of successful operation".
 - Acute appendicitis is one of the commonest causes of acute abdomen encountered in surgical practice, requiring emergency surgery.^[2]
 - The life time rate of appendicectomy is 12% for men and 25% in women, with approximately 7% of all people undergoing appendicectomy for acute appendicitis during their lifetime. It has been observed that males have higher rates of appendicitis than females for all age groups with an overall ratio of 1.2 to 1.3:1.^[3]
 - Even though modern diagnostic facilities, surgical skills, antibiotic therapy have brought down the mortality from 50% (before 1925) to less than 1/1,00,000 persons, still the morbidity is around 5-8% mainly due to delayed diagnosis & treatment, with the resultant complications.^[4]
- With the introduction of the laparoscopic technique, it provided an opportunity to explore new method of therapy in the management of the suspected cases of the acute appendicitis.^[5]
- Laparoscopic appendicectomy combines the advantages of diagnosis and treatment in one procedure with the least morbidity.^[6]
 - Patients are likely to have less post-operative pain and to be discharged from hospital and return to activities of daily living sooner than those who have undergone an open appendicectomy.^[7]
 - Other advantages include decreased wound infection, better cosmetic, ability to explore the entire peritoneal cavity for diagnosis of other conditions and effective peritoneal toileting without the need for extending the incision.^[4]
 - Laparoscopic appendicectomy is increasingly being employed particularly in young women of child bearing age in whom the differential diagnosis of right lower quadrant pain is extensive including gynaecological pathology.^[8]
 - The modern era of laparoscopic surgery has evoked remarkable changes in the approach to surgical diseases. The trend towards minimally invasive surgery has prompted general surgeons to scrutinize nearly all surgical procedures for possibility of conversion to the laparoscopic technique.^[9]

MATERIALS AND METHODS

This study was conducted in a tertiary care hospital at

Ahmedabad on 50 patients who underwent Laparoscopic appendicectomy between June 2022 to March 2023

TYPE OF STUDY: PROSPECTIVE STUDY.

SAMPLE SIZE: 50.

INCLUSION CRITERIA:

- _ All the patients diagnosed with complicated appendicitis.
- _ All patients who gave consent for study

EXCLUSION CRITERIA:

- _ Age <12 years and >65 years
- _ Pregnant females
- _ Non complicated acute appendicitis
- _ Gross peritonitis with tense abdomen, patients with low cardiopulmonary reserve where creating a pneumoperitoneum would be a risk
- _ Moribund patients who would be a risk for laparoscopic surgery.
- _ Previous abdominal surgeries with significant adhesions.
- _ All patients who didn't give consent for study.

All the patients fulfilling the inclusion and exclusion criteria were admitted and included in the study.

All the patients suspected to have complicated appendicitis would be subjected to clinical examination and imaging that includes ultrasonography in all cases computed tomography in selected cases. All the patients would be subjected to laparoscopic appendicectomy. The patients are confirmed to have complicated appendicitis by the following features:

HISTORY AND CLINICAL EXAMINATION:

- History of acute onset of right lower abdominal pain, vomiting, constipation and fever.
- Abdominal examination reveals the presence of a tenderness and mass in the right iliac fossa, or generalized guarding and rigidity.

ULTRASOUND FINDINGS OF PERFORATED APPENDICITIS:

Peri-vesical mass without peristalsis, peri-caecal or peri-vesical free fluid or an echogenic fluid collection, an appendix greater than 6 mm in diameter, thickened bowel loops with reduced peristalsis, an appendicolith, interloop fluid collections, fluid collections in the subhepatic or subdiaphragmatic spaces.

CT SCAN FINDINGS OF PERFORATED APPENDICITIS:

Fat streaking, an appendix more than 6 mm in diameter and focal caecal apical thickening, appendicoliths, abscesses, an arrowhead sign, pockets of fluid in the peri-caecal area, pelvis etc.

TOTAL WHITE CELL COUNTS:

If white blood cell count exceeds 15,000 cells /uL, the patient is more likely to have a perforation.

OBSERVATION

In our study, patients were included based on the inclusion and exclusion criteria. All the patients underwent laparoscopic procedure for appendicectomy

TABLE 1- TYPE OF APPENDIX

TYPE OF APPENDIX	NO. OF PATIENTS	PERCENTAGE
PERFORATED	29	58%
GANGRENE	21	42%

TABLE 2: OPERATING TIME:

OPERATING TIME (MINS)	NO. OF PATIENTS	PERCENTAGE
50	7	14%
55	8	16%
60	11	22%
65	4	8%
70	7	14%
75	6	12%
80	4	8%
85	2	4%
90	1	2%

As from the table, we can say that almost 52% patients operated were completed within 60 mins, and only 14% of cases required more than 80 mins. The extended intra operating time was because of identifying the appendix and dealing with dilated bowel loops making it technically difficult, adhesiolysis etc. The time spent in giving a thorough peritoneal lavage with warm saline also accounted for the prolonged operating time. The average mean time of operating was found out to be 64.6 mins.

TABLE 3: FEVER IN PATIENTS STUDIED:

FEVER	NO. OF PATIENTS	PERCENTAGE
YES	6	12%
NO	44	88%

Twice daily recording of temperature was done for all patients during the stay in the hospital, 88% of patients had no fever whereas 12% of the patients had fever (due to persistent drainage, small interloop collections or pelvic collections) for which antibiotic course was extended appropriately.

TABLE 4-: POST-OPERATIVE ABDOMINAL PAIN IN PATIENTS STUDIED:

POST-OP ABDOMINAL PAIN	NO. OF PATIENTS	PERCENTAGE
YES	7	14%
NO	43	86%

Based on clinical examination, symptoms and daily rounds, 14% of the patients had complaints of abdominal pain even after adequate analgesia given, rest 86% of the patients did not have any abdominal pain complaints

TABLE 5: INTRA-ABDOMINAL ABSCESS IN PATIENTS STUDIED.

INTRA-ABDOMINAL ABSCESS	NO. OF PATIENTS	PERCENTAGE
YES	5	10%
NO	45	90%

TABLE 6: LENGTH OF POST-OPERATIVE STAY IN THE PATIENTS STUDIED.

LENGTH OF POST-OP STAY	NO. OF PATIENTS	PERCENTAGE
POD-3	42	84%
POD-5	2	4%
POD-7	6	12%

NO PATIENTS HAVING POST OPERATIVE BOWEL OBSTRUCTION FEATURES IN THE PATIENTS STUDIED.

NO PATIENTS HAVING PORT SITE INFECTION IN PATIENTS STUDIED

DISCUSSION

Complicated appendicitis is a common surgical emergency. In the era of minimal access surgery there is still a controversy regarding the modality of treatment for complicated appendicitis - whether open appendicectomy or LAP appendicectomy

should be done. In many centres across the world LAP appendicectomy has been a routine for simple appendicitis in adults.

However, the role of laparoscopic approach in Complicated Appendicitis is still debatable because few articles published say that there is increased incidence of post operative intra-abdominal abscess with this modality of treatment.

The reasons quoted were that the pneumo-peritoneum created in laparoscopic approach helps the localized infected contents to spread throughout the peritoneal cavity and also that in open appendicectomy appendix is delivered outside the abdominal cavity and stump is inverted after division, possibly decreasing the incidence of intra-peritoneal contamination, whereas dissection of appendix in LAP appendicectomy occurs within the abdominal cavity which may result in the spillage of infected contents into the peritoneal cavity.

Although laparoscopic appendicectomy is well accepted for treatment of non-complicated appendicitis there has been concerns about its use in case of complicated appendicitis, particularly about the longer duration of surgery, surgical site infection, intra-abdominal abscess etc.

However laparoscopic appendicectomy in complicated appendicitis provides the advantage of panoramic view with increased magnification, ability to visualize the hidden corners (various pouches & intraperitoneal spaces) and clearance of purulent material by giving a thorough saline wash.

- The risk of wound infection is less in laparoscopic appendicectomy compared to the open procedure. A meta-analysis of randomised controlled trials has been reported with outcomes of 2877 patients included in 28 trials. Overall complication rates were comparable, but wound infections were definitely reduced after laparoscopy (2.3% to 6.1%).
- Rohr et al reported higher wound infection rates after laparoscopic appendicectomy, but most of the literature supports the view that wound infection is less common after a laparoscopic procedure.
- In our study, there were no port site infections.
- Due to the risk of intra-abdominal abscess formation, there is a strong controversy among surgeons regarding the use of the laparoscopic procedure in complicated appendicitis (gangrenous or perforated).
- There are several reports which state that if gangrene or perforation is found at the time of laparoscopic appendicectomy then the procedure should be converted. Frazee and Bohannon published a retrospective analysis of 15 patients with gangrenous appendicitis and 19 patients with perforated appendicitis who underwent laparoscopic appendicectomy. They found a 7% rate of postoperative intra-abdominal abscess in the gangrenous group and a 26% rate of postoperative intra-abdominal abscess in the perforated group.

- Tang et al found a postoperative intra-abdominal abscess rate of 11% for perforated appendicitis treated laparoscopically compared with a rate of 3% treated by the open method.

- Paya et al published a prospective study of 75 children with perforated appendicitis. Ten underwent laparoscopic appendicectomy and the remainder underwent open operation. There were no postoperative abscesses in the laparoscopic group but 2 (3.1%) of 65 patients who had open appendectomies developed postoperative intra-abdominal abscesses.

- The incidence of post operative intra-abdominal abscess after laparoscopic appendicectomy in adults with complicated appendicitis varies from 5.8% to 41%.

- However, in our study 10% incidence of formation of intra-abdominal abscess was present, which was managed conservatively in the form of empirical and long duration antibiotics and was followed up with blood investigation and USG abdomen at end of the antibiotic course, responding favourably.

- In Laparoscopic appendicectomy intestinal wall hematoma and post operative bowel paralysis is less in comparison with open appendicectomy because of minimal bowel handling which helps in initiation of oral feeds earlier as compared to the conventional technique.

Another advantage of laparoscopic approach is that there is a lower rate of post-operative adhesions, this is seen in our children too although the period of follow-up has not been long enough.

SUMMARY

- Most common age group in Acute Appendicitis is 26-30 years.
- There is slight Male predominance, with 56% of patients.
- The most common type of appendix was perforated type (58%).
- Mean duration of operating time is mostly less than 60 mins (52%).
- Only 12% of patients develop post-op fever, in which most of the patients is having intra-abdominal abscess formation.
- 10% patients are having formation of intra-abdominal abscess, associated with fever and abdominal pain, and managed conservatively.
- Nearly no patients have formed any other complication, like port site infection and post-op bowel obstruction.
- Most of the patients were started on oral feeds at the end of POD-1 (90%).

- ▶ Most of the patients did not require analgesics beyond POD-1 (84%).
- ▶ Antibiotics is required till POD-3 in most of the patients (84%).
- ▶ Most of the patients were discharged by the end of POD-3 (84%), with routine blood investigation within normal limits and USG abdomen normal.

CONCLUSION

- ❖ Our study has shown results encouraging the use of laparoscopic appendectomy in cases of complicated appendicitis, having found less post operative morbidity along with early start of post-operative oral feeds and decrease requirement of post-op antibiotics.
- ❖ Although the laparoscopic method can be technically challenging, but the results have demonstrated its feasibility and safety.
- ❖ The incidence of post-operative intra-abdominal abscess though less, can be managed conservatively with proper antibiotics and repeat blood investigation and USG abdomen, and follow up monitoring.
- ❖ The incidence of post-operative paralytic ileus associated with features of bowel obstruction and surgical site infection, in form of port site infection is nearly nil.
- ❖ The incidence of post-op fever and post-op abdominal pain is also on the lower side, and mainly it is associated with the development of intra-abdominal abscess formation.
- ❖ Most of the patients can be started on early oral feeding without any other complications.
- ❖ The requirement of post-op analgesics is usually low, indicating less post-op morbidity.
- ❖ The requirement of post-op antibiotics is also low, unless in the patients of intra abdominal abscess formation which required prolonged use of antibiotics.
- ❖ The length of stay in hospital is also short, unless the complication developed.
- ❖ Although the number of patients enrolled in this study is far too small, preliminary results show that our experiences with Laparoscopic appendectomy in Complicated Appendicitis has been encouraging, although technically demanding, but with prope rsurgical technique, it can be done without much of post-op complication.
- ❖ As laparoscopic approach is having less morbidity in our study, we recommend the use of laparoscopy even with complicated appendicitis.

NO. CONFLICT of INTEREST

SOURCE of FUNDING -SELF

Sorry to say, But no ethical committee was consulted at the time of study so ethical clearance certificate is not available at present

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