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Evaluation of Laparoscopic Appendectomy in Complicated Appendicitis

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ABSTRACT
Background: The role of laparoscopy in the treatment of complicated appendicitis is increasing.
Objective: The study goals to assess the role of laparoscopy in complicated appendicitis.
Patient and Methods: This prospective case series study involved 40 patients with complicated appendicitis who underwent laparoscopic appendectomy and were assessed concerning operative time, the postoperative outcome as regard analgesia use, duration of hospital stay, back to usual oral feeding, and postoperative complications in the Department of General Surgery at Chettinad Hospital and Research Institute, Kelambakkam from September 2021 to May 2022.
Results: 40 patients underwent laparoscopic appendectomy for complicated appendicitis. The mean age of all considered patients was 28.4 ±9.7 years with a minimum age of 18 years and maximum age of 53 years, there were 14 males (35%) and 26 females (65%) in the considered patients. Of the 40 patients, perforated appendix cases were 18, gangrenous appendix cases were 10, appendicular abscess cases were 8 and appendicular mass cases were 4 cases. Conversion to open technique was done in 2 cases (5%), postoperative hospital stay was two days in 10 patients (25%), 3 days in 14 patients (35%), 4 days in 12 patients (30%) more than 5 days in 4 patients (10%) and 2 patients had prolonged stay (converted to open surgery patients) and postoperative complications in 12 cases (30%) as fever, intra-abdominal collection, ileus and wound infection.
Conclusion: Laparoscopic appendectomy remains a safe and efficient technique in the treatment of complicated appendicitis.
Keywords: Appendicitis; Complicated appendicitis; Laparoscopic appendectomy.

I. INTRODUCTION

Acute appendicitis remains one of the furthermost common causes of acute abdominal pain with a prevalence of 1.17 per 1000 and a lifetime risk ofapproximately 7%. The delay in diagnosis may lead to difficulties like an appendicular abscess, mass, gangrene, perforation, and peritonitis.Thebenefits of laparoscopic technique over conventional open the technique contains shorter hospital stay, earlier return to usual activity, reduced pain, andbetter Cosmesis. Laparoscopic appendectomy has rapidly been established in recent years. Since Semm issued the first complete amputation of the appendix through laparoscopic operation in 1983 and Schreiber did the first laparoscopic appendectomy in a patient with acute appendicitis in 1987, laparoscopic appendectomy has been involved in nearly all hospitals international as the traditional technique in emergency departments. Benefits of laparoscopic appendectomy consist of a quick return to usualpatient's activity, and a better cosmetic result. The tendency to reduced patient illness after surgery has allowed the development of procedures requiring progressively less invasive contact to the operating field. Better access and the good imagining of the peritoneal cavity through small openings give laparoscopic appendectomy benefits when compared with an open approach. So, complicated appendicitis is well managed by laparoscopic technique

Aim of the work:

The study goals to assess the role of laparoscopy in complicated appendicitis concerning operative time, intra-operative problems, hospital stay, analgesia use, return to early oral feed, and postoperative hazards.

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Patients and Methods:

Forty patients with suspected complicated acute appendicitis were admitted to Surgical ward in Chettinad Hospital and Research Institute, Kelambakkam, from September 2021to May 2022. The suspicion of acute appendicitis which may complicates was succeeded by the next criteria: History of existing illness further than 3 days, Fever further than 39 °C. and Total leukocytic count further than 11000. Signs of complications in investigations are like as in ultrasound or CT image.

All patients were subjected to: History taking from the patient with a special alarm about the time of initial pain, General examination to omit general difficulties contraindicating laparoscopy.

Local examination is mandatory to make sure the existence of appendicitis and if any mass can be palpated. Laboratory investigations as CBC, liver, and kidney function tests, PT, PTT, and INR were done with a special concern about total leukocytic count and differential leukocytic count.

Radiological investigation such as CECT abdomen was done.

Inclusion criteria: After the diagnostic laparoscopy during the technique were Appendicular abscess, Non- palpable mass, Gangrenous appendix, Perforated appendicitis, Appendicitis with peritonitis and Appendicitis with extensive adhesions.

Exclusion criteria : Laparoscopy for uncomplicated appendicitis, suspicion of malignancy, Pregnant with Palpable appendicular mass.

Surgical procedure.

Preoperative antibiotics and intravenous fluids were administrated. Under general anesthesia with endotracheal intubation and the patient in the supine position, pneumo-peritoneum via either the Verres needle or Hasson open method was achieved. Three ports were used, the first port was 10 mm periumbilical port for the camera and the second port was 5 mm in the suprapubic area in the midline and the latest one was another 10 mm port between the previous two ports. The location of the appendix was explored to identify the type of complicated appendix. Control of the mesoappendix was done either by electro-cautery or clips or both whilecontrol of the base of the appendix was done by either end loop ligature or intra-corporeal sutures or clips. Retrieval of the appendix was done either by the endobag or through the 10 mm port. Peritoneal wash using saline was done until the wash fluid converted into clear, intra-peritoneal tube drain was left either in an appendicular bed or the pelvis. Statistical analysis.

Statistical Study Categorical variables existed as a number (ratio). All data were evaluated using SPSS 22.0 for windows (SPSS Inc., Chicago, IL, USA).

II. RESULTS:

The study involved 40 patients of adult males and females. The mean age of the considered patients was 28.4 ±9.7 years with a range among 18 and 53 years. Out of 40 patients, 26 (65%) patients were females and 14 (35%) patients were males. (Table 1).

All 40 patients submitted to diagnostic laparoscopy at first and intra-operative outcome were as following, 18 patients (45%) were perforated appendicitis (PA), 10 patients (25%) were gangrenous appendicitis, 8 patients (20%) were appendicular abscess and 4 patients (10%) were appendicular mass. (Table 2). The mean operating time of all considered patients was 51.7 ± 18.5 min with a minimum time of 40 minutes and a maximum time of 120 minutes (Table 3).

There were 38 patients (95%) who continued on the laparoscopic technique while there were only 2 patients (5%) converted to open technique. One (2.5%) case with appendicular mass was converted to open method by midline incision due to extensive adhesions, and one (2.5%) case with a gangrenous appendix was converted to open method by lower midline incision due to gangrenous base with friable cecum that required trimming of the base with closure by interrupted suture and application of only omental patch (Table 4). Concerning return to oral feeding in all considered patients, 14 patients (35%) resumed on the same day of operation, 20 patients (50%) resumed on the 1st postoperative day and 6 patients (15%) resumed on the 2nd postoperative day (Table 5).

The postoperative hospital stay was 2 days in 10 patients (25%), 3 days in 14 patients (35%), 4 days in 12 patients (30%), further than 5 days in 4 patients (10%), 2 patients of these cases had prolonged stay (converted to open surgery patients) (Table 6). Post- operative follow up of 40 patients revealed, Fever further than 38oc with collection on follow-up ultrasound in 2 patients (5%), Fever further than 38oc without collection on follow-up ultrasound in 3 patients (7.5%), postoperative ileus

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in 2 patients (5%), wound seroma in 3 patients (7.5%), wound infected seroma and infection in 2 patients (5%) while there were no complications in 28 patients (70%) (Table 7).

		Studied patients (N = 40)	
Age (years)	Mean ± SD	28.4 ± 9.7	
	Min - Max	18 – 53	
Sex	Male	14	35%
	Female	26	65%

Table 1: Demographic data of studied patients.

		Studied patients (N = 40)	
Intraoperative findings	Appendicular abscess	8	20%
	Appendicular mass	4	10%
	Gangrenous appendicitis	10	25%
	Perforated appendicitis	18	45%

Table 2: Intra-operative findings of all studied patients.

		Studied patients (N = 40)
Operative time (min)	Mean ±SD	51.7 ± 18.5
	Min - Max	40 – 120

Table 3: Description of operative time in all studied patients.

		Studied patients (N = 40)	
Conversion to open procedure	No	38	95%
	Yes	2	5%

Table 4: Conversion to open procedure in all studied patients.

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		Studied patients (N = 40)	
Return to oral intake	on the same day	14	35%
	on the 1st day	20	50%
	on the 2nd day	6	15%

Table 5: Return to oral intake in all studied patients.

		Studied patients (N = 40)	
Duration of hospital stay (days)	2 days	10	25%
	3 days	14	35%
	4 days	12	30%
	≥ 5 days	4	10%

Table 6: Duration of hospital stay in all studied patients.

		Studied patients (N = 40)	
Postoperative complications	No complications	28	70%
	Fever > 38 with collection on U/S	2	5%
	Fever > 38 without collection on U/S	3	7.5%
	Post-operative ileus	2	5%
	Wound seroma	3	7.5%
	Wound infected seroma and infection	2	5%

Table 7: Postoperative complications in all studied patients.

III. DISCUSSION:

Recently numerous studies show that laparoscopic appendectomy provides significant advantages over the open approach, containing a shorter hospital stay, fewer postoperative pain, quicker postoperative recovery, and less complication frequency. There are several retrospective and uncontrolled studies of laparoscopic appendectomy (LA), as well as numerous prospective randomized studies available up to now. While most of those have determined that the laparoscopic procedure is approximately as good as the open approach, there has been considerable debate on whether LA is superior or not. Increased practice of surgeons and nursing team definitely reduced the operating time.9 In contrast to the general confidence that conversion depends on the surgeon practice, we expect that intra-operative conditions are the most cause to convert. Within the present study, we reported 2

cases of intra-operative difficulties, one case with appendicular mass was converted to an open approach by midline incision due to extensive adhesions, and another case with a gangrenous appendix was converted to open approach by lower midline incision due to gangrenous base with friable cecum.

Our outcomes show that the duration of hospitalization was considerably shorter in the LA, and this is reliable with the study of some studies.10 Postoperative pain was evaluated by the patient needing non-steroidal anti- inflammatory intramuscular injection which is effective. Also, to reduce shoulder pain from remaining gas irritation, the draw of CO2 from the right subphrenic space and low-pressure pneumo-peritoneum were performed in all cases in addition to least tissue handling and trauma, which also donates to decreasing pain sensation.

In Ansari et al, out of 103 patients who were effectively operated laparoscopically, 21 patients established minor complications such as fever in 11 (10.67%) patients, 5 (4.85%) patients developed postoperative ileus that postponed their start of oral feeding and 5 (4.85%) patients developed port site infection. There remained no cases of postoperative intestinal obstruction and no mortality.12 the decrease of wound infection is a significant benefit of LA. The occurrence of wound infection is higher in OA relatively because the infected appendix is retrieved from the abdominal cavity directly via the wound, whereas in LA it is removed through a port. In addition, the port-site wounds in LA are minor compared to the major wounds of OA.

We intended to find predictive issues of Intra- abdominal abscess development complication in laparoscopic appendectomy. We detected that obesity, leukocytosis more than 20.000/mm3, perforated appendicitis, and extended operating time were associated with the development of a postoperative intra-abdominal abscess. minimally invasive surgical procedure is progressively established in the treatment of surgical emergencies. Nevertheless, in 2002 laparoscopic appendectomy (LA) was tested by a systematic assessment which revealed an increased frequency of IAA near threefold compared with open appendectomy (OA).

Possible causes imagined for this variation are that the infected substances may spread all over the abdominal cavity during pneumo-peritoneum or that as in the OA, the appendix is amputated outside the abdominal cavity and the base is inverted after separation, the incidence of intraperitoneal infection would be lesser. Asarias et al. listed that IAA is fivefold extra common with complicated appendicitis and measured increasing age as an expected feature.Horvath et al. accused the usage of Roeder knot, extreme wash, and the Trendelenburg‘s position for the greater frequency of IAA after LA in perforated appendicitis.while Gupta et al. blamed aggressive handling of the diseasedappendix and extreme irrigation to increase infectious problems. Definite operative concerns were taken in mind to reduce the occurrence of intra-abdominal abscess: Firstly, low-pressure pneumo-peritoneum restricts bacterial translocations to blood flow. Secondly, the draw of pus directly at the beginning of the technique. Thirdly, widespread adhesiolysis, to prevent disappeared pockets of pus. Fourthly, suction irrigation to extract infected fluid until becomes clear and finally sufficient drainage by numerous drains.

In the present study, 2 cases (5 %) established intra- abdominal abscess, one of them underwent ultrasound- guided drainage by pigtail, and the other case was a small collection underwent conservative management on antibiotic course according to culture and sensitivity. In this study, the IAA frequency was reduced. A related report has been recent.

IV. CONCLUSION:

This study has proved that laparoscopic appendectomy remains a safe and efficient approach in the treatment of complicated appendicitis. It resulted in a short hospital stay and low conversion frequency. It decreases the risk of postoperative infections.

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