


Original Research Article

# Comparative study on laparoscopic appendicectomy versus open appendicectomy in a tertiary hospital at Chennai

A. Sagaya Inba Sekar<sup>1</sup>, Anandi Andappan<sup>2\*</sup>

<sup>1,2</sup>Associate Professor, Department of General Surgery, Government Stanley Medical College, Chennai, Tamil Nadu, India

\*Corresponding author email: [anandiandappan@gmail.com](mailto:anandiandappan@gmail.com)

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## Abstract

**Background:** Appendicitis is sufficiently common that appendicectomy is the most frequently performed urgent abdominal surgery. Despite extraordinary advances in modern radiographic imaging and diagnostic laboratory investigations, the diagnosis of appendicitis remains essentially a clinical diagnosis.

**Aim of the study:** To determine the outcome of laparoscopic appendicectomy compared to open appendectomy and to rule out the clinical outcome between two major procedures.

**Materials and methods:** This comparative study was done in Government Medical College, Omandurar Government Estate in 2016 to 2018. A total of 75 patients' files that underwent surgery within the study period were perused. Thirty-two patients (42.7%) underwent laparoscopic surgery (LA) and 43 patients (57.3%) underwent open appendicectomy (OA). The relevant data was then extracted from the case notes using a pre-designed proforma questionnaire.

**Results:** There were a total of 44 male patients and 31 female patients in the study. All patients undergoing either LA or OA presented with right iliac fossa pain. Patients who presented with nausea undergoing LA were 53.13% while 31.11% undergoing OA presented with nausea. Vomiting was present in 18.75% of patients undergoing LA while 44.44% of the patients undergoing OA had vomiting. Fever was noted in patients undergoing OA (15.55%). Majority of patients had symptoms duration of between one day and one week. Those with symptoms durations of less than one day were 9.4% for LA group and 23.3% for the OA group. Urea and electrolytes were done in 93.8% of

patients undergoing LA and 69.8% of those undergoing OA. Abdominal ultrasound was performed in 40.6% of patients undergoing LA and 18.6% of a patient undergoing OA. Urinalysis and microscopy were performed in 6.3% of patients undergoing LA and 9.5% of patients undergoing OA. Wound sepsis occurred in 6.7% of patients undergoing OA. Miscarriage occurred in 1 patient undergoing OA. Only one patient in LA developed complication due to ileus.

**Conclusion:** Laparoscopic appendicectomy takes longer to perform our institution than open appendicectomy. Postoperative complications are lower with laparoscopic appendicectomy when compared with open appendicectomy.

## Key words

Laparoscopic Appendicectomy, Open Appendicectomy, Post-operative complications, Sepsis.

## Introduction

The vermiform appendix is considered by most to be a vestigial organ, its importance in surgery due only to its propensity for inflammation, which results in the clinical syndrome known as acute appendicitis [1]. Acute appendicitis is the most common cause of an "acute abdomen in young adults. Appendicitis is sufficiently common that appendicectomy is the most frequently performed urgent abdominal operation [2]. Despite extraordinary advances in modern radiographic imaging and diagnostic laboratory investigations, the diagnosis of appendicitis remains essentially a clinical diagnosis [3]. It is estimated that 16% of the population in western countries undergo appendicectomy for presumed appendicitis, although in the past 30 years the incidence has fallen dramatically in these countries [4]. No reason has been established for these changes in the incidence of acute appendicitis. Acute appendicitis is relatively rare in infants and becomes increasingly common in childhood and early adult life, reaching a peak incidence in the teens and early 20s [5]. The condition seldom occurs in patients over 65 years. The inflammatory process can be catarrhal or obstructive in nature. Catarrhal inflammation is thought to arise secondary to bacterial invasion of the lymphoid tissue on the surface of the appendix wall and because there is no luminal obstruction, it seldom progresses to gangrene [6]. The obstructive form of the disease, which is caused by the presence of faecoliths in more than 70% of patients, can rapidly proceed to gangrene and perforation [7].

## Materials and methods

This comparative study was done in Government Medical College, Omandurar Government Estate from 2016-2018. A total of 75 patients' files that underwent surgery within the study period were perused. Thirty-two patients (42.7%) underwent laparoscopic surgery (LA) and 43 patients (57.3%) underwent open appendicectomy (OA). The relevant data was then extracted from the case notes using a pre-designed proforma questionnaire.

**Inclusion criteria:** Only patients who presented with the diagnosis of acute appendicitis and underwent surgery were included.

**Exclusion criteria:** Patients who had appendicular abscesses or peritonitis or those who had previous lower abdominal surgery. Files that had incomplete information were excluded.

**Statistical analysis:** Data was entered into a computer using EPI info and was exported to SPSS version 10.0 for analysis. For continuous variables, a non-parametric test was used. For categorical factors comparison of the two groups was done using relative risk. Level of significance was taken as  $\leq 0.05$ .

## Results

A total of 75 patients underwent surgery in the study period. Thirty two patients (42.67%) had laparoscopic Appendicectomy (LA) and 43 patients (57.33%) had open appendicectomy (OA). Out of the 44 male patients, 18 patients

underwent LA surgery and 26 patients OA surgery. Out of the 31 female patients, 14 patients under LA surgery and 17 OA surgery. Majority of the patients undergoing either OA or LA were in the age groups between 21-30 years, followed by 31-40 years group.

Patients presenting with acute appendicitis undergoing LA were 12.5% while those undergoing OA were 76.74%. Patients presenting with recurrent appendicitis undergoing LA were 87.5% while those undergoing OA were 23.26% (Table - 1).

**Table - 1:** Preoperative diagnosis.

Pre-op diagnosis	LA	OA	Total
Acute appendicitis	4	33	37
Recurrent appendicitis	28	10	38

**Table - 2:** Presenting complications.

Presenting complain	OA	LA	Total
Pain	43	32	75
Nausea	14	17	31
Vomiting	20	6	26
Anorexia	1	0	1
Fever	7	0	7
Cough	1	0	1

**Table - 3:** Investigations.

Investigation	OA	LA	Total
No investigation	7	-	7
Abdominal ultrasound	8	13	21
Hemogram	32	30	62
Urea and electrolytes	30	30	60
Widal	1	0	1
LFTS	0	2	2
IVU	0	1	1
RBS	0	3	3
Ca++	0	1	1
Amylase	0	1	1
Abd X-ray	1	0	1
Urinalysis	4	2	6

All patients undergoing either LA or OA presented with right iliac fossa pain. Patients who presented with nausea undergoing LA were 53.13% while 31.11% undergoing OA presented with nausea. Vomiting was present in 18.75% of patients undergoing LA while 44.44% of the patients undergoing OA had vomiting. Fever was

noted in patients undergoing OA (15.55%) as per Table - 2.

**Table - 4:** Duration of surgery.

Duration of Surgery in hours	Type of surgery		Total
	LA	OA	
≥0.5<1	3	9	12
≥1<1.5	7	17	24
≥1.5<2	9	2	11
≥2 <2.5	9	2	11
≥2.5	2	0	2
Total	30	30	60

**Table - 5:** Histological diagnosis.

Histological diagnosis	LA	OA	Total
Normal appendix	7	3	10
Acute appendicitis	18	19	37
Recurrent appendicitis	1	1	2
Schistosomiasis of the appendix	0	1	1
A.lumbricoides in appendix	0	1	1
Tuberculous appendicitis	0	1	1

**Table - 6:** Outcome of surgery.

Outcome of surgery	LA	OA	Total
No change in symptoms	1	1	2
Resolution of symptoms	31	42	73
Worsening	0	0	0
Death	0	0	0

Table - 3 shows different investigations that were carried out preoperatively for patients with appendicitis in the study. Full blood count was done in 82.67% of all the patients, 93.75% of the patients undergoing LA and 74.42% of those undergoing OA had these investigations done. Urea and electrolytes were done in 60 patients (80%) 93.75% of LA and 69.77% of OA patients. Abdominal ultrasound was done in 21 patients (40.625% of LA and 18.61% of OA). Dialysis and microscopy were performed in 6 patients (8%). Other investigations carried out in a small number of patients included Widal tests, liver function tests, intravenous urography, random blood sugar, serum, calcium, serum amylase, and plain abdominal X-rays.

Duration of surgery was significant statistically between the two methods. Two patients in the

OA had the procedure done in 30 minutes, while no patient in LA was in this category. Twenty nine percent of patients in the LA procedure took less than 1 hour while 35.6% of patients in OA took the same duration. 40.6% of patients in LA had the procedure due in more than 1 1/2 hours but less than 2 hours while 7% in OA took the same duration. In the LA group, 6.3% of the patients took more than 2 hours (**Table – 4**).

Normal appendicitis was found in 21.9% of patients in the LA and 7% in the OA. A histological diagnosis of acute appendicitis was distributed as follows 56.3% of LA and 44.2% of OA. Recurrent appendicitis was 3.1% LA and 2.3% OA. Schistosomiasis of the appendix occurred in 2.2% of OA, tuberculous appendicitis occurred in 2.22% of OA and Ascaris lubricoids noted in 2.2% of OA group (**Table – 5**).

Only two patients had no change in symptoms one in LA and one in OA (3.1% and 2.4% respectively) as per **Table - 6**.

## **Discussion**

Laparoscopic appendicectomy has not gained the same widespread popularity as laparoscopic cholecystectomy. This is because the early postoperative recovery leading to quicker hospital discharge, which led to the worldwide acceptance of laparoscopic cholecystectomy, has not been universally seen with L.A. [8]. Moreover, in the majority of the published series of LA, there seems to be a trend towards an increased incidence of intraabdominal abscesses. However, laparoscopy is superior to the "watch and wait" policy where the diagnosis of appendicitis is questionable [9]. Furthermore, since a large incision can be avoided using the LA technique in obese patients, the incidence of postoperative morbidity can be reduced considerably [10]. Patients in the study presented with various symptoms. All patients presented had the right iliac fossa pain. Nausea was present in 41.3% of the patients and vomiting in 34.7% [11]. Fever was present in 9.3%. Anorexia is the

most constant symptom of appendicitis although in the study 1.3% of patients presented with the symptom. This figure is lower and could be due to inaccurate history taking. In the study, 17.3% of patients with acute appendicitis had symptom duration of fewer than 24 hours [12]. Those with symptoms duration of between 1-7 days were 26-7%, while those with symptoms of between 1 week and one month were 10.7%. Those who presented with symptom duration of between 1 month and 6 months were 12% while those with symptoms of greater than 6 months were 30.7%. These represent patients with recurrent appendicitis [13]. The diagnosis of acute appendicitis is more often a clinical diagnosis. Baseline investigations normally performed include full blood count, urinalysis and urea and electrolytes. Other investigations have done including abdominal ultrasound, plain abdominal radiography, and intravenous urography is done to rule out other differential diagnoses of appendicitis. In the study patients undergoing laparoscopic appendicectomy were exhaustively investigated as most of them had been referred to the outpatient surgical clinic and there was enough time to do investigations before surgery. Pre-operative co-morbidity was seen in 22.7% of the patients undergoing appendicectomy. The most prevalent for both OA and LA was peptic ulcer disease, which had been confirmed by either endoscopy and patients had already been under treatment [14]. This occurred in 9.3% and 12.5% respectively for LA and OA. Other co-morbidities included pulmonary tuberculosis, cystitis, diabetes Mellitus, gastroesophageal reflux disease, hypertension, secondary infertility, and uterine fibroids. Patients undergoing LA were associated with coexisting medical problems and this is comparable to the findings of Gunning J.E et al Seventy seven percent of the patients who presented with acute appendicitis underwent OA while 13.5% underwent LA. This is due to the fact that laparoscopic appendicectomy is done as an elective procedure and performed by a consultant surgeon and currently the operations are being done once a week and therefore is not available for emergency surgeries [15]. LA was performed

in 87.5% of patients who presented with recurrent appendicitis while 23% of the patients with appendicitis underwent OA. Duration of operation was longer in the LA group compared to the OA group and was statistically significant. The median operation time for the LA was 90-120 minutes while that of OA was 30-60 minutes. These findings are similar to those of Berci G, et al. [16]. In a review by Kelling G, et al, they noted/found that operation time was longer in OA group compared to LA but the difference was not statistically significant [17]. The long operating time could be attributed to our learning curve. Most of the personnel involved, the nurses and other support staff are not trained in laparoscopic surgery and instrument handling [18]. The instruments are expensive and delicate; the technicians are not well conversant with the equipment and cannot service the instruments when faulty. Of the patients undergoing LA, 21% had a normal appendix on histological examination in the study compared to studies in other centers [19, 20].

## Conclusion

In analyzing the various data we find that laparoscopic appendicectomy is similar to open appendicectomy in the parameters like blood loss, adjacent organ injury. Laparoscopic appendicectomy was better than open appendicectomy with respect to pain, wound infection, tackling co-existing pathology, duration of hospital stay, earlier return to normal activity, the excellent cosmetic end result, lesser use of antibiotics, and earlier resumption of oral feeds.

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