

*Research Article***Laparoscopic versus open surgery for suspected appendicitis****Mohamad B. Mahmoud**

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**Abstract**

**Background:** Appendectomy is one among the foremost common surgery wiped out emergency surgery. Appendectomy remains being performed by both open (OA) and laparoscopic (LA) methods. This study compared clinical outcomes between laparoscopic appendectomy technique and open surgery method for suspected appendicitis. **Methods:** This interventional study was performed for 50 patients diagnosed as suspected appendicitis. They were assigned to open appendectomy or laparoscopic appendectomy randomly. **Results:** a significant difference was found between the two studied groups according to operation time with longer in LAP appendectomy technique; and there have been 4 cases of site infection of surgery in open appendectomy group and 1 case in LAP appendectomy group, no statistically significant difference in surgical site infection between the 2 studied groups. **Conclusion:** Provided that surgical experience and equipment are available, laparoscopy might be considered safe and equally efficient compared to open technique and will be undertaken because the initial procedure of choice for many cases of suspected appendicitis. However, since there's no consensus to the simplest approach, both procedures (open and laparoscopic appendectomy) are still being practiced actively deferring the selection to the preference of surgeon and patients.

**Key words:** Laparoscopic appendectomy, appendicitis, opens surgery.

**Introduction**

A ruptured appendix is the one of the foremost common reason of intense midriff at different age bunches<sup>(1)</sup>. From the common populace, there are Approximately (7–10) % endures from intense a ruptured appendix with the highest rate of frequency within the 2<sup>nd</sup> and 3<sup>rd</sup> decades of life<sup>(2)</sup>.

In show disdain toward of a few endeavors to improve demonstrative precision, the clinical determination of intense a ruptured appendix remains questionable. The rate of negative investigation in youthful females ranges from 25% to 30%<sup>(3)</sup>.

For more than a century, Open appendectomy (OA) was the leading standard for treating the intense a ruptured appendix<sup>(4)</sup>. In 1889 Charles McBurney depicted, “it may be a secure, viable procedure with a moo rate of morbidity”<sup>(5)</sup>. Kurt Semm in 1983, was the primary who depicted Laparoscopic appendectomy (LA) method,<sup>(6)</sup> this way and its application for intense a ruptured appendix was detailed by Schreiber (1987)<sup>(7)</sup>.

With propels within the innovation and thus the surgical procedure, laparoscopic appendectomy has been the finest elective for the treatment of a ruptured appendix inside the final 2 decades<sup>(8)</sup>.

The negligible surgical injury through laparoscopic way driven to decrease of healing center remain, diminishing postoperative torment, quick return to the day action in a few settings related with gastrointestinal surgery.<sup>(9,10)</sup> A part of ponders comparing the laparoscopic with open appendectomy have a more noteworthy clinical result by means of the laparoscopic approach<sup>(11, 12)</sup>, while other thinks about have appeared negligible or no clinical benefits and lower surgical costs<sup>(13,14)</sup>. Except for a higher intraabdominal abscesses rate after LA in grown-ups, LA have an advantage over OA in torment escalated on the primary day, wound diseases, period of the healing center remain and time taken to return to typical movement for grown-ups. In differentiate, LA appeared preferences over OA in wound contaminations and period of healing center remain for children<sup>(15)</sup>.

In the present study, the main aim was to compare clinical outcomes between laparoscopic appendectomy and open surgery for suspected appendicitis.

### Material and methods

This was an interventional study.

Educated composed assent was gotten from each understanding to be included amid this study.

Our study populace included 50 patients. They were matured more prominent than 18 a long time matured and analyzed as suspected a ruptured appendix. Patients with other illnesses, such carcinoma or provocative bowel malady; the need for additional surgical medications (e.g., expansion of colon resection); unseemliness of laparoscopic approach due to past stomach surgery or surprising distension of the digestive system and flimsiness of breath or circulation since of systemic irresistible complications were prohibited from the study.

In this study, patients were isolated into 2 bunches for treatment: the primary gather for the open appendectomy (OA) treatment and the moment bunch for the laparoscopic appendectomy (LA) treatment.

### The following data about each patient were collected:

Personal history: age, sex, weight, height, BMI, marital status, occupation, smoking, family history and comorbidities.

A physical examination, routine hematology and blood chemical laboratory tests and urine screening.

Prior to surgery all the patients were subjected to ultrasonography of the abdomen. CT (Computed tomography) scan was checked to ensure correct diagnosis in selected patients.

### Interventions

All patients gotten preoperative intravenous anti-microbials (cefazopran hydrochloride 1 g each 12 h), which were proceeded inside the postoperative period until the fiery reaction diminished which decided by clinical (fever, torment, development, verbal

admissions) and research facility discoveries (white blood corpuscle check, CRP).

#### ● Laparoscopic appendectomy:

The persistent was set beneath common anesthesia inside the prostrate position. The more noteworthy peritoneal sac was gotten to utilizing the open Hassan method, and an 11-mm trocar was embedded at the subumbilical locale for the telescope. Pneumoperitoneum was performed by insufflation of CO<sub>2</sub> at a weight of 12-mm Hg. One or two of extra trocars (ordinarily 5 mm) were embedded at the lower quadrants of the guts. Dismemberment and mobilization of the reference section was performed with coagulation or ultrasonic dissector. The reference section was separated at the foot between two Endoloops. Recovery of the resected reference section was made utilizing the umbilical harbour.

#### ● Open appendectomy:

A lower right quadrant muscle part cut was utilized in most of the circumstances. The mesoappendix was ligated and separated. The appendiceal stump was transfixed and invaginated utilizing a purse-string suture. The cut was at that point closed layers.

All specimens were sent to histopathology. After full awareness was picked up by the understanding, Nourishment utilization was begun. Patients were released when nourishment was endured, and thus the fever had died down. Patients were taken after up one week and four weeks after discharge.

### Outcomes:

The primary result of this think about was the improvement of an irresistible complication, particularly a Surgical Location Contamination (SSI), inside one month of the operation. steady with the classification from the Centers of Infection Control and Anticipation (CDC) SSI were isolated into shallow incisional and profound incisional SSI. Shallow SSI incorporates contaminations including as it were the skin or subcutaneous tissue at the entry point and profound SSI incorporates contaminations including profound delicate tissues (e.g., fascial and muscle layers) at the cut <sup>(16)</sup>.

Stump spillage is characterized as any clinical or radiologic prove of a drag (such as release of intestinal substance through a deplete), whether reoperation or the other intercession was required. Extra tests like chest and stomach computerized tomography were performed to test leakage-related complications.

The auxiliary results was the operation time ( in minutes for both the methods was tallied from the skin cut to the final skin fasten connected), pain relieving utilize recurrence, begin of verbal admissions, recuperation of development (Disabled ileus was characterized as disappointment of bowel sounds to return inside 12 h postoperatively), reclamation of physical movement, period of clinic remain (the number of evenings went through at the clinic postoperatively), and changes inside the white blood cells check and CRP level after surgery.

### Results

A number of 50 patients were taken within the show consider amid this period, agreeing to the consideration criteria. Out of the 50 patients, 25 experienced open appendectomy and 25 experienced a laparoscopic appendectomy. Patient's age in patients with open appendectomy had normal esteem of  $39.72 \pm 9.480$  Vs  $39.16 \pm 8.050$  a long time in LAP appendectomy. Patients sex appear that more than 50% of patients within the two bunches were male 15(60%) and 17(68%) individually. BMI had a cruel

esteem of  $31.28 \pm 5.445$  kg/m<sup>2</sup> in open appendectomy gather versus  $29.17 \pm 5.598$  kg/m<sup>2</sup>. No noteworthy contrasts were found concurring to comorbidity, side effects and research facility examinations.

**Table (2)** show postoperative information and it found that there was critical contrast between the 2 bunches agreeing to operation time with longer in LAP appendectomy procedure. Clinic remain in patients with open appendectomy had cruel esteem of  $4.56 \pm 1.193$  Vs  $4.56 \pm 1.003$  days in LAP appendectomy. A percent 52% of all the patients treated by the open appendectomy gather and 40% in LAP appendectomy gather had bowel sounds return in day one after operation (at 24 hours) and remaining 48 and 60% in moment post-operative day (at 48 hours). There's no measurable centrality in bowel sounds return was found within the two consider bunches. Larger part of the patients treated by open appendectomy and LAP appendectomy bunch had return to ordinary action by seventh post-operative day (48% and 44%). there was no factual centrality in return to typical day movement between the two think about bunches. When location disease of the surgery was compared between the two consider bunches there was four cases of surgical site infection in open appendectomy group and one case in LAP appendectomy group, also there is no statistical significance in surgical site infection (SSI) between the two study groups

**Table (1): Comparison between the 2 study groups according to demographic data**

	<b>Open appendicectomy (n=25)</b>	<b>LAP appendicectomy (n=25)</b>	<b>P Value</b>
<b>Age</b>	39.72±9.480	39.16±8.050	0.992
<b>Sex n(%)</b>			
Male	15(60.0%)	17(68.0%)	0.769
Female	10(40.0%)	8(32.0%)	
<b>Comorbidity</b>			
HTN	6(24.0%)	4(16.0%)	0.725
DM	7(28.0%)	5(20.0%)	0.742
Dyslipidemia	3(12.0%)	1(4.0%)	0.609
Cardiovascular	1(4.0%)	2(8.0%)	1.000
<b>Height (cm)</b>	162.40±9.674	170.76±10.584	0.058
<b>Weight (kg)</b>	82.00±12.748	84.04±11.219	0.398
<b>BMI (kg/m<sup>2</sup>)</b>	31.28±5.445	29.17±5.598	0.171
<b>Symptoms</b>			
Vomiting	11(44.0%)	15(60.0%)	0.396
Anorexia	18(72.0%)	14(56.0%)	0.377
Nausea	10(40.0%)	12(48.0%)	0.776
Fever	11(44.0%)	14(56.0%)	0.572
Diarrhea	9(36.0%)	12(48.0%)	0.567
Dysuria	8(32.0%)	12(48.0%)	0.387
<b>Laboratory investigation</b>			
WBCs (x10 <sup>3</sup> )	17.21±10.670	16.92±6.888	0.900
CRP	29.92±6.390	30.96±6.255	0.490

**Table (2): Comparison between the 2 groups according to postoperative data**

	Open appendectomy (n=25)	LAP appendectomy (n=25)	P Value
<b>Operation time</b>	35.44±3.083	52.72±4.449	<0.001*
<b>Hospital stay</b>	4.56±1.193	4.56±1.003	0.992
<b>Return Bowel sounds</b>			
1 <sup>st</sup> day	13(52.0%)	10(40.0%)	0.571
2 <sup>nd</sup> day	12(48.0%)	15(60.0%)	
<b>Return Bowel normal activity</b>			
After 6 days	3(12.0%)	6(24.0%)	0.695
After 7 days	12(48.0%)	11(44.0%)	
After 8 days	8(32.0%)	7(28.0%)	
After 9 days	2(8.0%)	1(4.0%)	
<b>Laboratory investigation</b>			
WBCs (x10 <sup>3</sup> )	11.19±5.657	13.17±5.791	0.197
CRP	22.96±4.912	22.68±4.451	0.793
<b>Surgical site infection</b>	4(16.0%)	1(4.0%)	0.349

## Discussion

A ruptured appendix is one of the major causes of surgical guts in all age bunches. A percent extending 7–10 % of the common populace endures from intense a ruptured appendix with the most prominent rate of frequency being within the 2<sup>nd</sup> and 3<sup>rd</sup> decades of life<sup>(17)</sup>. Open surgical appendectomy was considered the most excellent standard strategy for treating intense a ruptured appendix patient for more than 100 a long time, but the predominance and the productivity of laparoscopic strategy compared to the open procedure pick up a extraordinary consideration these days<sup>(18)</sup>. There's an prove that the negligible surgical stun through laparoscopic approach coming about a critical shorter period of clinic remain, less postoperative torment, fast return to day action in a few settings related with gastrointestinal surgery<sup>(19)</sup>.

However, several studies was found in literature like Guller et al.,<sup>(20)</sup> Roviario et al.,<sup>(21)</sup>, several trials of Ortega et al.,<sup>(22)</sup>; Ignacio et al.,<sup>(23)</sup> and meta-analyses of Wei et al.,<sup>(24)</sup>; Sauerland et al.,<sup>(25)</sup> comparing laparoscopic with open appendectomy have provided some conflicting results. Some of these studies have showed a better clinical outcome with the laparoscopic approach, while other studies have shown minor or no clinical benefits and higher cost to preform<sup>(26)</sup>.

Taking the laparoscopic appendectomy into consideration, not at all like other laparoscopic methods, has not been found predominant to open surgery for intense a ruptured appendix<sup>(17)</sup>, the display think about pointed to compare clinical results between laparoscopic appendectomy and open surgery for suspected appendicitis.

Examination of our findings of statistic characteristics of member cases uncovered that Patient's age in patients with open appendectomy had cruel esteem of  $39.72 \pm 9.480$  Vs  $39.16 \pm 8.050$  a long time in LAP appendectomy. Patients sex were that more than 50% of patients within the two bunches were male 15(60%) and 17(68%) separately. BMI had a cruel esteem of  $31.28 \pm 5.445$  kg/m<sup>2</sup> in open appendectomy gather versus  $29.17 \pm 5.598$  kg/m<sup>2</sup>, and there was non-factually noteworthy distinction between bunches agreeing to comorbidity, indications and research facility examinations.

As compared to our findings, the consider of Biondi et al.,<sup>(17)</sup> which detailed that out of 593 patients with intense a ruptured appendix, there are a number of 310 patients treated by open appendectomy and 283 patients with laparoscopic appendectomy. There have been no noteworthy contrasts with reference to age and related co-morbidities. On the opposite, the contrast in sex and inside the check of white blood cell at introduction was measurably critical. Out of the whole 310 open methods, there are 214(69%) were performed for uncomplicated a ruptured appendix and 96(31%) for advanced infection counting appendiceal puncturing with neighborhood or worldwide peritonitis. Moreover; inside the laparoscopic gather, 241 understanding (85%) strategies included uncomplicated illness and 42(15%) complicated a ruptured appendix. Critical, we didn't watch contrasts between bunches for all the grades of a ruptured appendix.

Within the current study; we found that there was essentially contrast between the 2 bunches agreeing to operation time with longer in LAP appendectomy method. Clinic remain in patients with open appendectomy had cruel esteem of  $4.56 \pm 1.193$  Vs  $4.56 \pm 1.003$  days in LAP appendectomy. In understanding with our discoveries, the think about of Biondi et al.,<sup>(17)</sup> uncovered that the mean  $\pm$ SD (Standard Deviation) agent time of  $54.9 \pm 14.7$  min for LA bunch was longer than the cruel agent time of  $31.36 \pm 11.43$ min for open append-

ectomy ( $P < 0.0001$ ). Clinic stay was essentially shorter within the laparoscopic bunch with a mean  $\pm$ SD of  $1.4 \pm 0.6$  days compared with  $2.7 \pm 2.5$  of the open appendectomy gather ( $P = 0.015$ ).

The studies of Olmi e al.,<sup>(27)</sup> and Di Saverio et al.,<sup>(28)</sup> have concluded that laparoscopic appendectomy is more secure and comes about in a fast return to ordinary day exercises with less wound complications. In opposite of these findings' other analysts Kehagias et al.,<sup>(29)</sup> observed that there was no significant change in the outcome of the two procedures, and moreover noted higher operation costs with laparoscopic appendectomy.

A recent systematic review of meta-analyses of random controlled trials of Jaschinski et al.,<sup>(30)</sup> comparing laparoscopic and open appendectomy concluded that both methods are safe and effective for the treatment of acute appendicitis.

Within the present study we concluded that 52% out of the patients in open appendectomy bunch and 40% in LAP appendectomy bunch had return of bowel sounds by the primary post-operative day (at 24 hours) and remaining 48 and 60% in moment post-operative day (at 48 hours), there's no factual centrality in return of bowel sounds was taken note within the two consider bunches. Most of the patients in open appendectomy and LAP appendectomy gather had return to typical every day action by the seventh post-operative day (48% and 44%). there was no factual noteworthiness in return to typical action between the two examined bunches.

In comparison with Biondi et al.,<sup>(17)</sup> consider, which concluded that Bowel developments within the to begin with post-operative day were watched in a percent 93% of patients subjected to laparoscopic appendectomy and 69% within the open bunch ( $P < 0.001$ ). As a result, 85% of patients within the laparoscopic gather and 62% within the open gather were able to endure a fluid count calorie inside the primary postoperative day ( $P < 0.001$ ). Within the same time, a exceedingly critical

distinction existed between the two bunches in time taken to reestablish the schedule day action, which was less within the laparoscopic gather with a cruel  $11.5 \pm 3.1$  days compared with cruel  $16.1 \pm 3.3$  days within the open appendectomy bunch.

Furthermore to the over discoveries; this ponder uncovered that there have been four cases enduring of a surgical location disease in open appendectomy gather and one case in LAP appendectomy gather, and there was no measurable noteworthy in surgical location disease between the 2 think about bunches, hence the lower rate of wound disease in laparoscopic bunch seem moreover be since of arrangement of the segregated reference section into an endobag sometime recently the evacuation from the guts, lessening contact with the fascial surfaces and minimizing defilement. Then again, intra-abdominal boil may be a genuine and life-threatening complication.

Concurring to, the consider of Biondi et al.,<sup>(17)</sup> detailed that the common complication rates were 24.5 % and 6.7 % for open and laparoscopic appendectomy individually, with a rate of contaminated wound and dehiscence essentially higher inside the open gather ( $P < 0.001$ ).

Wound contamination is more common in complicated a ruptured appendix and ought to not speak to a critical complication inherently but highlights a solid affect for improvement time and quality of lifetime of patients.

In conclusion, the comparison between LA and OA has been plan analyzed in over RCTs; and assist more considers would improbable alter the discoveries of those trials. Hence, analysts and supports ought to center in surveying a modern surgical approach comparing single entry point LA versus ordinary three harbour LA that there's as of now deficiently prove<sup>(31)</sup>. Without a doubt, as long as surgical involvement and gear are accessible, laparoscopy may well be considered secure and similarly productive compared to the open strategy and will be embraced since the beginning strategy of

choice for numerous cases of suspected a ruptured appendix. In any case, there's no agreement to the best approach, both methods (open and laparoscopic appendectomy) are still being practiced actively conceding the determination to the inclination of specialist and patients. inside long term, laparoscopic appendectomy might speak to the quality treatment for patients with a ruptured appendix and undiscovered stomach torment.

LA and OA are secure and viable methods for the treatment of intense a ruptured appendix in clinical hone. The prove from this think about are frequently utilized for the occasion and overhauling of rules and protocols.

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