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Comparative Study between Open and Laparoscopic Appendectomy in Acute Appendicitis

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ABSTRACT

Background: Appendectomy is a widespread emergency surgery, and to date the appendectomy is still done through two approaches: open (OA) and laparoscopic (LA) and it is not known which is better than the other.

Objective: This study aimed to compare OA and LA surgical approaches in patients with acute appendicitis.

Patients and methods: Data were obtained from eighty patients underwent appendectomy at Baquba Teaching Hospital between September 2021 and May 2022. Forty patients in (OA) group underwent open surgery, as well as forty other patients in (LA) group underwent laparoscopic surgeries. The two groups were compared according to the operation time, hospital stay, wound infection, and return to normal daily activity.

Results: LA approach was associated with shorter (1.4±0.6 days) hospitalization than OA (2.7±2.5 days). Also, the operative time of the laparoscopic approach was clearly less (30±3.2 min) compared to the open approach (35±5.2 min). There was no postoperative infection in the LA patients, and the laparoscopic patients returned to their daily activities faster than the open surgery group.

Conclusion: Laparoscopic surgery is a safer approach to appendectomy, especially if it is performed by skilled specialist surgeons.

Keywords: Laparoscopic surgery, appendectomy, acute appendicitis.

INTRODUCTION

Appendicitis is simply defined as the vermiform appendix becoming inflamed, and the acute type is the majority intra-abdominal case that requires emergency surgery [(1,2)]. This condition usually begins acutely, but over time becomes chronic. This inflammation is characterized by abdominal pain, especially in the right lower quadrant [(3)].

The patient presents with clinical signs such as pyrexia, nausea, muscle guarding [(4)].

As maintained by the scientific literature, about seven .percent of the world's population will develop appendicitis during their lifetime, and this makes appendectomy undoubtedly one of the most common abdominal surgeries [(5)]. Over a century ago, OA surgery has been considered the safe and preferred operation for acute appendicitis [(6)].

Lately, several authors have suggested that the new procedure of LA surgery should be the surgical approach of choice for acute appendicitis cases [(7)]. In contrast, this laparoscopic technique has not been widely accepted among some surgeons yet. In 1981, German gynecologist Semm performed the first OA surgery, and then it is standardized among surgeons. It is usually done by a small lower right quadrant incision and is usually recovery after surgery is uneventful [(8,9)].

It comes after laparoscopic cholecystectomy in terms of common general surgeries, especially in the abdomen [(10)]. Considering the incidence of mortality rates with the traditional open surgery, although it was very low, with an uneasy morbidity rate, the use of laparoscopic technique was initially welcomed by many surgeons [(11,13)]. On the other hand, some surgeons were not enthusiastic due to some not good observations of laparoscopy, including the increase in cost to the patient, as well as some outcomes [(14)]. In addition, previous studies have also shown that laparoscopy contributes significantly to reducing unnecessary appendectomy and improving diagnosis, especially in women of childbearing age [(15)].

Besides, other studies report that laparoscopic appendectomy does offer significant beneficial advantages [(16)]. In general, laparoscopic appendectomy has been shown to be a surgical technique of choice for uncomplicated appendicitis. So far, the use of laparoscopic appendectomy in cases of complex appendicitis has been a questionable decision [(17)]. Because the choice of the surgical approach is the task of the surgeon, we conducted this study to compare both surgical approaches in terms of outcomes in acute appendicitis patients.

PATIENTS AND METHODS

In this retrospective study, eighty patients with acute appendicitis who underwent appendectomy at Baquba Teaching Hospital, Diyala Governorate (Iraq) between September 2021 and May 2022 were enrolled.

The participants were divided into two groups, group (OA) who underwent open appendectomy, and group (LA) who underwent laparoscopic appendectomy, with forty patients in each group. The decision to choose the surgical approach for each

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patient was made by the surgical team according to the circumstances of each case. Adults of both genders participated in this study, and pregnant women and patients with critical conditions requiring intensive care were excluded. A comparison was made between the two groups regarding: duration of operation (in minutes), hospital stay (in days) after surgery, incidence of post-operative infection, and return to normal activity (in days).

Surgical procedure

All patients who underwent appendectomy received general anesthesia as per the protocol approved in the surgical wards. Open surgery was done through the standard McBurney incision, to access and open the peritoneum to deliver the acute inflamed appendix, and to remove it with a conventional appendectomy approach. In laparoscopic appendectomy (**Figure 1**), a standard three-port technique was used, according to a previously described procedure [(18)], and patients were discharged from the hospital based on stabilization.

The operation time was calculated starting from the skin incision to the last stitch used, while the hospitalization period was restricted by the number of nights that the patient spent after the surgery in the hospital.

As for the consequences of the post-operative wound infection, it was considered redness, pus or sero-purulent discharge from the incision place.

Figure (1): Laparoscopic Appendectomy.

Ethical considerations:

This study was carried out after the Official Approval by the Ethical Committee of the Local Baquba Health Directorate, Iraq. All patients signed a written informed consent to participate in the study. This research has been done in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Analysis

All data were processed using Statistical Package for the Social Sciences (SPSS), version 26 (IBM), and quantitative data were presented as mean and standard deviation (SD) and were compared by Student's t-test between both study groups with set P value at less than 0.05 as significant.

RESULTS

Table 1 shows no considerable variations with regard to gender and age between the two surgical groups.

Table (1): Comparison both surgical groups in terms of gender and age.

Variables		Appendectomy surgical groups		P -value
		OA(N=40)	A(N=40)	
Gender	Male	23(65)	19(45)	0.394
	Female	17(35)	21(55)	0.346
Mean age		29.66 ± 15.13	27.75 ± 14.24	0.761

Table 2 shows considerable variations with regard to operative time gender and hospital stay between both surgical groups.

Table (2): Comparison both surgical groups in terms of operative time and hospital stay.

Variables	Appendectomy surgical groups		P-value
	OA (N=40)	LA (N=40)	
Operative time (min)	35±5.2	30±3.2	0.049
Hospital stay (day)	1.4±0.6	2.7±2.5	0.019

Table 3 shows a clear difference in the time it took to return to routine daily activities between the two groups. Wound infection was recorded in only 3 (15%) patients in the open appendectomy group versus none in the laparoscopy group.

Table (3): Comparison both surgical groups in terms of postoperative wound infection and return to normal activity

Variables	Appendectomy surgical groups		P-value
	A(N=40)	LA (N=40)	
Postoperative wound infection	3 (15)	0 (0.0)	1.00
Return to daily activity(day)	17.2±3.4	12.6±4.2	0.045

DISCUSSION

A preoperative specific diagnosis is particularly challenging for emergency cases, especially critical cases in the abdomen [19,20]. Because laparoscopic appendectomy improves the visibility of the entire abdomen, thus it can support the accuracy of diagnosis and identify definitive diseases that cause lower abdominal pain compared to the open approach [21]. Besides, several benefits of laparoscopic approach have been documented, as it necessity small incisions with good vision, provides preferable access to organs in the abdomen, as well as a quick recovery in the postoperative period [22,23].

The results of our study were in agreement with similar previous studies, where Mohammed et al. stated in their study that the mean age in the LA group was about 32 (SD 14) years compared to 34 (SD 13) years in the patients of OA group [24]. This similarity in age is due to the fact that appendicitis is often more common in the younger age group [25]. In a systematic literature study by **Quah and colleagues (2019)** comparing LA with OA for complicated appendicitis in 6,428 patients, they concluded that the laparoscopic approach patients had significantly less hospital stay and postoperative complications, including wound infection, and a faster return to solid food intake compared to patients with the traditional open approach. Thus, their recommendation was that LA be the surgical treatment of choice for patients with complicated appendicitis [26]. In another randomized controlled study by **Talha *et al.*** [27] on cases with perforated appendicitis (total 126) underwent appendectomy with both approaches, they noted a significant difference in hospital stay, and return to daily activities in favor of laparoscopy patients. In contrast, in another similar retrospective study conducted by **Fujishiro *et al.*** [28] on 4,489 pediatric patients underwent appendectomy, 70.5% of them were laparoscopic surgery, they found that the incidence of postoperative complications and length of hospitalization of patients with LA are similar to those of open appendectomy for acute appendicitis [28]. In 2018, Zosimas and colleagues reviewed the electronic records of 300 patients underwent either OA (166) or LA (134) in a one-year retrospective period, they concluded that although the LA approach surgery is safe and effective, but the choice between open traditional appendectomy and laparoscopic surgery should be tailored according to the clinical scenarios and the preference of the surgeons [29].

In conclusion, laparoscopic appendectomy has advantages over open traditional surgery especially with regard to hospitalization periods, resumption daily activities, and no wound infection incidence. Therefore, we recommend laparoscopic appendectomy in acute appendectomy patients as has better outcomes.

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