

Comparison between laparoscopic and open appendectomy in uncomplicated acute appendicitis at Al- Imamain Al- Kadhimain (A.S) Medical City

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Original Article

Abstract

Background: Acute appendicitis is one of the most common abdominal emergencies worldwide. The advent of laparoscopic appendectomy has impacted not only on the surgical results but also on the training of junior surgeons. In 1983, Kurt Semm performed the first successful laparoscopic appendectomy.

Objective: is to compare between laparoscopic appendectomy & open appendectomy regarding duration of operation, duration of hospitalization & time to return to usual light activity.

Patients & methods: This study is a prospective randomised clinical experiment carried out at the surgical department at Al-Imamain Al-Kadhimain Medical City in Baghdad, Iraq, from April 2012 to October 2013. There were 80 participants in this study. From them, forty have had laparoscopic appendectomy (by senior residents under supervision of the consultant) and the other forty had open appendectomy under general anesthesia by junior surgeons and all specimens sent for histo-pathological examination.

Results: Showed that in contrast to longer operative time in laparoscopic appendectomy (60-86 minutes) than open appendectomy (32-55 minutes), there was significant reduction in the duration of hospital stay (12.5-23.5 hrs.) and duration of return to work (2-3 days) following laparoscopic appendectomy as compared with open approach (17-35 hrs. and 4-8 days) respectively.

Conclusion: Laparoscopic appendectomy for uncomplicated appendicitis is a safe procedure with numerous benefits compared to open surgery, including shorter hospital stays, quicker return to work, and improved quality of life. These advantages are key aspects of minimally invasive surgery.

Keywords: Uncomplicated acute appendicitis, laparoscopic appendectomy, open appendectomy.

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1. INTRODUCTION

Acute appendicitis is a prevalent abdominal emergency globally. Appendectomy accounts for approximately one-third of all emergency procedures conducted in both developing and industrialised countries (1). The incidence is approximately 6-12% and the lifetime risk is around 8% (2). Open appendectomy has been considered the gold standard for treating acute appendicitis for many years, with satisfactory results in most reported studies (3). After Semm introduced the first laparoscopic appendectomy in 1983, many surgeons first showed reluctance, scepticism, or open rejection towards this procedure (4). Surgeons were dissuaded by the drawbacks of the laparoscopic method, such as prolonged surgery time, higher expenses for the patient, and documented problems (5,6). After almost 30 years, numerous randomised controlled trials have provided substantial evidence supporting laparoscopic appendectomy in various medical facilities worldwide(7,8). This procedure has been found to lower postoperative pain (6,8), decrease the occurrence of postoperative ileus and wound infections (8), and enable a quicker return to regular activities (12). However, the operation costs⁸ and the incidence of intra-abdominal abscesses (6-8) are significantly higher compared to open appendectomy and no significant benefits are present for the overall hospital costs or the readmission rates. Furthermore, although the hospital stays seemed shorter for laparoscopic appendectomy, results are contrasting (9,10). For all these reasons, one meta-analysis concluded that a more selective approach (suspicion of appendicitis and fertile women) would probably be more beneficial (10) for laparoscopic approach. The advent of laparoscopic appendectomy has impacted not only on the surgical results but also on the training of junior surgeons. Recent studies have showed that most appendectomies are now performed laparoscopically by senior surgeons than in the past when the open approach was used. This trend is not present in the University Hospital where most laparoscopic appendectomy cases are conducted by junior surgeons during their training (Registrars and Senior House Officers) under adequate supervision (11,12). Laparoscopic treatments have been widely implemented across various surgical specialties in recent times. As a result, advancements in laparoscopic instruments and methods have led to an increased number of patients opting for laparoscopic appendectomy over open appendectomy for appendicitis (13-15).

2. PATIENTS and METHODS

This is a prospective randomized clinical trial which was conducted at the department of surgery at Al- Imamain Al- Kadhmain Medical City, Baghdad-Iraq, between April 2012 and October 2013. Ninety three patients were enrolled in this study. Acute appendicitis was diagnosed on the basis of history, Physical examination and sonographic findings. From them forty eight patient have had laparoscopic appendicectomy and the remaining forty five had open appendicectomy.

Exclusion criteria:

1. Complicated acute appendicitis.
2. Normal appendix with coexistent complicated ovarian cyst.

According to these criteria, thirteen patients were excluded from this study. The remaining eighty patients, forty have had laparoscopic appendectomy (by senior residents under supervision of the consultant) and the other forty had open appendectomy under general anesthesia by junior surgeons and all specimens sent for histopathological examination.

In laparoscopic appendectomy, Co2 insufflation was done via veres needle inserted through a 10 mm transverse supra umbilical incision. Then after reaching 12 mmHg intra-abdominal pressure the needle is replaced by a 10 mm port, through which a 10 mm telescope was inserted to inspect the interior of the abdomen. Another two ports of 5 mm (one supra-pubic which was about 2-3 cm above symphysis pubis and another at a point midway between the umbilicus and left anterior superior iliac spine) were inserted under vision. We found these port sites were more convenient to the surgeon and to prevent overcrowding of the surgeon's hands and hands of the assistant holding the camera. After that, the operating table was adjusted in Trendelenburge position and tilted to the left to displace the bowel away from the right iliac fossa. After exploration, the appendix is grasped and the mesoappendix was divided by judicious hook diathermy (monopolar) taking small bites close to the wall of the appendix. Near to the base of the appendix, the remaining part of the meso- appendix was gently dissected down. The base of the appendix was ligated by endoloops, introduced into the abdomen, then the appendix is enclosed into the loop and the knot is tied. Two loops were applied proximal and one distal to the site of division. The stump of appendix was cauterized carefully by the tip of the hook. A 5 mm telescope was then introduced through the 5 mm port

of the left iliac fossa and the 10 mm telescope removed for grasping of the appendix into the 10 mm port to be removed all together (the 10 mm port and the appendix inside it).

In open method, classical appendectomy was done through right grid iron incision at McBurney's point.

The data collected from the two groups according to the duration of operation (which was calculated from the time of skin incision till the time of skin closure), hospital stay and the time of return to usual light activity.

3. RESULTS

Eighty patients were enrolled in the present study. They were 48 females (60%) and 32 males (40%). These patients were divided into two groups. Group A, included 40 patients (21 female, 19 male) have had laparoscopic appendectomy. Group B, included 40 patients, (22 female and 18 male) have had open appendectomy. The data were analyzed statistically with t test. The patients' demographics of the two groups were matched statistically in terms of age & gender as shown in (**Table 1**). In group A, the mean age was 26 (18-34) year, the F:M ratio was 1.1:1. In group B the mean age was 27 (19-35) year, the F:M ratio was 1.2:1. Regarding the duration of operations. The mean time for operations in Group A was 73.4 (60- 86) minute and Group B was 43 (32-55) minute as was shown in (**Table 2**). When we compare the duration of operation between Group A & Group B, it is statistically significant as p-value is <0.05. Regarding the duration of hospital stay. The mean time of hospital stay in Group A was 18 (12.5-23.5) hour and in Group B was 26 (17-35) hour. When we compare the duration of hospital stay between the two groups as shown in (**Table 3**). The p-value is <0.05. So it's statistically significant. Regarding the time to return to usual light activity. The mean time in Group A was 2.4 (2-3) days and in Group B was 6.1 (4-8) day. When we compare the time to return to usual light activity between the two groups as shown in (**Table 4**). The p-value is < 0.05. So it's statistically significant.

Table 1. The patients' demographics

Characteristics	Group A (Laparoscopic appendectomy)	Group B (Open appendectomy)	P. value
Age (years) mean±SD	26±8	27±9	>0.05
Gender (F:M)	1.1:1	1.2:1	>0.05

The statistical difference is not significant when we compare Group A with Group B regarding age and genders as p-values are > 0.05 for all.

Table 2. comparison between studied groups according to the duration of operation

Variable	Group A	Group B	P. value
duration of operations (minutes) (mean ±SD)	73.4±12.6	43±11.3	<0.0001

Table 3. Hospital Stay

Variable	Group A	Group B	P. value
Hospital Stay (hours) (mean ±SD)	18±5.5	26±8.7	<0.0001

Table 4. comparison between studied groups regarding to return to usual light activity

Variable	Group A	Group B	P. value
return to usual light activity (mean ±SD)	2.4±0.5	6.1±2.2	< 0.05

4. DISCUSSION

In 1886, Reginald Fitz of Boston accurately recognised the appendix as the main reason for inflammation in the right lower quadrant and suggested early surgical intervention. Open appendectomy was the primary treatment for acute appendicitis before laparoscopic instruments were introduced. Although there are variations across different surgery centres, laparoscopic appendectomy become popular because of several advantages over open appendectomy such as cosmetic appearance and excellent outcomes (16-18). Regardless of disease severity or patients' age, the optimal surgical approach for patients with acute appendicitis is still debated (19-22). In addition, it is hard to say that laparoscopic

appendectomy is better because of some disadvantages as longer operative time and higher hospital costs seen in some studies (23,24). In this study we try to compare between laparoscopic and open appendectomies regarding duration of operation, duration of hospitalization and time to return to light work. Regarding the duration of operation in patients who have had open appendectomy, it is significantly shorter than those with laparoscopic appendectomy (32-55 min (Mean 43 ± 11.3 min) Vs. 60-86 min (Mean 73.4 ± 12.6 min)), $p < 0.05$). Our study agrees with many other studies as F. Colombo et al (8) at a British University Hospital (55 ± 26.8 min for open appendectomy vs. 83 ± 26.9 min for laparoscopic appendectomy, $p < 0.05$), and Mohamed A. Said et al., (25) at Department of Surgery, Al Azhar University, Egypt (42 min for open appendectomy vs. 95 min for laparoscopic appendectomy, $p < 0.01$). Regarding the duration of hospital stay after surgery which was significantly shorter for patients who had laparoscopic appendectomy than those who underwent open appendectomy in this study ((12.5-23.5) hrs. (Average 18 ± 5.5 hrs) Vs. (17-35) hrs. (Average 26 ± 8.7 hrs.), $p < 0.05$). These results are in agreement with other studies as well like F. Colombo et al., (6) at a British University Hospital (2.2 days for laparoscopic appendectomy vs. 3.7 days for open appendectomy, $p = 0.02$) also Chien-Che Wang et al., 26 at department of General Surgery, PoJen General Hospital, Taipei, Taiwan (4.01 ± 2.9 for laparoscopic appendectomy days vs. 5.33 ± 5.12 days for open appendectomy, $p < 0.001$). The reason behind longer hospital stays for both open and laparoscopic appendectomies in these studies than that in ours is due to the fact that they included complicated appendicitis in their study, while only uncomplicated appendicitis have been included in the study. Regarding the time to return to light activity which was significantly shorter for patients who have had laparoscopic appendectomy than those who underwent open appendectomy in this study ((2-3) days (Average 2.4 ± 0.5 days) vs. (4-8) days (Average 6.1 ± 2.2 days), $p < 0.05$). These results are in agreement with other studies as well like Adrian E. Ortega et al (27) at the Department of Surgery (AEO, JHP), University of Southern California, Los Angeles, California (9 ± 8 days for laparoscopic appendectomy vs. 14 ± 11 days for open appendectomy, $p < 0.001$) also Shaikh AR et al., 28 at the Department of Surgery, Liaquat University of Medical and Health Sciences Jamshoro, a public sector university (12.6 ± 3.3 days for laparoscopic appendectomy vs. 19.1 ± 3.1 days for open appendectomy, $p < 0.001$).

However, there are variable definitions of activity ranging from light, normal usual and heavy work activity. In contrast to other studies, only short time (light) activity we had included in our study because of difficulties of regular follow-up of our patients postoperatively after discharging home. Even so, laparoscopic appendectomy show shorter time to return to work than open operation whether light or ordinary work is considered.

5. CONCLUSIONS

Although the sample size of the study was relatively small, we conclude that the laparoscopic approach to appendectomy in patients with uncomplicated appendicitis is safe and has many advantages over the open approach, in terms of length of hospital stay, return to work, and quality of life, which are considered the major advantages of minimally invasive surgery. The main limitations of laparoscopic appendectomy are:

1. Availability and maintenance in the causality department.
2. Technical demands for surgical staff in the theatre.
3. The longer operative time, this can be shortened by increasing skills and experience.

Ethical Clearance:

Ethical issues were taken from the research ethics committee. Informed consent was obtained from each participant. Data collection was in accordance with the World Medical Association (WMA) declaration of Helsinki for the Ethical Principles for Medical Research Involving Human Subjects, 2013 and all information and privacy of participants were kept confidentially.

Conflict of interest: Authors declared none

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