

Laparoscopic appendectomy in comparison with open traditional surgery for suspected cases of acute appendicitis.

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الخلاصة

الخلفية: لاكثر من قرن، عملية استئصال الزائدة الدودية باستعمال الجراحة التقليدية بقيت هي العلاج الذهبي لالتهاب الزائدة الدودية الحاد. الان استئصال الزائدة بالناظور انتشر ليثبت انه افضل من العملية الروتينية.

الهدف: مقارنة الامانه ومدى الفائده من استئصال الزائدة بالناظور واستئصال الزائدة جراحيا.

المرضى و الطرائق: دراسيه مستقبلية اجريت في مستشفى اليرموك التعليمي والمستشفيات الاهليه في بغداد اشتملت 130 مريض من نيسان 2013 الى نيسان 2014. ثلاثون مريض تم استبعادهم من الدراسه و مئة مريض تم تقسيمهم الى مجموعتين

مجموعة أ (40 مريض تم علاجهم بعملية استئصال الزائدة بالناظور) و مجموعه ب (60 مريض تم علاجهم بعملية استئصال الزائدة جراحيا)، بعد اخذ موافقة المريض. اهم القياسات المشموله كانت وقت العملية، المضاعفات بعد العملية، بدء الغذاء عن طريق الفم، البقاء في المستشفى.

النتائج: 40 مريض تم معالجتهم بالناظور، لا يوجد فرق مهم بين المجموعتين في العمر، جسم المريض، النتائج السريرية والمختبرية. معدل العمر كان 30 سنة، نسبة الذكور الى الاناث كانت 1/1,2 في المجموعه أ مقارنة 1/1,3 في المجموعه ب. وقت العملية كان 45 دقيقة في المجموعه أ بينما 40 دقيقة في المجموعه ب، حاجة المريض لمسكن الالم بعد العملية كان 1,1 في المجموعه أ و 3,1 في المجموعه ب. خمسة من المرضى (12,5%) تم تحويل العملية من الناظور الى عملية فتح جراحيا، معدل البقاء في المستشفى كان يوم واحد في المجموعه أ ويومين في المجموعه ب.

الاستنتاج: استئصال الزائدة الدودية بالناظور هو اجراء امن و فعال، اقل الم بعد العملية، رجوع مبكر للعمل مع الحصول على جرح اجمل من العملية الجراحية التقليدية

الكلمات الافتتاحية: الناظور، الفتحة، استئصال الزائدة الدودية.

Abstract

Background For more than a century, open appendectomy remained the gold standard for the treatment of acute appendicitis. Now laparoscopic appendectomy has struggled to prove its superiority of performing general surgical procedure.

Objective is to compare the safety and benefits of laparoscopic appendectomy with open appendectomy.

Patients & Methods a prospective study has been done in AL- Yarmouk teaching hospital and private hospitals, 130 patients were selected from April, 2013 to April 2014. 30 patients excluded from the study and hundred patients were Divided into two groups, group A (40 patients with acute appendicitis treated by laparoscopic appendectomy) and group B (60 patients treated by open appendectomy), after taking informed consent. The main outcome measures included was operative time, postoperative complications, return to oral feeding and hospital stay.

Results 40 patients treated by laparoscopic appendectomy, there was no significant difference between two groups in age, body build, clinical and laboratory findings. Mean age group was 30 years, male to female ratio was 1.2:1 in compare to 1.3:1 in group B. Operating time was 45 min. with time range (35-55min), while in group B, operating time was 40 min. Postoperative analgesia requirement was 1.1 in group A, and 3.1 in group B. Five patients(12.5%) was converted to OA in group A. Mean hospital stay was one day in group A, and two days in group B. **Conclusion** Laparoscopic appendectomy is safe and effective, less postoperative pain, early return to normal work and better cosmetic scar than open appendectomy.

Key words laparoscopy, open, appendectomy.

Introduction

Acute Appendicitis is the top common surgical emergency with an incidence of 6-10% and is considered as the most frequent in both children and young adults with peak age incidence between 10-30 years, and most cases require surgical intervention through appendectomy in order to avoid rupture of the appendix and its complication sequel. The traditional surgical approach (open appendectomy OA) involves a small incision (about 4.5cm or 2 inch) in the right lower quadrant of the abdominal wall, named grid iron incision. Alternatively, it is possible to perform the operation by laparoscopic method (laparoscopic appendectomy LA), which requires 3 very small incisions (each about 1.25cm or 1/2 inch). The surgeon then introduces a camera and special laparoscopic instruments into the abdominal cavity and removes the appendix as in the conventional operation^[1]

Open appendectomy is a safe and usually chosen method of operation for acute appendicitis for more than a century, but since last 10 years, laparoscopic appendectomy is gaining popularity, although still not as popular as laparoscopic cholecystectomy. Since its initial description by a German gynecologist Semma in 1983.^[2] LA for suspected appendicitis is considered safe and effective. It has gained popularity in recent years and has become one of the most widely performed procedures using the laparoscope world wide.^[3]

LA gives a better assessment of the peritoneal cavity than that obtained by the standard grid-iron incision. The procedure allows fast and comprehensive inspection of the para-colic gutters and the pelvic cavity that is not possible with the OA. So it improves the diagnostic precision.^[4]

Despite OA being associated with low morbidity and mortality rates, the popular minimally invasive approach (LA) showed more postoperative benefits such as less wound infection, less pain, and quicker recovery in the cost of more operating time and hospital cost, in addition LA can have

additional advantage for female patients as it increases the diagnostic quality and decreasing the postoperative adnexial adhesions and the resulting infertility problems with better aesthetic outcome.^[5]

Numerous studies have compared OA with LA, but the role of laparoscopy is still a contentious issue. However, it has not become the universal paragon procedure for acute appendicitis as laparoscopic cholecystectomy. This is perhaps, mainly due to the emergency type of disease often operated by junior doctor and Overseeing may not be available in all hospitals. In our Al-Yarmook teaching hospital, appendectomy is being performed by both methods depending on the availability of trained staff for laparoscopy and patients choice.^[6]

We conducted this prospective study to compare the results of open appendectomy with laparoscopic appendectomy in terms of postoperative pain and analgesia requirements, rate of wound infection and hospital stay, reflecting on early return to work, to justify the increase in apparent cost of procedure.

Patients & Method

This prospective study was performed in AL-Yarmouk teaching hospital and the private hospitals in Baghdad city, from April 2013 to April 2014. One hundred thirty Patients with suspected acute appendicitis were selected (60 male and 70 female) and then divided into group A (40 patients managed with laparoscopic appendectomy LA and 60 patients with open appendectomy OA) while 30 cases were excluded from the study. Our exclusion criteria for this study were being younger than 9 years, showing signs of generalized peritonitis, having a palpable mass in right iliac fossa suggesting appendiceal mass or abscess, or being pregnant female. Patients who gave their informed consent were randomized to either group A (40 patients LA) and group B (60 patients OA group).

All patients were informed about the nature of the study and the possibility of conversion to open in case of laparoscopic group. Patient's ages were ranging from 14 – 45 years old. Those patients presented with suggestive history of right lower quadrant pain or peri umbilical pain, less than 24 hours duration migrating to right iliac fossa associated with nausea and/ or vomiting and history of anorexia with or without fever. On physical examination right iliac fossa tenderness and or rebound tenderness with sometimes positive cough and Rovsings sign, fever of less than 38 C. On laboratory investigation leukocytosis above 10000 cells/ml, and urine analysis and chest x-ray done for all patients. Abdominal ultrasound mostly done for females to exclude diseases that mimic acute appendicitis. All patients received prophylactic antibiotics including ceftriaxone (1g, every 12 hr.) and metronidazole vial. The OA was performed through a McBurneys muscle – splitting incision.

While the LA patients, the classic three port technique was performed through two 10 mm (umbilical and right iliac fossa) and one 5mm (suprapubic) ports. After pneumopertoneum done the abdominal cavity was explored to locate the appendix and rule out other possible diagnosis. The appendix and mesoappendix were divided with endoloop and then appendix removed in a laparoscopic bag. Facial defects in port sites were closed. All of the removed appendices were sent for histopathological study.

Postoperatively bowel sounds were checked every 6 hours. Once present, the patients were started on a clear liquid diet and the patient was discharged home when he is clinically stable.

Operative time is difference between the start of surgery, which was taken from draping of patient till the abdomen closure with skin suturing. Length of hospital stay is the difference between the day of surgery and the day of discharge of the patient. Postoperative analgesia is calculated in numbers whether its intravenous or intramuscular injections required. Then the postoperative complications which occurring during postoperative recovery involving respiratory, gastrointestinal, urinary, and vascular system. All those parameters were recorded and compare between Laparoscopic appendectomy and Open appendectomy in our study.

Statistical analysis was performed using SPSS software and Independent t-test was applied to compare mean difference between group A and group B. P- value of less than 0.05 was considered significant.

RESULTS

One hundred thirty patients with clinical diagnosis of acute appendicitis were randomized into groups A and B, 40 patients in group A underwent LA while 60 patients in group B underwent OA. Patients in the two groups were comparable with their age, sex and clinical features of acute appendicitis as shown in table 1. Migratory right iliac fossa pain and tenderness were common clinical features, followed by anorexia, nausea and elevated temperature. Average age was similar in both groups (14- 45 years), and the mean age was 30 years in both group (A and B), male to female ratio was different in both groups, in group A was (1.2:1) and in group B was (1.3:1). There was no significant differences in age, body build, clinical presentation or laboratory findings between the two groups.

Table 1

Variables	Group A	Group B	%Group A	%Group B
Mean age	30 years	30 years		
Sex Male	22	34	22%	34%
Female	18	26	18%	26%
Migratory RIF pain	34	52	34%	52%
Anorexia	15	34	15%	34%
Nausea & Vomiting	20	42	20%	42%
Tenderness	36	55	36%	55%
Rebound T	35	53	35%	53%

Regarding the operative time, in group A was 45 min. with time ranging from 35 to 55 min. while in group B was 30min. ranging from 20 to 40min. postoperative analgesia requirement was calculated as number of injections required postoperatively in the hospital and before discharge. It was 1.1 doses for patients in LA(1-5 patients), need postop. Analgesia as compared to 3.1 doses in OA (3-6 patients). Return to bowel function was defined as the passage of flatus and audibility of gut sounds, it was 8 hours and 30 min. after LA while it was 14 hours after OA.

Regarding the allowance of oral fluids intake, it was 14 hours after LA and it was 22 hours after OA.

Postoperative wound infection. Only one patient had postoperative wound or port infection in LA, treated by daily dressing and antibiotic in compared with OA, there were 8 patients had postoperative wound infection, treated by daily dressing and antibiotic cover. In LA the mean hospital stay was one day, while in OA it was 2 days, statistically not significant differences were noted in both groups A and B.

Table 2

Variables	Group A	Group B
Operative time	45 min	30 min
+ve bowel sound	8.30 hours	14 hours
Postop. Intake	14.30 hours	22 hours
Postop. analgesia	1.1	3.1
Hospital stay	1 day	2 day

Five patients in group A were converted to an open procedure (12.5%). The indication for conversion were inability to insufflate in one, unclear anatomy or difficult dissection in the remaining four patients.

Most of postoperative complications were observed after group B as compared to group A but none were statistically significant such

as wound infection 7(17%), paralytic ileus 2(5%), respiratory tract infection (zero), deep venous thrombosis (DVT) was (zero). While in group B : wound infection 17 (28.3%), paralytic ileus 5(8.3%). Respiratory tract infection 2(3.3%), DVT (zero) as show in table 3.

Table 3

Complications	Group A	Group B
Wound infection	7(17.5%)	17(28.3%)
Paralytic ileus	2(5%)	5(8.3%)
Resp.tract infection	2(3.3%)
DVT

According to follow up visits patients in group A, resumed their normal activity after one day. While in group B, this period was 1 to 2 days which does not show a significant difference between the two groups.

Discussion

Laparoscopic appendectomy (LA) has struggled to prove its superiority over the open appendectomy (OA). Although OA is the treatment of choice for acute appendicitis and is by far the most commonly performed emergency abdominal operation.^[7] With development of minimally invasive surgery, LA had gained a lot of attention around the world. LA was first reported in 1983 and has since been considered safe with high accuracy and complication rates as low as zero to 1.4%.^[8]

LA gives a better evaluation of the peritoneal cavity than that obtained by the standard open appendectomy. The procedure allows rapid and thorough inspection of the paracolic gutters and pelvic cavity that is not possible with open grid iron approach.^[9]

The laparoscopic appendectomy for patients with suspected appendicitis improves the diagnostic accuracy and is therefore recommended. There are innumerable reports showing that laparoscopy improves diagnosis and reduces unnecessary appendectomies in fertile women.^[10]

A number of studies have been carried out in Pakistan till date comparing open to laparoscopic appendectomy. In most of the studies, it is conducted that LA better than OA. Compared to a prospective study carried out in Nawaz Sharif Social Hospital, in 2010, which revealed that there was less operative time in LA.^[11] Another study was carried out in 2003, Multan. It was also conceded that LA though new and expensive was a better choice as compared to OA as there was an added benefit of better visualization in cases of young female patient where the diagnosis between gynecological causes cannot be ruled out.^[12]

In our study, the mean operative time was 45 min. in LA, in compare to 30 min. in OA

which was longer in about 15 min. the operating time of LA also depend on the experience of the surgeon and the competence of their team. This is comparable to other studies reporting about 10.7 to 30 min. shorter mean operative time for OA group.^[13]

Generally all laparoscopic procedures are more time consuming for the following reasons; inborn attribute of slow tactic of laparoscopic techniques, time spent by slow insufflations and routine diagnostic checkup done before any procedure.

In Iraq at 2011, study done by Tariq Al-Aubaidi was reveal that the mean operating time was about 25 min. shorter in OA group as compared to LA group. And the mean analgesic requirement postoperatively in LA group was 1.4 doses; the postoperative complications were minor and occurred much less in patients of LA group. Hospital stay was 1 day in LA group.^[14]

Regarding the mean analgesic requirement in our study was 1.4 doses in group A and is comparable to report done by Kamal M et al was 1.2 doses.^[15] In this study, the postoperative wound infection rate was (17.5%) in group A and are more comparable to other studies reporting rates of 0%-5%.^[16] The mean hospital stay in group A was 1 day shorter than group B and this is slightly higher than that reported in Yau KK et al and Kamal M et al.^[17] and similar to result reported in Lujan et al Tate et al.^[18]

The incidence of conversion to open appendectomy in this study was similar to that reported by Lujan Moupean.^[18] but less than those reported in Pokala et al, Young et al (15%-20%).^[19] And higher than those reported in Yau et al and Gupta et al (7%-8%).^[20]

The return to normal activity following appendectomy is the subject of intense debates. A minimally invasive operation (LA) by definition should allow for a quicker recovery, shorter convalescence at home, and quicker return to work. In this study, there was shorter time to relief from pain and

shorter time to return to work in group A than group B.

Conclusion

Laparoscopic appendectomy is safe and effective, less postoperative pain, early return to work and better cosmetic scar than open appendectomy. We have shown that LA has significant advantages over OA with respect to length of hospital stay, early return of bowel functions, rate of routine discharge, and less chances of postoperative wound infection. There was also less need for postoperative analgesia requirement, thus the overall leading to early mobility of patient and return to normal life.

References

- 1-Guller U, Hevery S, Purves H, et al. Laparoscopic versus open appendectomy: outcomes comparison based on a large administrative database. *Ann Surg.* 2004;239:43-52.
- 2-Peiser JG, Greenberg D. Laparoscopic versus open appendectomy: results of a retrospective comparison in an Israeli hospital. *Isr Med Assoc J* 2002;4:91-4.
- 3-Larsson PG, Henriksson G, Olsson M, et al. Laparoscopy reduces unnecessary appendectomies and improves diagnosis in fertile women: a randomized study. *SurgEndosc.* 2001;15:200-202.
- 4-Tzovaras G, Liakou P, Baloyiannis I, Spyridakis M, Mantzos F, et al. Laparoscopic appendectomy: differences between male and female patients with suspected acute appendicitis. *World J Surg* 2007;31(2):409-13.
- 5-Shaik AR, Sangrasi AK, Shaik GA. Clinical outcomes of laparoscopic versus open appendectomy. *JLS* 2009;13(4):574-80.
- 6-Milewezyk M, Michalik M, Ciesieki M.A prospective, randomized, unicenter study comparing laparoscopic and open treatments of acute appendicitis. *SurgEndosc* 2003;17(7):1023-8.
- 7-Long KH, Bannon MP, Zietlow SP, et al. Laparoscopic appendectomy Interest group: a prospective randomized comparison of laparoscopic appendectomy with open appendectomy: clinical and economic analysis. *Surgery.* 2001;129:390-400.
- 8-Nguyen NT, Zainabadi K, Mavandadi S, Paya M, Stevens CM, Root J, et al. Trends in utilization and outcomes of laparoscopic versus open appendectomy. *Am J Surg* 2004;188:813-20.
- 9-Marzouk M, Khater M, Elsedak M, Abdelmoghny A. Laparoscopic versus open appendectomy: a prospective comparative study of 227 patients. *SurgEndosc* 2003;17:721-4.
- 10-Bushra Shirazi, Naureen Ali, Muhammad ShahidShamim. Laparoscopic versus open appendectomy: A comparative study. Department of surgery, Ziauddin Medical University, Karachi. *JPMA*, 2010; 60:901-4.
- 11-Mansab Ali, Muhammad Tahir, Fatima Asim, ZahidMahmood, MuneerImran. Laparoscopic versus open appendectomy- A Prospective comparative study of 100 patients. Department of surgery, Nawaz Sharif Social Hospital, Multan Road, October 2010.
- 12-Multan, Mustafa Kamal, Khalid HussainQureshi. Laparoscopic versus open appendectomy. Department of surgery, Nishtar Medical College, 2003.
- 13-Sauerland S, Jaschinski T, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. *Cochrane Database Syst Rev* 2010;(10):CD001546.
- 14-Tariq Al-Aubaidi. Laparoscopic versus open appendectomy in patients with acute appendicitis. *AL-Kindy Col Med J* 2011;Vol.7 No. 2 p:78-84.
- 15-Kamal M, Qureshi KH. Laparoscopic versus open appendectomy. *Pak J Med Res* 2003;42:23-6.
- 16-Young JL, Law WL, Lo CY, Lam CM.A Comparative study of routine laparoscopic versus open appendectomy. *JLS* 2006;10:188-92.
- 17-Yau KK, Siu WT, Tanq CN, Yanq GP, Li MK. Laparoscopic versus open appendectomy for complicated appendicitis. *J Am Collsurg* 2007;205:60-5.
- 18-Lujan JA, Robles R, Perrilla P. Laparoscopic versus open appendectomy; Prospective assessment. *Br J Surg* 1994;81:133-5.
- 19-Pokala N, Sadhasivam S, Kiran RP, Parithivel V. Complicated appendicitis-is the laparoscopic approach appropriate? A comparative study with open approach;outcome in a community hospital setting. *Am Surg* 2007;37:737-41.
- 20-Rohit Gupta, Cliff S. Infectious complications following laparoscopic appendectomy. *Can J Surg* 2006; 49:6.