

# Outcomes Of Laparoscopic Versus Open Appendectomies

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## Abstract

Laparoscopic surgical therapy of acute appendicitis was started to be practiced frequently in the last two decades. Compared with open appendectomy (OA), laparoscopic appendectomy (LA) is more advantageous in diagnosis of other pathologies and in preventing late complications, for example adhesions and incisional hernia. Other advantages are short hospitalization, short operation times, and fewer postoperative early complications. **METHODS:** Between the years of 2006 and 2008, with the prediagnosis of acute appendicitis, LA was done in 80 patients and OA in 120 patients. We investigated the differences between the two groups in terms of hospitalization and operation times, cost accounting/cost-effectiveness and postoperative early complications. We also entered average age and gender of the patients. **RESULTS:** The average age of the 33 women and 47 men that had LA was 30, that of the 47 women and 73 men that had OA was 34. In 4% of patients, LA was changed to OA. Hospitalization time was 3.2 days and operation time was 49 minutes in the LA group, and 3.8 days and 56 minutes, respectively, in the OA group. Cost in the LA group was calculated as 1200 Turkish Liras, and cost in the OA group was 650 Turkish Liras. Wound infection of an incision occurred in 2.5% in the LA group, and in 8.3% in the OA group. **DISCUSSION:** For the minimalization of the early and late complications, and due to advantages of short hospitalization and short operation times, LA can be performed on trust and easily.

## INTRODUCTION

Acute appendicitis is the most frequent cause of acute abdomen that needs emergent surgery. The risk of getting acute appendicitis is 6% during lifetime (1). Acute appendicitis is a disease that can be diagnosed easily with clinical history, physical examination and simple laboratory findings.

After the first description of appendectomy by McBurney in 1894, open appendectomy was performed as gold standard in the last two decade (2). The first laparoscopic appendectomy was put into practice by Semm in 1983 (3). So, LA had began to be used widespread parallel to the improvement of the technology and of the more convenient equipment. But it was not as widely used as laparoscopic cholecystectomy. LA is preferred in the women with pain in the right lower quadrant and in the patients with non-complicated appendicitis. Advantages and disadvantages of LA for the surgical treatment of the acute appendicitis are still in discussion (4).

Our aim in this study was the estimation of results of 80 patients that had LA and of 120 patients that had OA.

## SURGICAL TECHNIQUE

Preoperatively, all the patients had got urinary bladder and nasogastric catheters. The operation was done under anesthesia (endotracheal intubation). The surgeon was placed near the left hip and the first assistance near the left thoracal region of the patients. The pneumoperitoneum was created with a Veres needle via the incision made beneath the umbilicus. After the first trochar (10mm) was placed, 2 more trochars (10mm and 5mm) were also placed from right upper quadrant and suprapubically. First of all, the abdomen was explored. Then the appendix was held with the help of grasper. The mesoappendix was excised with the help of the harmonic scalpel placed from the right upper quadrant. The proximal appendix was ligated intracorporally with vicryl after separation from the mesoappendix. Then the proximal appendix was shoring up with a large clips. After the excision of the appendix, it was taken out through the 10mm trochar in uncomplicated cases. In complicated cases, it was taken out within an endobag. After bleeding control of the mesoappendix, the right lower quadrant was irrigated and a drain was inserted in the perforated cases.

## METHODS

We compared the results of 200 patients that were

appendectomized between September 2006 and April 2008 in the Ankara Keçiören Training and Research Hospital. One hundred twenty of them were open and 80 laparoscopically operated. Pregnant patients, those with bleeding diathesis, plastrone appendices, and patients before the age of 15 and after the age of 65 were excluded.

Age and gender of patients, hospitalization times, cost, transfer rate from laparoscopic appendectomy to open one, duration of operation and complications were compared. Duration of the operation was determined beginning from the onset of general anesthesia to the covering of the incision. Early complications were recorded.

Avarage and standard deviations of demographical data about the open and laparoscopical appendectomy were accounted. Differences between the two groups were compared with chi-square test and Fisher's exact test.  $P<0.005$  was accepted as statistically significant.

### RESULTS

Clinical and demographical input is shown in table 1. Eighty patients (M/F 47/33) were in the LA group and the average age was 30 (15-65). The OA group was composed of 120 patients (M/F 73/47) and the average age was 34 (15-65). There was no statistical difference of gender and age averages between the two groups (Table 1).

Hospitalization time of the LA group was 3.2 days, and 3.8 days for the OA group. Operation time was 49 minutes (29-80) in the LA group and 56 minutes (37-96) in the OA group. Hospitalization and operation times in the LA group were shorter than in the OA group but this was not statistically significant ( $p>0.086$ ,  $p>0.064$ ).

In three patients (4%) the operation was started laparoscopically and then converted to open appendectomy (in one due to perforation and in two because of anatomical localization).

Cost analysis was done in the two groups. It was computed as 1200 YTL for the LA group and 650 YTL for the OA group. The patients that had wound infection after discharge and the patients with second laparotomy because of intraabdominal abscess were not included to the cost analysis. Costs were lower in the OA group (statistically significant;  $p<0.002$ ).

In our study, wound infection, hemorrhage, cecal fistulae, and intraabdominal abscess were evaluated in the two groups. A second operation was done for two patients in the

OA group due to intraabdominal abscess. Wound infection was detected in ten patients of the OA group and in two patients of LA group.

**Figure 1**

TABLE 1: COMPARISON OF THE OUTCOME BETWEEN THE GROUPS OF LA AND OA

	laparoscopic appendectomy (LA), N= 80	Open appendectomy (OA), N= 120	P value
GENDER M/F	47/33	73/47	$P>0.057$
AGE AVERAGE	30(16-65)	34(16-65)	$P>0.089$
HOSPITALIZATION TIME*	3.2	3.8	$P>0.086$
COST ACCOUNT YTL	650 ytl	1200 ytl	$P<0.002$
OPERATION TIMES**	49(29-80)	56(37-96)	$P>0.064$

$P<0.005$  = Statistically significant

\*days

\*\*minutes

### DISCUSSION

Acute appendicitis is the one of the most important emergent surgical procedures (5). Early diagnosis and treatment are also important to prevent the complications such as perforation and sepsis. Conventional open appendectomy is performed with low mortality and low morbidity. It was started after the first laparoscopical appendectomy of Semm in 1983 (3). In the last two decades it was practised with increasing technical and surgical experience, but it is not as prevalent as laparoscopical cholecystectomy and Nissen operations (4). We think that the cause of this is that surgeons can perform open appendectomies successfully, fast and confidential with the use of a small laparotomy.

Laparoscopical appendectomy is found more advantageous in terms of hospitalization time, cost, duration of operation and fewer complications (6).

The most important advantage of laparoscopical appendectomy is detecting and solving pathologies other than appendicitis laparoscopically in the event of negative appendectomy. Generally, in the case of negative laparotomy, the incision is lengthened or another laparotomy is preferred for effective sight and exploration. This can cause incisional hernias and adhesions in the future. Bad cosmetical result is the disadvantage of open appendectomy (7-9).

In our study, acute appendicitis cases were operated laparoscopically with 96% success. For only 3 patients (4%),

the operation was changed to open appendectomy. In the literature, the conversion rate is reported as 7.8% (10). These proportions can change according to the rate of perforated appendicitis. We did not separate the patient groups into perforated and non-perforated.

Operating time is shorter for LA in some studies, but longer in some others (11). In the our study, operation time was found to be shorter in the LA group, but this was not statistically significant. As our hospital is a training and research hospital, assistant doctors perform open appendectomies, so operation time may be longer. In the LA group, the appendix stump was sutured intracorporally, automatical suture and stapler were not used in order not to increase costs. We think that operation time will become shorter with the increase of surgical experience and technological experience.

In the study of Richard et al., time spent in hospital was 3.5 days in the LA group and 6 days in the OA group (12). Guller et al. performed a study in a large patient group, and found 3.7 days in the LA group and 5 days in the OA group (13). In the our study, time spent in hospital was 3.2 days in the LA group and 3.8 days in the OA group. But the difference was not statistically meaningful.

In different meta-analyses, wound infection rates show differences, but generally they are lower in the LA group than in the OA group (14,15). In our study, wound infection was seen in two patients of the LA group (2.5%). In the OA group, wound infection was found in 10 patients (8,3%). Hemorrhage, cecal fistulae or intraabdominal organ laceration did not occur in both groups. However, in the OA group, an intraabdominal abscess occurred with necessity of a second laparotomy.

Cost accounting was done in the study of Ng and co-workers and LA was found to be more expensive than AA. But the difference was not statistically significant.

LA is more advantageous than OA owing to short operation time, low complication rates, better cosmesis and diagnosing of other pathologies. Especially for the young women, LA

can be applied with confidence to avoid unnecessary laparotomy and complications like incisional hernia and adhesions.

### References

1. Bernard MJ, David HB. The Appendix. In: F.Charles B, Dana KA, Timothy RB, eds. Schwartz's Principles of Surgery. New York, McGraw-Hill; 2005; p.119-35.
2. Fingerhut A, Millat B, Borrie F. Laparoscopic versus open appendectomy: Time to decide. *World J Surg* 1999; 23: 834-845.
3. Semm K. Endoscopic appendectomy. *Endoscopy*. 1983; 15: 59-61.
4. Kevin PL, Charles SC, Ricard JA. Appendix. In: Mohamed B, Michael JL, John SK, eds. Sabiston Textbook of Surgery. Philadelphia, Elsevier Saunders. 2004 , p.1381-94.
5. Ekeh AP, Wozniak CJ, Monson B, Crawford J, McCarthy MC. Laparoscopy in the contemporary management of acute appendicitis. *Am J Surg* 2007; 193(3): 310-3.
6. Bonanni F, Reed J III, Hartzell G, et al. Laparoscopic versus conventional appendectomy. *J Am Coll Surg* 1994; 179: 273-278.
7. Cueto J, D'Allemagne B, Vasquez-Frias JA, et al. Morbidity of laparoscopic surgery for complicated appendicitis: an international study. *Surg Endosc* 2006; 20: 717-720.
8. Van den Broek WT, Bijnen AB, de Ruiter P, et al. A normal appendix found during diagnostic laparoscopy should not be removed. *Br J Surg* 2001; 88: 251-254.
9. Sauerland S, Lefering R, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. *Cochrane Database Syst Rev* 2004; (4): CD 001546.
10. Martin L, Puente I, Sosa J, et al. Open versus laparoscopic appendectomy: a prospective randomized comparison. *Ann Surg* 1994; 222: 256-261.
11. Yau KK, Siu WT, Tang CN, Yang GP, Li MK. Laparoscopic versus open appendectomy for complicated appendicitis. *J Am Coll Surg* 2007; 205: 60-65.
12. Richard KF, Fisher KS, Flores JH, Christensen BJ. Laparoscopic appendectomy: comparison with open appendectomy in 720 patients. *Surg Laparosc Endosc* 1996; 6: 205-209.
13. Guller U, Hervey S, Purves H, et al. Laparoscopic versus open appendectomy: outcomes comparison based on a large administrative database. *Ann Surg* 2004; 239: 43-52.
14. Kazemier G, Steyerberg EW, Bonjer HJ. Meta-analysis of randomized clinical trials comparing open and laparoscopic appendectomy. *Surg Endosc* 1997; 11: 170.
15. Temple LK, Litwin DE, McLeod RS. A meta-analysis of laparoscopic versus open appendectomy in patients suspected of having acute appendicitis. *Can J Surg* 1999; 42: 377-383.
16. Ng WT, Lee YK, Hui SK, et al. An optimal cost-effective laparoscopic appendectomy technique for our surgical residents. *Surg Laparosc Endosc Percutan Tech* 2004; 14: 125-129.

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