

# Laparoscopic versus Open Appendectomy Outcomes

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## Abstract

**Background:** Appendicitis is one of the most common surgical emergencies requiring an appendectomy, with a life-time risk of 6%. The overall mortality rate for open appendectomy (OA) is around 0.3% and morbidity is about 11%. **Objective:** To compare laparoscopic vs open appendectomy with regard to postoperative pain and nausea, operative results, perioperative and post-operative complications, hospital admission. **Methods:** This prospective comparative study is performed in the Department of Surgery, North West Aramed Forced Hospital, Tabuk, Kingdom of Saudi Arabia. All patients between 13 and 60 years of age admitted through the accident and emergency (A&E) department with a clinical diagnosis of acute appendicitis and those who completed follow-up are included in the study. All those patients in whom a clinical diagnosis of acute appendicitis was not established or have a palpable mass in the right lower quadrant, suggesting an appendiceal abscess and those who does not give consent are excluded from the study. We reviewed the medical records of all patients who underwent a laparoscopic and open appendectomy in King Salman Armed Forces Hospital, Saudi Arabia from 1/1/2012 to 31/12/2015. **Result:** A total of 502 patients underwent Appendectomy at King Salman Armed Forces Hospital from 1/1/2012 till 31/12/2015. Of these, 203 were male (40.4%) and 299 were female (59.6%). The mean age was 18 years. Alvarado Score more than 7 in 93% of patients diagnosed with appendicitis. Comorbidities included diabetes 21 (5.56%) and hypertension 7 (1.39%). The mean Body Mass Index (BMI) was 20 kg/m<sup>2</sup>. 328 patients (65.3%) underwent Open Appendectomy (OA). None of Laproscopic appendectomy(LA) had a conversion. The mean operative time was 76 minutes (44 minutes and 50 minutes for OA and LA, respectively). Mean hospital stay in OA 2 days and one day LA. Eight cases (1.6%) developed seroma (6 cases in OA and 2 cases in LA with rates of 1.2% and 0.4% respectively). Nine patients (1.6%) had wound infection, 8 in OA and one in LA with rate of 1.5% and 0.2% respectively). Four patients (0.8%) develop the hematoma

(3 cases in OA and one case in LA with rates of 0.6% and 0.2% respectively). Seven cases of reported appendectomy develop the pelvic abscess (1.4%) (5 cases in OA and 2 cases in LA with rates of 1% and 0.4% respectively). **Conclusion:** Alvarado Score carries high significance in the diagnosis of acute appendicitis. Laparoscopic appendectomy has improved diagnostic accuracy along with advantages in terms of fewer seroma, hematoma, wound infections, faster recovery, and earlier retention to normal activity but longer operative time.

### Keywords

Appendix, Appendicitis, Acute Appendicitis, Open Appendectomy, Laparoscopic Appendectomy

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## 1. Introduction

Appendicitis is one of the most common surgical emergencies that require appendectomy worldwide, with a life time risk 6%. The overall mortality risk for open appendectomy (OA) is 0.3% and morbidity rate is about 11%. Kurt Seem was the first to describe laparoscopic appendectomy in 1989. Encouraged by the success of laparoscopic cholecystectomy, it has become the gold standard of gall stone disease in short span of time [1]. Ilves, I. detected a clear seasonality affect the incidence of acute appendicitis [2]. The aim of this study is to describe the outcomes of appendectomy in King Salman Armed Forces Hospital (KSAFH), Tabuk, KSA.

## 2. Methods

Approval was obtained from the local ethical and research committee. This was a retrospective study. Demographic data of patient collected. The presence of comorbidities and surgical complications were reported. We reviewed the medical records of patients who underwent appendectomy surgery in King Salman Armed Forces Hospital, Tabuk, Saudi Arabia from 1/1/2012 to 31/12/2015 with a minimum of 12 months follow-up. Our aim is to compare open versus laparoscopic appendectomy with regard to comorbidities, method of diagnosis, hospital admission, operative time, complication rate, and histopathological finding. Our inclusion criteria were those more than 13 years old in post appendectomy. Exclusion criteria were those less than 13 years old, and patients who were unwilling to give informed consent.

## 3. Operative Technique for Laparoscopic Appendectomy

After preoperative preparation, three trocar incisions were done. 5 mm supraumbilical for the camera inserted with visiport technique. One suprapubic 5 mm and the last 11 mm were placed at the left lower quadrant. The appendix identified at the right iliac fossa at the end of three tinea coli isolate the appendix

from the mesoappendix using a hook, suture the base of the appendix with end loop, cut the suture at the appendix base and retrieve the appendix. Then suction is done for any collection if present. Finally closure of 11mm port site fascia and skin were made.

#### 4. Results

A total of 502 patients underwent the appendectomy at King Salman Armed Forces Hospital. And among them, 299 were female (59.6%) and 203 were male (40.4%). The mean age was 18 years old. Comorbidities include diabetes 21 (5.5%) and hypertension 7 (1.4%). Alvarado score more than 7 in 93% of patient diagnosed with acute appendicitis. Body mass index was 20 Kg/m. 328 patients underwent open appendectomy (OA) (65.3%) and 174 patients underwent laparoscopic appendectomy (LA) (34.7%). None of LA had a conversion. Mean operative time was 76 minutes (44 minutes and 55 minutes for OA and LA, respectively). Mean hospital stay one day in both open and laparoscopic appendectomy. Eight cases (1.6%) develop the seroma (6 cases in OA and 2 cases in LA with the rates of 1.2% and 0.4%, respectively). Nine cases (1.8%) develop the wound infection (8 cases in OA and one case in LA with the rates of 1.5% and 0.2%, respectively). Four cases (0.4%) develop the hemoma (3 cases in OA and one case in LA with the rates of 0.6% and 0.2%, respectively). Seven cases (1.4%) develop the pelvic abscess (5 cases in OA and 2 cases in LA with the rates of 1% and 0.4%, respectively).

Type of operation	Open Appendectomy	Laparoscopic Appendectomy
No. of cases	328	174
Time (minute)	44	55
Seroma	6	2
Wound infection	8	1
Hematoma	3	1
Pelvic abscess	5	2
vascular injury	0	0

#### 5. Discussion

Acute appendicitis is one of the most common abdominal emergencies worldwide. The cause remains poorly understood, with few advances in the past few decades. Obtaining a confident preoperative diagnosis is still a challenge, since the possibility of appendicitis must be entertained in any patient presenting with an acute abdomen [3].

Early diagnosis and treatment with appendectomy is the preferred choice for preventing complications as perforation, which can increase morbidity. Experienced minimal invasive surgeons skills can decrease morbidity.

Open appendectomy has been the treatment of choice for a century since its

introduction by McBurney in 1894, and the procedure is standardized among surgeons. Laparoscopic surgery has gained in popularity and been applied in almost every surgical specialty. Laparoscopic appendectomy has proved to be feasible and safe in randomized comparison with open appendectomy.

Some studies failed to demonstrate an advantage of laparoscopic over open appendectomy, but a recent systematic review of meta-analyses of randomised controlled trials comparing laparoscopic versus open appendectomy concluded that both procedures are safe and the treatment of acute appendicitis was effective [4]. The average hospital stay in the laparoscopic appendectomy was reduced by half a day, to some extent [5].

Laparoscopic appendectomy had a higher cost in terms of material than open appendectomy. However, some studies had shown no obvious difference in total hospitalization costs between them. The reduction in hospital stay for LA might have some contribution [6]. Shorter hospital stay meant cost savings and improved patient satisfaction. The importance of laparoscopic appendectomy is not established as study suffers from multiple limitations.

## 6. Conclusion

Alvarado score carries high significance in the diagnosis of acute appendicitis. Laparoscopic appendectomy has improved diagnostic accuracy along with the advantage of fewer seroma, hematoma, wound infection, pelvic abscess and faster recovery and earlier retention to normal activities but long operative time.

## Acknowledgements

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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