Laparoscopic versus Open Appendectomy in Adults

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ABSTRACT
Background: Appendicitis is the most frequent surgical emergency. It affects people of all ages and gender. Methods to manage appendicitis are either medically by antibiotics and watchful waiting or surgery. The surgical approach includes laparoscopic and open appendectomy; neither surgical technique was proved to be the most efficient method to do an appendectomy. Objectives: comparison between laparoscopic appendectomy versus open appendectomy in regards to the complications, applicability, cost and hospital stay. Material and Methods: In this review, we used a comprehensive search of EMBASE, Pubmed, MEDLINE, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews from January 1, 1995, to July 17, 2018. Conclusion: Open appendectomy is the preferred choice in case of a perforated appendix or severe inflammation. Laparoscopic appendectomy offers fewer complications, hospital stay and lesser time in the operation room.
Keywords: appendectomy, laparoscopic, technique, appendicitis.

INTRODUCTION
Appendicitis is an inflammation of the appendix, which is a 3 1/2-inch-long tube of tissue that extends from the large intestine. Appendicitis is the most common cause of acute abdomen. Almost 40,000 hospital admissions in England are due to appendicitis. It also affects 5.7-57/100,000 individuals and mostly adolescents and children. The leading causes of variation in incidence are age, gender, and ethnicity. The incidence of acute appendicitis peaks at the age of 10 and 30 years old.

Appendectomy is considered the most common emergency surgery. It is mainly diagnosed by ultrasound or computed tomography (CT) scan. An approach in diagnosis and management has been reported in cases where pre and post-admission delay have occurred. A study has shown that postponing appendectomy has a higher risk of progression to advanced disease. If left untreated, the patient may develop appendix abscess, rupture, or generalized peritonitis.

Laparoscopic appendectomy (LA) is considered the first therapeutic choice for acute appendicitis. It has been linked to have a short hospital stay, less postoperative pain, and better wound healing. In contrast, some studies have established that LA has a higher incidence of intra-abdominal abscesses and difficult applicability in complicated appendicitis surgery. On the other hand, open appendectomy (OA) has shown to have low morbidity and mortality rate. The controversy in literature will remain regarding the best method of an appendectomy.

In this study, we aimed at comparing the advantages and disadvantages of LA versus OA. Our objectives included a comparison between both types in regards to the complications, applicability, cost and hospital stay.

MATERIALS AND METHODS
- Data Sources and Search terms
The review was conducted using a comprehensive search of EMBASE, Pubmed, MEDLINE, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews from January 1, 1995, to July 17, 2018. The used search terms were appendectomy, laparoscopic appendectomy, open appendectomy, laparoscopic versus open appendectomy and management of appendicitis.
- Data Extraction
Two independent individuals reviewed studies, abstracted data, and resolved the disagreement by consensus. Studies were evaluated for quality. A review protocol was followed in every part.
INDICATIONS
Appendectomy has been considered an option for patients with appendicitis who experience fever, abdominal pain, or peritonitis with leukocytosis, but recent studies have shown that patients presenting with such symptoms can also be treated with antibiotics. A study was conducted on 202 patients who presented with acute appendicitis and managed with antibiotics showed a recurrence rate of 13.9%. On the other hand, recurrence in surgery for appendicitis has rarely been reported since the duplication of the appendix is 0.004%-0.009% in the general population. Patients who were treated by surgical approach may experience wound infection and hernia, which do not occur in patients who are treated with antibiotics. However, post interventional peritonitis has been higher in patients who were treated with antibiotics. A more extended hospital stay was reported in patients treated with antibiotics. Even though studies have not found inferiority of antibiotics for appendicitis over surgical approach, Ha...
bladder. The video monitor is placed on the right side of the patient while the patient is supine. Inserting ports follows the principle of triangulation to maximize the exposure of the appendix. 12-mm peri-umbilical port is used for pneumoperitoneum. Two 5-mm ports are then placed in the suprapubic, and the left lower quadrant. Once locating the appendix, adhesions must be dissected bearing witness not to injure the right ureter and the iliac vessels. To dissect the mesoappendix, a Babcock-clamp is used. Laparoscopic gastrointestinal anastomosis stapler is used to divide the appendiceal base and the cecum. In some situations, to correctly place the staples, part of the cecum might be included. Removing the appendix after placing it in a specimen bag through the umbilical port decreases wound infection. Finally, irrigation with normal saline and closing the skin incisions.

**Figure 2:** Laparoscopic Appendectomy Steps.

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**Table 1: Comparison between open versus laparoscopic appendectomy advantages**

<table>
<thead>
<tr>
<th>Open Appendectomy</th>
<th>Laparoscopic Appendectomy</th>
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<tbody>
<tr>
<td>Effective in a ruptured appendix and severe inflammation</td>
<td>Fewer complications (incisional hernias, surgical wound’s infection)</td>
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<tr>
<td>Less cost</td>
<td>Less operation time</td>
</tr>
<tr>
<td>Less pain</td>
<td>Less hospital stay</td>
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**CONCLUSION**
LA and OA are options to do an appendectomy, and they both have their advantages and disadvantages. LA presented a less frequency of complications such as surgical wounds’ infection, and incisional hernia. OA can be a better option in cases of severe inflammation or ruptured appendix. For the patient’s and hospital’s benefit, OA is considered a cheaper option, although it takes a longer time in the operation room. Meanwhile, both techniques are performed depending on the surgeon, experience, and comfort. It is still difficult to decide which approach is better; more studies are needed to determine the most effective way.

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