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EVALUATION OF THE OUTCOMES POST OPEN APPENDECTOMY

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ABSTRACT:

Introduction: Appendectomy, a common surgical procedure for appendicitis with a 6% lifetime risk, primarily involves open appendectomy (OA) with an 11% morbidity rate and 0.3% mortality rate. McBurney's 1894 technique remains a standard, marking a century of practice. Acute appendicitis, with a 9-10% lifetime risk, most commonly affects individuals aged 10-20. Charles McBurney's 1895 report revolutionized surgical care, introducing lateral incisions as an alternative to midline laparotomy. Today, both laparoscopic and open appendectomy approaches exist, with surgery remaining the mainstay despite antibiotic therapy advancements. The Gridiron Incision is utilized in open appendectomy.

Aim and objectives: To improve surgical understanding, and evaluate post-open appendectomy complications, recovery, and efficacy.

Method: This one-year prospective study focused on appendicitis patients admitted to the hospital, excluding pregnant women and those with critical conditions, coagulation issues, cirrhosis, chronic diseases, or mental health problems. Data from 70 eligible patients undergoing open appendectomy were collected, covering demographics, medical history, lab results, surgical details, postoperative recovery, and complications. The study employed a specific protocol, including antibiotics, McBurney incision, peritoneal inspection, meticulous dissection, and histopathological analysis. Patients were discharged upon meeting criteria such as pain relief, bowel sounds, and consistent dietary intake. The research observed gender-specific parameters and complications, emphasizing the importance of clear inclusion and exclusion criteria for meaningful results.

Result: The study on open appendectomy procedures reveals notable gender differences in postoperative outcomes. Males exhibit significantly shorter operative times (29.40 ± 10.50 minutes) than females (53.8 ± 13.9 minutes). Additionally, a higher percentage of women report bowel movements (60.00%) and an earlier return to regular eating schedules (40.00%) on the first postoperative day (POD) compared to men. Gender disparities extend to analgesic usage, with men requiring more doses of parenteral analgesics. The study also identifies various postoperative complications, including vomiting, paralytic ileus, and wound infection as minor problems, and highlights major issues such as wound dehiscence, intra-abdominal abscess, and hemoperitoneum. The findings suggest potential gender-related variations in healing processes following open appendectomy, emphasizing the need for tailored postoperative care and monitoring to enhance recovery outcomes with minimal complications.

Conclusion: This study concluded that compared to open appendectomy provided a number of benefits, such as a shorter recovery time, reduced need for postoperative pain medication, quicker return to work, fewer wound infections, and somewhat higher hospital costs.

Keywords: Appendicitis, Laparoscopic appendectomy, lateral incisions, antibiotics

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INTRODUCTION:

A lifetime risk of 6% is associated with appendicitis, one of the surgical emergencies involving appendectomy that occurs most frequently. In general, open appendectomy (OA) possesses an 11% morbidity rate and an overall mortality rate of 0.3% [1]. Since McBurney's 1894 introduction of the open appendectomy, it has been the recommended treatment for almost a century, and surgeons have standardized the process. An appendectomy is among the most common surgical operations [2]. Acute appendicitis is the most frequent reason for appendectomy. Acute appendicitis carries a 9% to 10% lifetime risk. The most prevalent age range for acute appendicitis cases is 10 to 20 years old [3].

Appendicitis is recognized as the initial surgical illness in the United States, and appendectomy has a significant and legendary place in the annals of surgery. The surgical care of appendicitis report by Charles McBurney was published in 1895 [4]. He discussed the drawbacks of the traditional midline laparotomy, exploratory needle puncture, and the possible outcomes of undrained purulent appendicitis [5]. Lastly, instead of using a midline laparotomy, he proposed a unique surgical method and exposure that involved making successive lateral incisions into the internal oblique, external oblique, and transversus abdominis muscles [6].

The first laparotomy to be done using a source control strategy to eliminate an infectious danger was an appendectomy. The most effective therapy for appendicitis has been appendectomy ever since it was first identified more than a century ago. Today, the 1983-described laparoscopic appendectomy technique or an open approach can be used to have the swollen appendix surgically removed [7].

The mainstay of treatment for acute appendicitis is still surgery, even with the substantial advancements while treating acute appendicitis with primary antibiotic therapy [8]. While antibiotic therapy may have short-term results that are comparable to appendectomy, a sizable, randomized study found that for all antibiotic therapies used as the primary treatment for acute appendicitis 1 out of 4 people in the antimicrobial medication group needed an appendectomy after a year [9].

A lower right abdominal single incision is used in an open appendectomy (S/P) to remove the appendix, whereas a minimally invasive procedure called a laparoscopy (LA) creates small abdominal ports and inflates the abdomen to reach an abdominal pressure (IAP) for 12 to 15 mmHg [10]. During surgery, an oblique incision known as the Gridiron Incision was made in all patients having an open approach. Despite its potential to reduce the risks of wound infection, the usage of wound protective devices was not an open approach [11].

Method

Research Design

This prospective study was conducted for one year period examined appendicitis patients who were admitted in the hospital. We did not include pregnant women or patients in critical care who had coagulation problems, cirrhosis, chronic medical or mental disease, hemodynamic instability, or were pregnant. The authors obtained patients' data of 70 patients from the hospital who were eligible. The patients who went open appendectomy were only considered. The study authors have collected data on the patient's demographics, medical history, preoperative lab results, surgical time, intraoperative findings, time spent eating soft foods, length of hospital stay after surgery, pain medication, and complications. The diagnosis was verified by a review of medical records and physical examination. CT scans or abdominal ultrasonography were done when a clinical diagnosis remained ambiguous.

The protocol required that the patients were administered with a 5-days course of metronidazole and third-generation cephalosporin when general anaesthesia was induced. McBurney incision was used to accomplish OA. The appendix was removed as normal by opening the peritoneum after the incision. Pneumonia peritoneum was produced by the continuous delivery of 12–14 mmHg of carbon dioxide using

an infra umbilical Verres cannula. The patient was slightly rotated to the left while in Trendelenburg. Examining the abdominal cavity helped rule out any potential pathology within the abdomen or pelvis. Two ligating loops fixed the base after bipolar forceps divided the mesoappendix; dissection was then performed distal to the second loop. Closed the distal appendicular stump to avoid enteric or purulent leakage. The specimen was extracted using an endobag through a 10-mm infraum bilical incision. Every sample underwent histopathology analysis. Patients had to be pain-free after anaesthesia and making bowel sounds before clear fluids could be administered for oral feeding. We started patients on a soft diet when they could drink enough liquids and still passed gas. Patients were discharged after consistent dietary intake, absence of fever, and adequate management of discomfort. Minutes passed between the two procedures' skin incisions and the last skin stitch. Duration of stay was based on the frequency of hospitalisations following surgery. Infection of the wound was indicated by redness or purulent or seropurulent discharge from the site of the incision. When bowel sounds do not return within 12 hours after surgery, it is considered paralytic ileus. The observation were made during the surgery and parameters were evaluated among male and female separately. Complications of the patients were also studied.

Inclusion and Exclusion Criteria

Inclusion

- Diagnosed appendicitis patients as evidenced from blood reports and ultrasound.
- People whose appendicitis diagnosis was ambiguous but confirmed by clinical history, physical exam, and abdominal ultrasound or CT.
- Patients who underwent only open appendectomy .

Exclusion

- Pregnancy exclusion to prevent confounding circumstances.
- Exclusion of hemodynamically unstable critical care patients to focus on stable cases.
- To isolate appendicitis' effects on outcomes, exclude chronic medical or psychiatric patients.
- Cirrhosis patients should be excluded because it may impair outcomes.

Statistical analysis

When comparing percentages and frequencies of categorical data, the Chi-square test was employed. The mean and standard deviation were used in the Mann-Whitney U test for nonparametric continuous data and the Student's t-test for parametric data. An intention-to-treat analysis was used to compare the two groups. In this study, we included patients who underwent open surgery while receiving laparoscopic assistance. The sample size for our study was decided by calculating the necessary numbers for each parameter, with a significance level of $\alpha = 0.05$ and a power of 90%. These parameters include surgical time, hospital stay, postoperative discomfort, complication rate, return to regular activities, and cost. Significant results were indicated by a P-value of 0.05. Every computation was carried out using the SPSS program, version 17.0.

Result

Figure 1 shows that there were 45 male cases and 25 female cases out of a total of 70 open appendectomy cases. This means that there are 25 girls in the dataset for every 45 males that undergo open appendectomy. Simplifying the ratio yields 9:5. This indicates that, within the sample under consideration, men were more likely than females to undergo open appendectomy. A larger proportion of cases found in males relative to females suggests a possible gender-based differential in the occurrence of open appendectomies, according to the data.

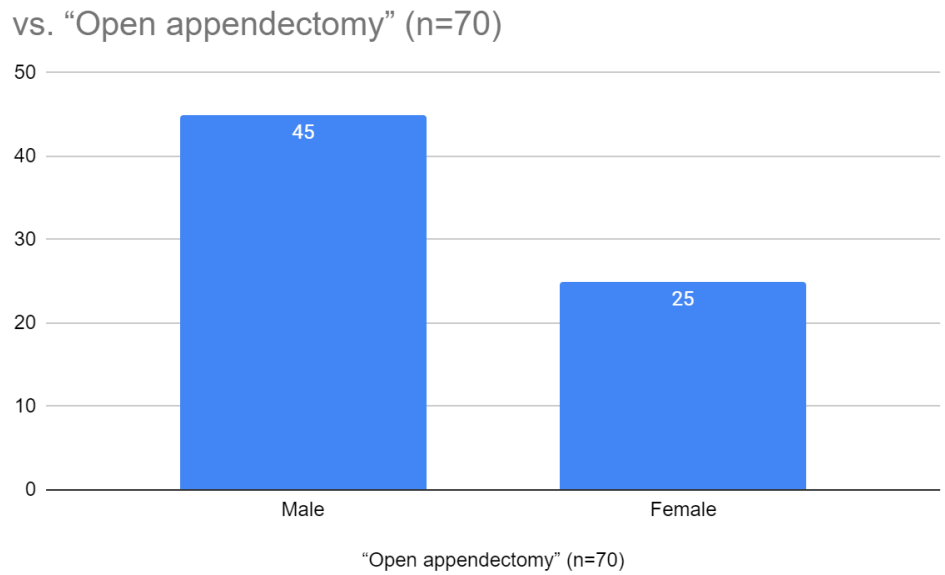

Figure 1: Gender distribution of open appendectomy

Figure 2, which shows the co-morbidities of open appendectomy cases (n=70), emphasises several diseases. Out of all the instances, 30 were caused by coronary artery disease (CAD), while 20 were caused by hypertension. Ten instances are attributable to diabetes mellitus (DM) and chronic obstructive pulmonary disease (COPD). Open appendectomy is associated with an increased risk of cardiovascular disease (CAD) and hypertension (hypertension), according to the research. People having open appendectomy who also have chronic obstructive pulmonary disease (COPD) and diabetes mellitus (DM) likely have some other health problems. The significance of taking co-morbidities into account during appendectomy procedures is highlighted by this information.

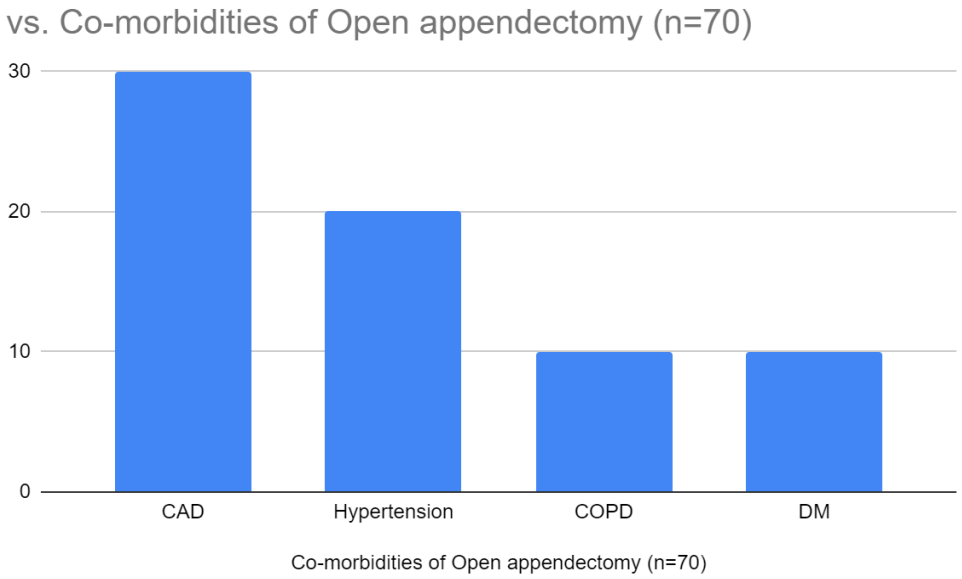

Figure 2: Co-morbidities of Open appendectomy

Results from seventy open appendectomy surgeries are shown in Table 1. Acute appendicitis patients free of complications make up the bulk (33.33%). The second most common finding, accounting for 20.00% of all cases, is appendicitis with gangrene. Notably, peritonitis is evident in 13.33% of cases, and appendiceal abscesses are seen in 26.66% of procedures. From what we can tell from the chart, there is a wide range of pathological disorders that can call for an open appendectomy. Although acute appendicitis is the most common consequence, other complications like as gangrene, abscesses, and peritonitis show how diverse these operations may be. Surgical intervention is necessary for a variety of appendiceal disorders.

Table 1: Observations made during the time of surgery

Observations made during surgery, n (%)	
Acute appendicitis without complications	25 (33.33%)
Appendicitis with gangrene	15 (20.00%)
Abscess in the appendices	20 (26.66%)
Peritonitis	10 (13.33%)

Table 2 displays male and female findings of parameters information pertaining to open appendectomy surgeries, broken down by gender (n=45 for males and n=25 for females). The operational time for males is substantially lower than that of females, at 29.40 ± 10.50 minutes, as compared to 53.8 ± 13.9 minutes. In terms of percentages, 44.44% of men and 60.00% of women report having bowel motions on the first postoperative day (POD). As of the 1st postoperative day (POD), 55.55 % of the men and 40 % of the women have returned to their regular eating schedules. The data also shows that there are gender disparities in the amount of parenteral and oral analgesics used. These results raise the possibility that there are gender differences in the ways in which people heal following an open appendectomy.

Table 2: Male and Female findings of parameters

Parameter	**Male (n=45)**	**Female (n=25)**
Operative time (min)	29.40 ± 10.50	53.8 ± 13.9
Bowel movements (1st POD)	20 (44.44%)	15 (60.00%)
Time until diet (1st POD)	25 (55.55%)	10 (40.00%)
Parenteral analgesics (doses/day)	1.6 ± 0.5	1.1 ± 0.4
Oral analgesics (doses/day)	1.98 ± 2.30	1.90 ± 1.10
Hospital Stay (day)	2.9 ± 2.4	1.5 ± 0.5
Return to normal activity (day)	15.9 ± 3.2	10.8 ± 3.2

Following an open appendectomy, patients experienced both minor and substantial problems, as seen in Table 3. In this study, 20 patients (28.5%) out of 70 patients had complications (including minor and major) like Vomiting (30.00%), paralytic ileus (10.00%), and wound infection (15.00%) are among the minor problems that have been observed. Haemorrhage within the abdominal cavity occurs in 10% of cases, wound dehiscence in 15% and intra-abdominal abscess in 20% of cases. Both open and laparoscopic appendectomy operations can lead to a wide variety of problems, as these studies demonstrate. Postoperative care must prioritise monitoring and treating these issues for the best chance of successful recovery with few side effects.

Table 3: In both open and laparoscopic appendectomy procedures, there are both minor and significant postoperative complications.

Complications that arise after surgery	Open appendectomy (n = 20)
Minor	
Vomiting	6 (30.00%)
Paralytic ileus	2 (10.00%)
Wound infection	3 (15.00%)
Major	
Wound dehiscence	3 (15.00%)
Intra-abdominal abscess	4 (20.00%)
Hemoperitoneum	2 (10.00%)

Discussion

The most frequent surgical treatment in general surgery, appendectomy, is still carried out using mixed open and laparoscopic techniques since the best technique is still up for debate. We chose to assess the results of the two procedures in order to share our expertise with the global community, as more trials are required and as few of these studies have been carried out in poor nations [12]. A safe and helpful surgical approach for therapeutic purposes is the laparoscopic technique. It offers a few advantages over open appendectomy benefits: a shorter hospital stay, less postoperative analgesic medication needed, early onset of dietary tolerance and a speedier return to routine. The majority of people who have appendicitis suspicions should have a laparoscopy as their first procedure choice whenever possible [13].

Although appendectomy is a frequent surgical treatment, there is no comprehensive list of long-term effects. Our goal was to do a thorough analysis of the long-term consequences of appendectomy in acute appendicitis [14]. The incidence of chronic consequences of an appendectomy for acute appendicitis was determined to be minimal in our systematic study. The majority of the included studies addressed the low occurrence of obstructive ileus following appendectomy; nevertheless, the available data did not support a substantial difference between the laparoscopic and open approaches [15]. Additionally, we discovered a higher incidence of ulcerative colitis and a decreased incidence of Crohn's disease respectively [16]. These findings may point to variations in the underlying pathophysiology of the two conditions, which makes for an intriguing area for future study. Lastly, the evidence to date suggests that the concern about decreased fertility, particularly following a ruptured appendix, may not be warranted [17].

Research findings indicate that individuals older than 50 years old with acute appendicitis had increased rates of death and perforation, a notable rise in the time lag between the start of symptoms and hospital admission, high rates of difficulties as well as unusually high rates of malignancy on histological investigations [18]. The research aimed to determine the imaging, laboratory, and clinical outcomes that may have an impact on the operational and post-surgical results in a group of patients older than 50 who had acute appendicitis and had surgery [19]. It has been proposed that managing acute appendicitis towards the end of adulthood presents difficulties with regard to both diagnostic and post-operative procedures. Consequently, These patients' pre-operative clinical, laboratory, and imaging data must be carefully monitored and meticulously assessed [20].

Surgeons generally perform Open appendectomy (OA), it is carried out by a very little lower right incision quadrant. Recovery after OA is usually straightforward. It is the most common intra-abdominal surgery emergency & the second-most prevalent general surgical operation performed in India and has a 6% lifetime risk [21]. Comparing the clinical outcomes of open versus laparoscopic

appendiceal operations was the aim of the study. In contrast to an open appendectomy, a laparoscopic technique is safer. A laparoscopic appendectomy led to a reduced length of hospital stay following surgery [22].

During pregnancy, the most frequent non-obstetric surgical condition is acute appendicitis. Regarding the best surgical treatment for acute appendicitis during pregnancy, opinions differ. Our goal is to determine the effects of open approach (OA) and laparoscopic (LA) procedures on obstetrics and surgery in pregnant individuals with acute appendicitis [23]. There is still disagreement in the literature today on the best way to do appendices on expectant mothers. To fully understand the crucial impact of laparoscopic appendectomy on fetal loss rates, further extensive research is required [24].

For a German general hospital, research was conducted to assess the quality of life after laparoscopic as opposed to open appendectomy in kids and teens. A few years following the procedure, the quality of life of the identical study population was assessed once again. an increased number of referrals and increased contentment with their scars suggest that more laparoscopic appendectomy patients were happy with the way their surgery went [25].

Conclusion

This study concluded that compared to open appendectomy provided a number of benefits, such as a shorter recovery time, reduced need for postoperative pain medication, quicker return to work, fewer wound infections, and somewhat higher hospital costs. In the open appendectomy, we noted high levels of patient satisfaction following surgery and notable patient preference during consent collection. The likelihood of intra-abdominal abscess formation was higher following open appendectomy, but this may no longer be the case due to technological advancements.

Addressing the existing research gap requires conducting larger-scale studies that encompass diverse patient populations, considering factors like age, comorbidities, and socioeconomic status. Additionally, exploring the economic implications and cost-effectiveness of open appendectomy versus laparoscopic approaches would contribute to a more comprehensive understanding of the benefits and drawbacks associated with each method.

Future prospects in the field of open appendectomy research should delve into refining surgical techniques and postoperative care to further enhance patient outcomes. This includes investigating innovative approaches to minimize operative time, optimize pain management strategies, and reduce complications. Additionally, exploring the long-term impacts of open appendectomy compared to laparoscopic procedures on patients' quality of life and overall well-being could provide valuable insights.

References

1. 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
2. Ortega AE, Hunter JG, Peters JH, Swanstrom LL, Schirmer B. Laparoscopic Appendectomy Study Group. A prospective, randomized comparison of laparoscopic appendectomy with open appendectomy. Am J Surg. 1995;169:208–13
3. Hellberg A, Rudberg C, Kullman E, et al. Prospective randomized multicentre study of laparoscopic versus open appendicectomy. Br J Surg. 1999;86:48–53
4. Heikkinen TJ, Haukipuro K, Hulkko A. Cost-effective appendectomy. Open or laparoscopic? A prospective randomized study. Surg Endosc. 1998;12:1204–8
5. Addiss DG, Shaffer N, Fowler BS, Tauxe RV. The epidemiology of appendicitis and appendectomy in the United States. Am J Epidemiol. 1990 Nov;132(5):910-25.
6. Rocha LL, Rossi FM, Pessoa CM, Campos FN, Pires CE, Steinman M. Antibiotics alone versus appendectomy to treat uncomplicated acute appendicitis in adults: what do meta-analyses say?. World Journal of Emergency Surgery. 2015 Dec;10:1-6.
7. Pisano M, Coccolini F, Poiasina E, Bertoli P, Capponi MG, Poletti E, Naspro R, Ansaloni L.

Conservative treatment for uncomplicated acute appendicitis in adults. Emerg Med Health Care. 2013;1(1):2.
8. Atema JJ, van Rossem CC, Leeuwenburgh MM, Stoker J, Boermeester MA. Scoring system to distinguish uncomplicated from complicated acute appendicitis. Journal of British Surgery. 2015 Jul;102(8):979-90.
9. Rutkow IM. Appendicitis: the quintessential American surgical disease. Arch Surg. 1998 Sep;133(9):1024.
10. Nshuti R, Kruger D, Luvhengo TE. Clinical presentation of acute appendicitis in adults at the Chris Hani Baragwanath academic hospital. International journal of emergency medicine. 2014 Dec;7:1-6.
11. Pedersen AG, Petersen OB, Wara P, Rønning H, Qvist N, Laurberg S. Randomized clinical trial of laparoscopic versus open appendicectomy. Br J Surg. 2001;88:200–205
12. Milewczyk M, Michalik M, Ciesielski M. A prospective, randomized, unicenter study comparing laparoscopic and open treatments of acute appendicitis. Surg Endosc. 2003;17:1023–1028
13. Moberg AC, Berndsen F, Palmquist I, Petersson U, Resch T, Montgomery A. Randomized clinical trial of laparoscopic versus open appendicectomy for confirmed appendicitis. Br J Surg. 2005;92:298–304
14. Ignacio RC, Burke R, Spencer D, Bissell C, Dorsainvil C, Lucha PA. Laparoscopic versus open appendectomy: what is the real difference? Results of a prospective randomized double-blinded trial. Surg Endosc. 2004;18:334–7
15. Frazee RC, Roberts JW, Symmonds RE, et al. A prospective randomized trial comparing open versus laparoscopic appendectomy. Ann Surg. 1994;219:725–8
16. Yong JL, Law WL, Lo CY, Lam CM. A comparative study of routine laparoscopic versus open appendectomy. JSLS. 2006;10:188–92
17. Marzouk M, Khater M, Elsadek M, Abdelmoghny A. Laparoscopic versus open appendectomy: a prospective comparative study of 227 patients. Surg Endosc. 2003;17:721–724
18. Stewart B, Khanduri P, McCord C, et al: Global disease burden of conditions requiring emergency surgery.Br JSurg2014;101:e9–e22.
19. Hirano ES, Pereira BM, Bustorff-Silva JM, Rizoli S, Nascimento Jr B, Fraga GP. Not complicated acute appendicitis in adults: clinical or surgical treatment?. Revista do Colégio Brasileiro de Cirurgiões. 2012;39:159-64.
20. Sauerland S, Jaschinski T, Neugebauer EAM: Laparoscopic versus open surgery for suspected appendicitis. Cochrane Db of Syst Rev 2010; ArtNo: 001546CD001546.
21. 21.Malagon AM, Arteaga-Gonzalez I, Rodriguez-Ballester L. Outcomes after laparoscopic treatment of complicated versus uncomplicated acute appendicitis: a prospective, comparative trial. Journal of Laparoendoscopic & Advanced Surgical Techniques. 2009 Dec 1;19(6):721-5.
22. 22.Tsioplis C, Brockschmidt C, Sander S, Henne-Bruns D, Kornmann M. Factors influencing the course of acute appendicitis in adults and children. Langenbeck's archives of surgery. 2013 Aug;398:857-67.
23. 23. Salminen P, Paajanen H, Rautio T, Nordström P, Aarnio M, Rantanen T, Tuominen R, Hurme S, Virtanen J, Mecklin JP, Sand J. Antibiotic therapy vs appendectomy for treatment of uncomplicated acute appendicitis: the APPAC randomized clinical trial. Jama. 2015 Jun 16;313(23):2340-8.
24. 24. Masoomi H, Mills S, Dolich MO, Ketana N, Carmichael JC, Nguyen NT, et al. Comparison of outcomes of laparoscopic versus open appendectomy in adults: data from the Nationwide Inpatient Sample (NIS), 2006-2008. J Gastrointest Surg. 2011;15:2226–2231.
25. 25. Guller U, Hervey S, Purves H, Muhlbaier LH, Peterson ED, Eubanks S, et al. Laparoscopic versus open appendectomy: outcomes comparison based on a large administrative database. Ann Surg. 2004;239:43–52.