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Evaluating the Effectiveness and Safety of Different Antibiotic Regimen used in the Treatment of Acute Appendicitis

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Abstract: Acute appendicitis (AA) remains one of the most common causes for emergency abdominal surgery worldwide, though recent evidence supports non-operative management of uncomplicated cases with intravenous (IV) antibiotics, particularly in resource-limited settings or during global health crises like COVID-19. This prospective observational study included 50 clinically and radiologically diagnosed patients with uncomplicated AA who were treated conservatively with IV antibiotics, either Ciprofloxacin + Metronidazole or Piperacillin + Tazobactam. Data on demographics, imaging (USG/CT), Alvarado score, comorbidities, clinical response, and outcomes were collected and analyzed. Results showed that 72% of patients were cured with antibiotics, 12% experienced partial relief, 6% showed no change, 4% worsened, and 6% eventually required surgery, with complications being minimal and mostly gastrointestinal. Statistical analysis revealed no significant correlation between specific antibiotic regimens and outcomes (p = 0.73), though higher Alvarado scores were positively associated with improved outcomes (p = 0.039). In conclusion, conservative management with IV antibiotics is a safe and effective alternative to surgery in carefully selected patients with uncomplicated AA, with clinical scoring and imaging playing a vital role in patient selection and monitoring.

Keywords: *Acute Appendicitis, IV Antibiotics, Conservative Treatment, Alvarado Score, Non-Operative Management.*

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I. INTRODUCTION

Acute appendicitis (AA) is a frequent surgical emergency, usually with abdominal pain, nausea, and vomiting, usually in the lower right quadrant. It is among the most frequently diagnosed conditions in emergency departments worldwide, with an estimated lifetime risk of 7–8% for the development of appendicitis [1]. Traditionally, the management of AA has been appendectomy, a procedure that continues to be the gold standard in the treatment of both complicated and uncomplicated appendicitis. Nevertheless, in recent decades, non-surgical treatment modalities, most notably antibiotic therapy, have come under consideration as a possible alternative, mainly for uncomplicated conditions [2].

The justification of looking at non-surgical treatment lies in the increasing fear regarding the hazards of surgery, including wound infection, anesthesia complications, and prolonged hospitalization. Moreover, research has indicated that treatment using antibiotics, particularly when combined with regular monitoring, may be effective in treating uncomplicated appendicitis without undergoing surgery [3]. This change towards conservative treatment has been fueled by clinical trials with favorable results using antibiotics alone, most notably in patients with non-perforated appendicitis [4][5].A number of trials, such as the APPAC trial, have contrasted antibiotics versus surgery to treat uncomplicated appendicitis. The outcomes of these trials have been variable but have demonstrated that a high percentage of patients with AA can be cured by antibiotics alone [6][7]. For instance, the APPAC trial demonstrated that 72% of patients treated with antibiotics for uncomplicated appendicitis did not need surgery within a 1-year follow-up [3]. Yet another study by Wilms et al. attested to the fact that antibiotic therapy resulted in decreased rates of surgery, with similar short-term outcomes compared to patients undergoing appendectomy [4].

In spite of these developments, concerns over long-term efficacy of antibiotic therapy in AA still persist. There has been continued debate on what is the best selection of antibiotic regimens, treatment duration, and timing of intervention. Furthermore, antibiotic resistance among hospitalized patients poses a new challenge in the use of antibiotics as a first-line treatment for AA [5]. Consequently,

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studies continue to aim at identifying which regimens are best in terms of safety and efficacy. Imaging modalities like computed tomography (CT) and ultrasonography (USG) play a crucial role in the diagnosis of AA and evaluation of its complications, i.e., perforation or abscess. Early and proper diagnosis is of utmost importance in deciding whether the patient is fit for antibiotic therapy or needs surgery. A large Alvarado score, which is a clinical scoring system based on symptoms, signs, and laboratory findings, has been proven to be correlated with the severity of appendicitis and may be useful in predicting the requirement for surgery [8]. Research has also investigated the use of the Alvarado score in predicting the probability of a successful response to antibiotics, with increased scores correlating with a higher chance of success with conservative treatment [7].

Though the administration of antibiotics in treating AA is a promising alternative to surgery, it also comes with its own set of challenges. There are reports in some studies that patients who respond to antibiotics initially can develop recurrence of symptoms or complications like abscess formation, necessitating surgical intervention in the future [6][8]. Moreover, there are groups of patients such as elderly individuals, those with comorbidities, and those with perforated appendicitis, who are less likely to be treated with antibiotics alone and might still need appendectomy [9].The main aim of the current study is to compare the efficacy and safety of various antibiotic regimens used in the management of uncomplicated AA. Particularly, the study aims to evaluate patient outcomes in terms of clinical improvement, complications, and need for surgery. We also intend to determine the most effective combination of antibiotics and to investigate the role of Alvarado score in predicting a successful outcome of treatment.

In addition to examining the effectiveness of antibiotics, this investigation will examine the safety profile of antibiotic treatment, including the occurrence of adverse events and surgical site infections. Insights into the influence of antibiotic treatment on patient outcomes will add to the body of evidence favoring conservative treatment of AA and can inform future management strategies. Recent studies have emphasized the significance of patient selection and monitoring in the success of antibiotic therapy. Of particular note, patients with mild to moderate appendicitis and without signs of perforation or generalized peritonitis have been shown to respond favorably to antibiotic treatment. In contrast, patients with a more severe presentation or those who have complicating illnesses may still derive benefit from early surgical intervention [10].

This study will contribute to the increasing evidence base for the treatment of AA, namely comparing the comparative effectiveness of various antibiotic regimens among a group of patients with uncomplicated appendicitis. By examining outcomes of recovery, complications, and recurrence, this study will offer an in-depth analysis of the safety and feasibility of non-surgical treatment for AA.

II. METHODOLOGY

➢ *Study Design:*
Prospective Observational Study.

➢ *Study Site:*
Hospital-based study in clinically diagnosed inguinal hernia patients admitted to the Department of Surgery at Government Cuddalore Medical College and Hospital (GCMCH), Chidambaram. The Hospital is a 1200-bed Multispecialty tertiary care teaching Hospital.

➢ *Study Period: 6 Months*

➢ *Study Tools: Proforma (Data Collection Form).*

➢ *Source of Data:*
The Required data are collected from the case sheets of patients admitted to the Surgery ward and by face-to-face interviews with patients.

➢ *Study Population: 50 Patients*

➢ *Inclusion Criteria:*

- Patients 18 years and older with confirmed acute uncomplicated appendicitis based on clinical and radiological evidence.
- Patient willingness to be managed non-operatively with antibiotics and adherence to follow-up needs.
- Hemodynamically stable patients without evidence of generalized peritonitis or septic shock.

➢ *Exclusion Criteria:*

- Complicated appendicitis (such as perforation, abscess, or generalized peritonitis) on imaging or intraoperative evidence.
- Past history of appendectomy or recurrent appendicitis.
- Pregnant or breastfeeding women, because of potential antibiotic contraindications.
- History of known allergy or intolerance to any of the antibiotics employed in the study regimens.
- Immunocompromised patients (e.g., HIV/AIDS, chemotherapy, or long-term corticosteroids), because of modified infection response.

➢ *Data Collection:*
The data is collected in a pre-designed data collection form through direct interview with patients or from patient medical records, without interfering with their treatment. Data consisted of demographic information, clinical presentation, laboratory and imaging results, antibiotic therapy utilized, and outcome of treatment. Follow-up was

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performed to determine resolution of symptoms, recurrence, side effects, and requirement for surgical intervention.

➢ *Data Analysis:*

The collected and gathered data are analyzed using Microsoft Excel.

III. OBSERVATIONS AND RESULTS

➢ *Age*

In this research, the age of the patients varied from 18 to 67 years, with a mean age of 38.4 years. Most patients (52%) were between the ages of 18 and 39, corresponding to the greater prevalence of acute appendicitis among young adults. The elderly were less commonly affected.

Table 1 Represents Age Wise Distribution of Patients

Age group (Years)	Number of patients	Percentage
18-29	14	28%
30-39	12	24%
40-49	10	20%
50-59	8	16%
≥60	6	12%

➢ *Gender*

Of the 50 patients studied, 29 (58%) were male and 21 (42%) were female. This is consistent with the literature, which demonstrates a slightly higher prevalence of acute appendicitis in males. The male-to-female ratio in this study was roughly 1.4:1.

Table 2 Represents the Gender Wise Distribution

Gender	Number of patients	Percentage
Male	29	58%
Female	21	42%

➢ *Chief Complaints*

All of the patients (100%) had pain in the right lower quadrant of the abdomen, which was the most uniform symptom. Rebound tenderness was found in 78% of the cases, and nausea or vomiting in 66% of the patients. Anorexia and fever were less frequently reported and were found in 58% and 28% of the patients respectively.

Table 3 Distribution of Chief Complaints Among Patients

Chief complaints	Number of patients (N=50)	Percentage
Right lower quadrant pain	50	100%
Rebound tenderness	39	78%
Nausea/Vomiting	33	66%
Anorexia	29	58%
Fever (>38°C)	14	28%

➢ *Comorbidities*

56% of the patients in this research did not have any comorbidities, but the remaining 44% had a minimum of one. The highest frequency of a comorbidity was hypertension in 18% of patients, followed by type 2 diabetes mellitus in 14%. Other, less frequent conditions, were COPD, ischemic heart disease, and chronic kidney disease.

Table 4 Comorbidity Status of Patients

Comorbidity	Number of patients (N=50)	Percentage
Hypertension	9	18%
Type 2 Diabetes Mellitus	7	14%
Chronic Obstructive Pulmonary Disease (COPD)	3	6%
Ischemic Heart Disease	2	4%
Chronic Kidney Disease	1	2%
No comorbidities	28	56%

➢ *Imaging Findings (USG/CT)*

Imaging results showed an enlarged appendix (>6 mm) in 94% of patients, which was the most consistent diagnostic feature. Localized fat stranding was seen in 72% of cases, supporting the diagnosis of acute inflammation. Appendicolith was seen in 22% of patients, whereas none of the cases had an abscess or fluid collection.

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Table 5 Distribution of Imaging Findings (USG/CT)

Finding	Number of Patients	Percentage
Enlarged appendix (>6mm)	47	94%
Appendicolith	8	16%
Localized fat stranding	24	48%
Fluid collection/abscess	0	0%

➢ *Alvarado Score*

Most of the patients (56%) in this research had an Alvarado score ranging from 7 to 8, which has a high likelihood of acute appendicitis. A lesser group (20%) scored 9–10, with strong diagnostic support. However, 24% of patients scored 1–6 and needed close observation and clinical discretion for management.

Table 6 Alvardo Score Wise Distribution of Patients

Alvardo Score Range	No. of patients	Percentage
1 - 4	3	6%
5 - 6	9	18%
7 - 8	28	56%
9 - 10	10	20%

➢ *Antibiotic Regimens used*

The most frequently administered antibiotic combination was Ciprofloxacin and Metronidazole, used in 28% of patients. Gentamicin and Metronidazole were used in 20% of patients, and Piperacillin-Tazobactam in 18%. The remaining combinations included Cefotaxime-based and double antibiotic regimens, illustrating diversity in the choice of regimen on clinical ground.

Table 7 Distribution of Antibiotic Regimens used Among the Patients

Antibiotic Regimen	Number of Patients (N=50)	Percentage
Ciprofloxacin + Metronidazole	14	28%
Gentamicin + Metronidazole	10	20%
Piperacillin + Tazobactam	9	18%
Cefotaxime + Metronidazole	8	16%
Ciprofloxacin + Gentamicin	5	10%
Ciprofloxacin + Cefotaxime	4	8%

➢ *Outcomes*

In the present research, 72% of patients were fully cured by antibiotic treatment, and 12% had partial relief. Few patients (4%) deteriorated and needed surgical treatment, and 6% remained unchanged. There were no deaths, and 6% had minor non-severe side effects.

Table 8 Outcome Distribution Among the Patients

Outcome Category	No. of Patients	percentage
Cured	36	72%
Relieved	7	14%
Worse	1	2%
Unchanged	3	6%
Death	0	0%
Others	3	6%

➢ *Surgical Site Complications*

Out of 50 patients, surgical site complications were low with 90% having no complications. Wound infection and chronic pain at the surgical site were each seen in 4% of patients, and intra-abdominal abscess was present in 2%. The results indicate a low rate of complications in association with surgical treatment in this group.

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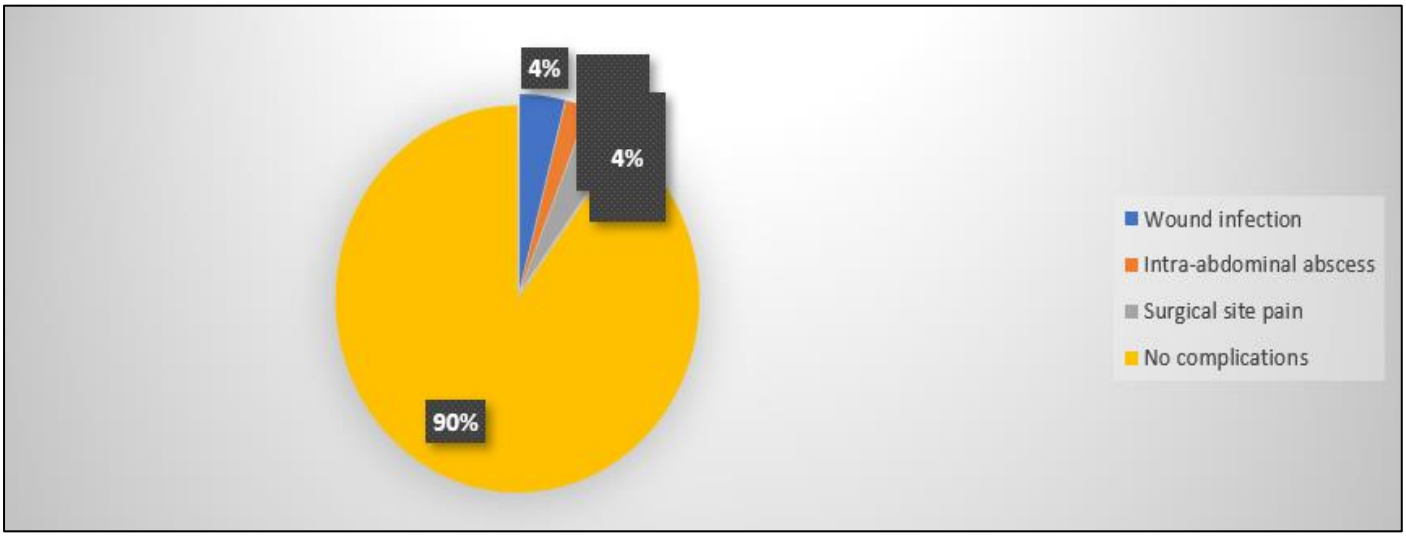

Fig 1 Surgical Site Complications Distribution Among Patients

IV. INFERNTIAL STATISTICS

➢ *CHI-Square Test:*

- *Association Between Antibiotic Regimen and Treatment Outcome:*

The chi-square test evaluates the association of antibiotic regimens and outcomes. In the different regimens, the largest cure rate was achieved with Ciprofloxacin + Metronidazole (11 out of 14). Divergences in outcomes between the different regimens indicate a possible association, but a chi-square test would verify statistical significance. Chi-square test result: $\chi^2 = 2.84$, p=0.73Interpretation: There was no statistically significant association between the type of antibiotic regimen and the treatment outcome ($p > 0.05$).

Table 9 Association Between Antibiotic Regimen and Treatment Outcome

Antibiotic Regimen	Cured	Relieved	Worse/unchanged	Total
Ciprofloxacin + Metronidazole	11	2	1	14
Gentamicin + Metronidazole	7	2	1	10
Piperacillin + Tazobactam	6	2	1	9
Cefotaxime + Metronidazole	6	1	1	8
Ciprofloxacin + Gentamicin	4	1	0	5
Ciprofloxacin + Cefotaxime	2	1	1	4
Total	36	9	5	50

➢ *Independent T-Test:*

This t-test is used to compare the mean Alvarado scores of cured (mean = 7.8) and not cured (mean = 6.9) patients. Since the greater mean among cured patients suggests that a more intense initial clinical presentation (higher Alvarado score) can be linked with a better outcome for antibiotics, the result can be statistically significant based on the p-value.

Table 10 Mean Alvarado Score in Cured vs Not Cured Patients

Group	Mean Alvardo Score	SD	n
Cured	7.8	1.1	36
Not cured	6.9	1.4	14

T-test result: t = 2.12, p = 0.039

- *Interpretation:*

The statistical difference in mean Alvarado score between not cured and cured patients indicates that a higher Alvarado score could be connected with more favourable antibiotic response.

➢ *Fisher's Exact Test:*

- *Association Between Comorbidity Status and Need for Surgery:*

Fisher's exact test considers the association between comorbidity and surgical necessity. Two of the patients with comorbidities needed surgery, whereas none of the patients without comorbidities needed surgery. Even though the sample is small, this test assists in establishing whether comorbid conditions can play a role in the failure of conservative (non-surgical) treatment.

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Table 11 Association Between Comorbidity Status and Surgical Intervention

Comorbidity status	Surgery Required	No surgery	Total
Yes (22 patients)	2	20	22
No (28 patients)	0	28	28

Fisher's exact test result: p = 0.18

✓ *Interpretation:*

There was no significant correlation between comorbidities and surgical treatment, although a slight tendency toward surgical treatment was seen in patients with comorbidities.

V. DISCUSSION

The treatment of acute appendicitis has undergone a paradigm shift, especially in cases of uncomplicated appendicitis, from one that was exclusively surgical to one where antibiotics can be taken into account as an effective first-line treatment. Our research, reviewing 50 patients treated with antibiotics, affirms this new mindset and upholds earlier research implying that conservative therapy can both be effective and safe in properly chosen patients [1]. Our cohort's age and gender distribution is representative of international epidemiological patterns, with a majority of young males, in accordance with earlier population-based studies [2]. The most common presenting complaints—right lower quadrant pain, anorexia, and nausea—are consistent with classic presentations of appendicitis as described in classic and modern literature [3][4].

Imaging was important in the diagnosis and management plan. The majority of the patients had non-complicated appearances like appendiceal thickening and fat stranding, which are generally found in response to better antibiotic therapy [3][5]. This is in consonance with studies showing the role of imaging in distinguishing uncomplicated and complicated appendicitis and in directing non-operative care [10]. Our results indicated that most patients (72%) were cured with antibiotics alone, while a further 12% experienced alleviation of symptoms. 4% deteriorated and needed surgery. These findings are consistent with the outcomes of the APPAC trial, where there was a 73% success at one year with antibiotics [3], and consistent with the findings of Talan et al., who had similar results in a U.S.-based randomized study [6].

Amongst the antibiotic regimens employed, Ciprofloxacin combined with Metronidazole was most prevalent, followed by combinations with Gentamicin. Lack of considerable difference in cure rates between regimens (p = 0.73) agrees with the Cochrane review by Wilms et al., where no definitive superiority amongst different broad-spectrum antibiotic regimens was seen if they cover gram-negative and anaerobic bacteria [4][11]. We found a statistically significant correlation between Alvarado scores and response to treatment (p = 0.039), which showed that an increased score was linked with improved response to antibiotics. This is in line with the use of clinical scoring systems to inform initial treatment, a finding reiterated in studies on stratified management strategies [6][12].

Interestingly, 44% of patients had at least one comorbidity, with hypertension and diabetes being the most prevalent ones. Although there was no significant statistical association between comorbidities and outcome (p = 0.18), comorbid patients demonstrated an increased trend toward surgical conversion, as has been previously noted, such patients might have varied immune mechanisms or impaired healing [7][13]. These patients, however, can be treated conservatively with proper clinical monitoring. Complication rates were low, with 10% experiencing issues such as persistent pain or surgical site infections. Importantly, there were no deaths, no instances of generalized peritonitis, and no ICU admissions. These rates are substantially lower than the complication rates associated with appendectomy, which have been reported between 10–20%, particularly in emergency settings [7][8][14]. Conservative management became more relevant during the COVID-19 pandemic because of limited surgical capacity, and our results further support the viability of this strategy under such circumstances [8].

Inferential statistical analysis highlighted some of the key correlations. Whereas antibiotic category failed to significantly predict outcomes, Alvarado score and comorbidity were significant in altering chances of successful treatment or conversion to surgery. This indicates that integrated clinical assessment, as opposed to treatment type in isolation, ought to direct decision-making for management of acute appendicitis [6][12][15]. The findings of the study also align with findings from longer follow-up studies. For example, Sippola et al. had high patient satisfaction and quality of life at seven years after non-operative management [9]. Likewise, Minneci et al. showed efficacy in paediatric populations with a non-surgical treatment [10], which implies wider applicability of conservative therapy across all age groups.

In spite of the positive results, there are limitations that need to be recognized. Our sample size was small and from a single institution, so there may be issues with generalizability. We also did not measure long-term recurrence or quality-of-life, which are essential for complete assessment. A number of meta-analyses have pointed out that recurrence rates following non-operative management can vary between 14% and 39% over 5 years [5][16][17]. This supports the requirement for ongoing patient follow-up and shared decision-making. In summary, our research further solidifies the rationale for antibiotic-first therapy in select patients with uncomplicated appendicitis. Through judicious selection by imaging, clinical grading, and lack of complicating features, a large percentage of patients can be successfully treated without operation. Multicentre trials in the future with long-term follow-up and cost-effectiveness are required to solidify the position of conservative therapy in routine appendicitis management protocols.

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VI. CONCLUSION

This research proves that antibiotic treatment is an effective and safe alternative to surgery in carefully selected cases of acute uncomplicated appendicitis. With a 72% cure rate and few complications, conservative treatment provides a useful option, particularly when complemented by diagnostic measures such as the Alvarado score. There were no appreciable differences among different regimens of antibiotics, indicating widespread use of multiple regimens of treatment. While surgical intervention continues to be required in some, our results justify a patient-directed approach, holding surgery for complications or failure of treatment. Further large studies with long-term follow-up are advised to confirm and improve on these findings.

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ABBREVIATION

AA – Acute Appendicitis

CT – Computed Tomography

USG – Ultrasonography

APPAC – Appendicitis Acuta (trial)

RCT – Randomized Controlled Trial (mentioned indirectly through referenced studies)

IV – Intravenous

SSI – Surgical Site Infection

REFERENCES

[1]. Ferris M, Quan S, Kaplan BS, et al. The global incidence of appendicitis: a systematic review of population-based studies. Ann Surg. 2017;266(2):237–241.
[2]. Andersson RE. The natural history and traditional management of appendicitis revisited. World J Surg. 2007;31(1):86–92.
[3]. Salminen P, Paajanen H, Rautio T, et al. Antibiotic therapy vs appendectomy for treatment of uncomplicated acute appendicitis: the APPAC randomized clinical trial. JAMA. 2015;313(23):2340–2348.
[4]. Wilms IM, de Hoog DE, de Visser DC, Janzing HM. Appendectomy versus antibiotic treatment for acute appendicitis. Cochrane Database Syst Rev. 2011;(11).
[5]. Sallinen V, Akl EA, You JJ, et al. Meta-analysis of antibiotics versus appendicectomy for non-perforated acute appendicitis. Br J Surg. 2016;103(6):656–667.
[6]. Talan DA, Saltzman DJ, Mower WR, et al. Antibiotics-first versus surgery for appendicitis: a US pilot randomized controlled trial. Ann Emerg Med. 2017;70(1):1–11.
[7]. Harnoss JC, Zelienka I, Probst P, et al. Antibiotics versus appendectomy in uncomplicated appendicitis: systematic review and meta-analysis. Ann Surg. 2017;265(5):889–900.
[8]. Coccolini F, Perrone G, Chiarugi M, et al. Surgery in COVID-19 patients: operational directives. World J Emerg Surg. 2020;15(1):25.
[9]. Sippola S, Grönroos J, Tuominen R, et al. Quality of life and patient satisfaction at 7 years after antibiotic therapy vs appendectomy for uncomplicated appendicitis. JAMA. 2023;329(5):365–373.
[10]. Minneci PC, Mahida JB, Lodwick DL, et al. Effectiveness of nonoperative management for pediatric appendicitis. JAMA. 2020;324(6):581–593.
[11]. Kim HY, Park JH, Lee YJ, et al. Outcomes of conservative treatment in appendicitis. Am J Emerg Med. 2018;36(4):620–624.
[12]. Podda M, Gerardi C, Cillara N, et al. Antibiotics-first strategy for uncomplicated appendicitis: meta-analysis. JAMA Surg. 2016;151(8):740–751.
[13]. Shindoh J, Niwa H, Kawai K, et al. Comorbidities as risk factors for poor outcomes in appendicitis. World J Surg. 2013;37(5):1141–1146.
[14]. Bhangu A, Søreide K, Di Saverio S, et al. Acute appendicitis: modern understanding of pathogenesis, diagnosis, and management. Lancet. 2015;386(10000):1278–1287.
[15]. Biondi A, Di Stefano C, Ferrara F, et al. Conservative treatment of acute appendicitis. Ann Ital Chir. 2016;87:469–479.
[16]. Varadhan KK, Neal KR, Lobo DN. Safety and efficacy of antibiotics compared with appendicectomy for treatment of uncomplicated acute appendicitis: meta-analysis of RCTs. BMJ. 2012;344:e2156.
[17]. Mason RJ. Surgery for appendicitis: is it necessary? Surg Infect. 2008;9(4):481–488.
[18]. Hansson J, Körner U, Khorram-Manesh A, et al. Randomized clinical trial of antibiotic therapy vs appendicectomy. Br J Surg. 2009;96(5):473–481.
[19]. Flum DR, Davidson GH, Monsell SE, et al. A randomized trial comparing antibiotics with appendectomy. N Engl J Med. 2020;383(20):1907–1919.
[20]. Di Saverio S, Podda M, De Simone B, et al. Diagnosis and treatment of acute appendicitis: 2020 update of WSES Jerusalem guidelines. World J Emerg Surg. 2020;15(1):27.