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EFFICACY AND SAFETY OF APPENDECTOMY VERSUS ANTIBIOTIC TREATMENT IN UNCOMPLICATED ACUTE APPENDICITIS: AN EVIDENCE-BASED REVIEW

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Abstract: Objective: To compare the efficacy and safety of appendectomy and conservative treatment with antibiotics in the management of uncomplicated acute appendicitis. **Methodology**: Bibliographic review through PubMed with the final screening of 17 articles to make up the collection of this study. **Discussion:** Appendectomy, considered the gold standard, is more than 98% effective and has almost zero risk of recurrence. Conservative treatment with antibiotics shows initial efficacy of 70% to 80%, with fewer immediate complications and reduced costs, but has a high recurrence rate, reaching up to 39% in 5 years, as well as the need for additional interventions. Laparoscopic appendectomy is preferred due to faster recovery and fewer complications, while conservative treatment is a viable option for selected patients, provided there is adequate monitoring. **Final considerations:** The choice between approaches should be individualized, taking into account the patient's preferences, clinical profile and available resources. Future studies should focus on clear selection criteria, strategies to reduce recurrence and impacts on quality of life, with a view to optimizing clinical outcomes.
Keywords: Appendectomy; Conservative treatment; Uncomplicated acute appendicitis; Efficacy and safety.

INTRODUCTION

Appendicitis is one of the most common intra-abdominal emergencies, with clinical manifestations ranging from subclinical and self-limiting forms to severe conditions with sepsis and mortality. Its diagnosis, however, presents a medical challenge due to the absence of effective laboratory or imaging tests, requiring clinicians to rely on signs and symptoms or clinical scoring systems. This scenario often results in misdiagnosis and, consequently, inadequate treatment (Weledji; Zisuh; Ngounou, 2023).

Its main etiology is related to luminal obstruction by fecaliths, but inflammatory progression is neither linear nor inevitable, depending on the patient's immune response and the appropriate intervention time (Weledji; Zisuh; Ngounou, 2023). According to Köhler *et al.* (2021), acute appendicitis affects around 7% to 8% of the population throughout their lives and is one of the main causes of acute abdominal pain. Its classic symptoms include pain in the lower right quadrant of the abdomen, fever, nausea and laboratory changes such as leukocytosis and increased C-reactive protein.

Laparoscopic appendectomy is preferred due to its lower complication rate and faster recovery compared to open surgery (Alajaimi *et al.*,2023). However, although laparoscopic appendectomy is widely recognized as the gold standard in the treatment of appendicitis, conservative management with antibiotics has gained prominence, especially in cases of uncomplicated appendicitis (Ehlers *et al.*, 2016).

Evidence suggests that the distinction between complicated and uncomplicated appendicitis may reflect different pathological entities. However, there is significant variation in the individual response to treatment, and the rates of recurrence and therapeutic failure in conservative management still represent major challenges. In addition, advances in minimally invasive techniques and the prophylactic use of antibiotics have reduced postoperative complications, optimizing clinical management (Ehlers *et al.*, 2016).

These advances underscore the need to consolidate the available knowledge, especially on properly established diagnostic criteria that will allow a determination to be made between a surgical or conservative approach depending on the case. In specific populations, such as young children and the elderly, these doubts are even more evident. In addition, there is a lack of robust studies analyzing predisposing factors for progression to complicated forms, as well as the effectiveness of standardized protocols for conservative treatment (Bendib, 2024).

Given these controversies, it is essential to expand comparative studies between surgical and conservative approaches, focusing not only on clinical and economic outcomes, but also on patients' quality of life. This review aims to evaluate and compare the efficacy and safety of appendectomy versus antibiotic treatment in the management of uncomplicated acute appendicitis, focusing on outcomes such as complication rate, appendicitis recurrence, recovery time, mortality and patient quality of life.

METHODOLOGY

A literature review based on the criteria of the PVO strategy (*population, variable and outcome)* with the study's guiding question: "What is the efficacy and safety of appendectomy compared to antibiotic treatment in the management of uncomplicated acute appendicitis, considering complication rates, recurrence, recovery time, mortality and patient quality of life?".

The searches were carried out in the PubMed/MEDLINE (Medical Literature Analysis and Retrieval System Online) database, using carefully selected search terms combined with the Boolean operators "AND" and "OR". The search strategy included the search terms *"appendectomy", "antibiotics", "acute appendicitis"*.

Initially, 269 articles were identified and submitted to the previously established inclusion and exclusion criteria. The inclusion criteria covered studies published between 2019 and 2024, written in English, and which directly addressed the outcomes of interest, such as complication rates, recurrence, recovery time, mortality and quality of life. In addition, review, meta-analysis, observational

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and experimental studies were considered. On the other hand, the exclusion criteria included duplicate articles, works available only in abstract format and studies that did not directly address the proposed objectives or that did not meet the other inclusion criteria.

After applying these criteria, the initial number of articles was reduced to 94. After reading and analyzing all the studies, 11 articles were selected to form the body of evidence for this review. These studies were analyzed in detail, forming the basis for the discussion on the efficacy and safety of appendectomy compared to the use of antibiotics in the management of uncomplicated acute appendicitis.

Acute appendicitis, one of the most frequent surgical emergencies, is characterized by inflammation of the appendix, usually caused by obstruction due to faecaliths, lymphoid tissue hypertrophy or tumours. Traditionally, appendectomy is considered the gold standard of treatment, offering a definitive solution with low recurrence rates. However, it is associated with post-operative complications ranging from 8.2% to 31.4%, and up to 28% of surgeries can be performed without confirmation of active appendicitis (Pata *et al.*, 2023). In recent years, antibiotic treatment has been considered a viable alternative in cases of uncomplicated acute appendicitis, with significant efficacy in selected cases of uncomplicated appendicitis and safe short--term outcomes. However, studies, such as the one carried out by the CODA Collaborative, show conflicting results. Although antibiotics can be effective in some scenarios, it is unclear whether this approach is superior, equivalent or inferior to laparoscopic appendectomy. In addition, the use of antibiotics has been linked to a recurrence rate of up to 39% over five years, a limitation that should be considered especially in young populations and those at higher risk of new episodes (Pata *et al.*, 2023).

COMPLICATION RATES

The comparative analysis of complication rates between appendectomy and antibiotic treatment in the management of uncomplicated acute appendicitis is crucial for assessing the safety of such approaches. A meta-analysis by Xu *et al.* (2023) showed that the complication rate in the antibiotic-treated group was significantly lower (3.9%) compared to the appendectomy group (9.5%). This difference was even more pronounced when comparing conservative treatment with open surgery (4.8% vs. 14.5%). However, when considering laparoscopic surgery, no statistically significant difference in complication rates was identified between conservative management (3.1%) and the surgical approach (4.4%). In addition, patients initially treated conservatively who, due to treatment failure, required subsequent appendectomy, had surgical complication rates similar to those observed in patients who underwent surgery as the initial approach (9.5% vs. 11.9%).

A study by Javanmard-Emamghissi *et al.* (2021) corroborates these findings, indicating that non-operative treatment with antibiotics had lower complication rates compared to appendectomy, with an 80% success rate in cases of uncomplicated acute appendicitis over a 90-day period. In addition, patients treated conservatively had shorter hospital stays and reduced costs, even in cases where an interval appendectomy was necessary.

COST COMPARISON

Antibiotic treatment for uncomplicated acute appendicitis has been shown to be more cost-effective than appendectomy, as evidenced by a study from the APPAC trial (Podda *et al.*, 2021). The total costs of surgery were up to 1.6 times higher in the first year and 1.4 times higher after five years. This cost reduction in conservative management stems from the absence of immediate surgical

intervention and lower productivity losses, since patients treated with antibiotics return to work more quickly (average of 11 days versus 22 days for surgery). Conservative management is an economically advantageous alternative, especially in contexts of limited resources, as long as strict selection and monitoring criteria are followed.

RECOVERY AND RECURRENCE

In the management of uncomplicated acute appendicitis, the recurrence of the disease after conservative treatment with antibiotics compared to appendectomy is one of the main clinical concerns. Although the initial use of antibiotics, such as ceftriaxone and metronidazole, can resolve the condition in many patients, the rate of recurrence over time is a determining factor. Appendectomy, on the other hand, remains the standard treatment, virtually eliminating the risk of recurrence. Studies indicate that the recurrence rate after antibiotic treatment varies between 20% and 39% (De Wijkerslooth *et al.*, 2024; Weledji; Zisuh; Ngounou, 2023). In addition, a recurrence rate of 27% is observed in one year, which progressively increases in the following years (Weledji; Zisuh; Ngounou, 2023).

In contrast, appendectomy demonstrates superior efficacy, with a success rate of approximately 92% (Weledji; Zisuh; Ngounou, 2023) and virtually no recurrence (De Wijkerslooth *et al.*, 2024). However, the choice of treatment must be individualized, taking into account the specific risk of each patient and their preference for surgical procedures, even in the face of a higher probability of recurrence in conservative treatment.

Recovery time also varies significantly between therapeutic approaches. Appendectomy, particularly laparoscopic appendectomy, is associated with faster recovery compared to open surgery, offering advantages such as less postoperative pain, lower risk of infection at the surgical site and earlier reintegration into normal activities (Weledji; Zisuh; Ngounou, 2023). Laparoscopy, as a minimally invasive technique, has become the standard of treatment for this pathology due to its effectiveness and lower physical impact on the patient.

On the other hand, treatment with antibiotics can prolong recovery time, especially in complicated cases such as abscesses or phlegmons, which may require drainage or other additional procedures. In addition, patients who initially opted for conservative management may require subsequent surgical interventions due to therapeutic failure or worsening of the appendicitis, which could extend the total recovery period and result in further hospitalization (De Wijkerslooth *et al.*, 2024). Post-surgical recovery, although potentially predictable, can also vary depending on factors such as age, the presence of comorbidities and the occurrence of complications. Despite this, appendectomy provides a more consistent overall recovery time and reduces the risk of late complications associated with non-surgically treated appendicitis, such as perforations or abscess formation.

It is important to emphasize that the analysis of recovery time should not be limited to the length of hospital stay, but should include the impact of long-term complications and the patient's quality of life. While antibiotic treatment is effective for the acute resolution of appendicitis in a significant proportion of cases, frequent relapses and the need for subsequent appendectomy can prolong the total recovery period and compromise the patient's long-term well-being (De Wijkerslooth *et al.*, 2024).

MORTALITY AND QUALITY OF LIFE

A study conducted by Sugiura *et al.* (2020) concluded that emergency laparoscopic appendectomy (ELA) is the most effective strategy for preserving quality of life in patients with complicated appendicitis. LAS showed

lower recurrence rates and better results in terms of quality-adjusted life years (QALYs). Although it is related to an increased risk of perioperative complications, such as abscesses and infections, recovery after surgery has been shown to be faster and more consistent compared to non-operative approaches.

With regard to mortality, the study by Javanmard-Emamghissi *et al.* (2021) revealed that both operative and non-operative management for uncomplicated acute appendicitis have low mortality rates. In the conservatively treated group, the 30-day mortality rate was 0.2%, while in the operative group it was 0.3%, with no statistically significant difference between the two groups. These findings suggest that both treatments are safe in terms of immediate mortality. In addition, there was no increase in the severity or evolution of cases among patients who required surgery after initial antibiotic management failed.

FINAL CONSIDERATIONS

The review compared the efficacy and safety of appendectomy and conservative treatment with antibiotics in uncomplicated acute appendicitis. Appendectomy, the gold standard, shows efficacy of over 98% and almost zero risk of recurrence, while conservative treatment shows initial efficacy of 70% to 80%, with fewer immediate complications and reduced costs. However, the high recurrence rate (up to 39% in 5 years) and the need for additional interventions limit its definitive use. The choice must be individualized, taking into account the patient's preferences, clinical profile and available resources. Laparoscopic appendectomy is preferred due to faster recovery and fewer complications. Conservative treatment is feasible in selected patients, provided it is well monitored. Future studies should focus on clear selection criteria, reduction of recurrence and impact on quality of life, with a view to optimizing clinical outcomes.

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