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The effectiveness comparison of appendectomy action through the antibiotic therapy administration in acute appendicitis patients

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ABSTRACT

The purpose of this research to compare the effectiveness of appendectomy by administering non-operative management in the form of antibiotics in acute appendicitis patients. The research method used descriptive qualitative through the Literature Review (LR) approach. The data source used a secondary source. Data analysis technique selects literature based on title, year, and indexed articles, then reviews articles that match the subject matter. the articles from those journals are compared to find the differences and similarities. A literature review of four PubMed, DOAJ, Cochrane, and Google Scholar databases published in the last five years, i.e. from 2018-2022. Twelve pieces of literature were obtained and reported the advantages and disadvantages of each procedure. Apshortextomy keeps the gold standard with a lower risk of recurrence and severity and a higher treatment success rate. Appendectomy is also required for appendicitis cases with complications. However, antibiotic therapy has advantages with lower levels of complications, fewer costs, and fewer hospital stays. The success rate of non-operative therapy in the form of antibiotics can reach 65-75%, while it can reach 67,1% in children. There are differences in research results related to the effectiveness of appendectomy and antibiotic therapy in acute appendicitis patients. Each of these therapeutic procedures has its advantages and disadvantages. It is very important to be concerned about the urgency and expectations of the patient in selecting this therapy.

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INTRODUCTION

Acute appendicitis (AA) has been considered one of the most common acute surgical conditions in the world. Recent studies, however, have suggested that nonoperative management (NOM) with a course of antibiotics (ABX) may be as effective as surgery in treating appendicitis (Rushing et al.,

2019). Acute appendicitis is one of the most common emergencies condition and generally must be treated immediately through surgical therapy. About one in ten people worldwide experience acute appendicitis (Chisthi et al., 2020; Haijanen et al., 2019; Patkova et al., 2020; Yang et al., 2019). Regarding to the gender condition, men suffer from acute appendicitis more often than women (8.6% vs. 6.7%) (Poprom *et al.,* 2019). In western countries, about 8-10% of people will experience acute appendicitis in their lives, and about 1-8% of children who complain of abdominal pain to the emergency room are diagnosed with acute appendicitis (Chisthi et al., 2020; McLauthlin & Packard, 2017; Moraga et al., 2016; O'Leary et al., 2021; Smith J, 2019).

Appendectomy is a standard surgical procedure on patients experiencing appendicitis. In 2014, more than 95% of appendicitis patients in the United States have this appendectomy procedure (Flum & Davidson, 2021). In this current condition, more than 180,000 adults and 70,000 children in the country are having appendectomy procedures each year. Although this surgery is curative, appendectomy is a major intra-abdominal surgery with perioperative and post-operative risks in the form of pain and some frequent disabilities occurs (Chisthi et al., 2020). The incidence of perioperative complications after appendectomy in appendicitis patients reaches 5-15%, with the patients experiencing serious complications reaches 1-7% (Minneci *et al.,* 2020). Some of the complications of appendectomy that can occur intra- and postoperatively include vascular injuries, urinary tract complications, hematoma, colonic fistulas, surgical wound infections, adhesions, intestinal obstruction. In addition, surgery also allows patients to get longer treatment in the hospital. The rate of postoperative complications ranged from 2%-23% and more than 3% of patients were re-treated with intestinal obstruction and postoperative adhesion (Bom et al., 2021; Herrod et al., 2022; Poprom et al., 2019).

Conservative or non-operative management is one of the alternatives way that can be done in patients with appendicitis. The success of antibiotic therapy as an alternative therapy in appendicitis patients has been reported since 60 years ago (Awayshih et al., 2019; Ceresoli et al., 2021; Flum & Davidson, 2021). Several studies have shown that non-operative therapy in the form of antibiotics can be safer or minim risk with a higher level of efficacy rather than the appendectomy (Bom et al., 2021; Minneci et al., 2020; Shimoda et al., 2018; Vaos et al., 2019).

The use of antibiotics in appendicitis patients has become more common way during the Covid-19 pandemic. The lack of manpower, health facilities, and strict health protocols during the pandemic has caused medical professional organizations to recommend antibiotics as a first-line therapy in acute appendicitis patients. During the two months of lockdown in 2020, England people was estimated that around 54% of patients with appendicitis were taking antibiotic therapy (Herrod et al., 2022; Köhler et al., 2021; Snapiri et al., 2020).

Therefore, the researchers conducted a review of this library to find out and compare the effectiveness of appendectomy action through non-operative way in the form of antibiotic therapy for acute appendicitis patients.

RESEARCH METHOD

The research method used descriptive qualitative through the Literature Review (LR) approach. The data source used a secondary source. The author conducted a discovery, selection, and review of literature with a literature review method related to the effectiveness of appendectomy compared to the administration of non-operative management in the form of antibiotics in acute appendicitis patients with the keywords of appendectomy and antibiotics. The literature sources used PubMed, DOAJ, Cochrane, and Google Scholar. The author selected the literature published in the last five years in 2018-2022. From the search results, a total of 6 journals from Pubmed were obtained, 91 journals from DOAJ, 121 journals from Cochrane, and 11.500 journals from Google Scholar. Data analysis technique selects literature based on title, year, and indexed articles, then reviews articles that match the subject matter. the articles from those journals are compared to find the differences and similarities. Then, a selection of journals through open access criteria was

carried out and literature was obtained 12 journals that met with the criteria. The writing process was started with examining the content of each piece of literature that met the author's criteria, brainstorming, and cross-examining primary sources others.

RESULTS AND DISCUSSIONS

Several studies have been conducted to determine the level of effectiveness in providing alternative therapies in the form of antibiotics and also standard therapies carried out in the form of appendectomy in acute appendicitis patients. In this literature review, the researchers also discussed the advantages and disadvantages of each procedure apart from the effectiveness.

Advantages and Disadvantages of Appendectomy Therapy

Currently, appendectomy is a primary procedure as a *gold standard* for acute appendicitis patients due to low levels of mortality, recurrence rate, and perforation. The advantages of this appendectomy include a higher degree of effectiveness and also a lower risk of re-surgery. However, this requirement needs to be considered because of the complications that can cause postoperatively, the rates are not small, and the potential for longer to be hospitalized (Yang *et al.,* 2019).

Over 200 million surgical procedures are performed annually worldwide, and appendectomy is one of the most costly surgical procedures. In appendicitis patients with antibiotic treatment for five years follow-up resulted in a much lower overall cost than appendectomy. Since most recurrences of appendicitis occur within the first year after initial antibiotic treatment, these results suggest that uncomplicated treatment of acute appendicitis with antibiotics results in lower overall costs than appendectomy even after long-term follow-up (Bi *et al.,* 2019).

Acute appendicitis with complications, such as the presence of perforation, appendicolith, abscess, or suspicion of a tumor keep requiring surgical therapy as a first line. However, randomized control trial research proves that about 70-80% of appendicitis occurs without complications (Haijanen *et al.,* 2019).

Advantages and Disadvantages of Antibiotic Therapy

Research conducted by Yang Z *et al.* Explained in detail related to the selection of therapeutic procedures for acute appendicitis patients in adults. For the adult patients, conservative action such as the administration of antibiotics have a high efficiency, although they are still slightly lower than appendectomy. Conservative measures also have a significantly lower incidence of complications than surgery. Therefore, for patients who do not have a strong desire to have emergency surgery or refuse the operation, they can choose conservative treatment in the form of antibiotics that may be temporary. This is because the administration of conservative therapy has a higher recurrence rate than surgery, so that the patient allows for appendectomy at any time. All of these things apply to appendicitis patients with or without complications (Yang *et al.,* 2019).

The advantages of antibiotic therapy in acute appendicitis patients is that it can avoid the risk of complications that can occur when surgery is performed, such as wound infection, intestinal adhesion, or incisional hernia. In addition, conservative therapy may prevent patients from anesthesia-related risks, which may play a certain role in comorbid patients. Further advantages of antibiotic therapy are potentially shorter hospitalizations, reduced duration of absence from work, and lower costs. However, on the other hand, the main risk that can occur with antibiotic therapy is its failure. Uncomplicated primary appendicitis can turn into complications, such as the onset of perforation appendices with peritonitis or perityphlitic abscesses and the possibility of sepsis may occur. Thus, requiring secondary surgery is often more invasive, at worst causing morbidity or mortality that irreversible. Moreover, there is a risk of recurrent appendicitis, such as wide

spectrum antibiotic therapy for acute appendicitis is the development of antibiotic resistance (Prechal *et al.,* 2019).

The Effectiveness of Appendectomy Compared with Antibiotic Therapy

Research by Minneci P *et al.* reveals that the success rate of this non-operative therapy can reach 65-75%. It is proven that this action can reduce disability, improve quality of life, and reduce side effects and complications that usually arise postoperatively (Minneci *et al.,* 2020).

A study also showed that therapy with antibiotics was no less than appendectomy therapy based on standard health measurements taken over 30 days on respondents. On the 90th day, 27% of respondents in this study wanted an appendectomy. However, in this study, it was found that there were greater complications found in patients with antibiotic therapy compared to patients undergoing appendectomy (Flum & Davidson, 2021).

Different results were also obtained from the research by Peter O *et al.* which suggests that an uncomplicated acute appendicitis treated with antibiotics is at risk of a high recurrence rate and a low quality of life. Surgery should remain the mainstay of treatment for this commonly encountered acute surgical condition (O'Leary *et al.,* 2021).

A randomized control trial concluded that the use of antibiotics in acute appendicitis patients without complications is less effective than appendectomy, but it may reduce the risk of complications that can occur if surgery is conducted (Moraga *et al.,* 2016).

The research of Prechal D *et al.* showed that more than 1/3 of patients with antibiotic therapy in acute appendicitis without complications came with recurrent appendicitis. Therefore, appendectomy must still be considered the first line of therapy for the disease. However, antibiotic treatment is not associated with a higher incidence of complications than appendectomy (Prechal *et al.,* 2019).

Poprom M *et al.* conducted studies that showed that the use of antibiotics to treat acute appendicitis without complications resulted in a therapeutic success rate about 12%-32% lower than appendectomy. However, antibiotic therapy reduces the risk of complications by about 23%-86%. Antibiotic penicillin administration has lower effectiveness than surgery and other antibiotics. Appendectomy has the highest level of therapeutic effectiveness followed by antibiotics of group beta laktam with/without penicillin. The administration of antibiotics beta lactam and cephalosporin + metronidazole ranked first and second with the lowest risk of complications (Poprom *et al.,* 2019).

The Effectiveness of Appendectomy Compared with Antibiotic Therapy in Pediatric Patients

Minneci P *et al.* revealed that non-operative management in the form of antibiotics in pediatric appendicitis patients had a success rate of 67,1%. Compared to appendectomy, antibiotic therapy can reduce disabilities that usually appear postoperatively (Minneci *et al.*, 2020).

Studies were also conducted on pediatric patients by Patkova B *et al.* which showed that acute appendicitis treatment with antibiotics appeared to be safe in the medium term and none of the pediatric patients who received treatment non-operatively experiencing recurrence. The study was conducted by follow-up on pediatric patients for five years to monitor the effectiveness of antibiotics and appendectomy as well as complications that can arise during five years. Patients receiving non-operative treatment were given meropenem iv (10 mg/kg x 3 per 24 hours) and metronidazole (20 mg/kg x 1 per 24 hours) for a minimum of two days. After children tolerated oral intake, they are given oral ciprofloxacin (20 mg/kg x 2 per 24 hours) and metronidazole (20 mg/kg x 1 per 24 hours) soon for a total of ten days of treatment (Patkova *et al.,* 2020).

Herrod P *et al.* examined the comparison of antibiotic use and appendectomy in pediatric patients. This research proves that conservative therapy has a significant success rate that is feasible and effective. However, in appendicolith patients, appendectomy action is the main choice (Herrod *et al.,* 2022).

CONCLUSION

There are several differences in research results related to the effectiveness of appendectomy and antibiotic therapy in acute appendicitis patients. Each of these therapeutic procedures has its advantages and disadvantages. It is very important to consider the urgency and desires of the patient in the selection of this therapy. Appendectomy remains the gold standard with a lower risk of recurrence and severity and a higher success rate of treatment. Appendectomy is also required for cases of appendicitis with complications. However, antibiotic therapy has advantages with lower levels of complications, fewer costs, and fewer hospital stays. The success rate of non-operative therapy in the form of antibiotics can reach 65-75%, while it can reach 67.1% in children. There are differences in research results related to the effectiveness of appendectomy and antibiotic therapy in acute appendicitis patients. Each of these therapeutic procedures has its advantages and disadvantages. It is very important to be concerned about the urgency and expectations of the patient in selecting this therapy.

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