

Case Report

# Scheduled Surgery and Antibiotic Therapy in Catarrhal Acute Appendicitis

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## Abstract

*Introduction:* Appendicitis is an acute inflammation of the appendix. Appendectomy remains one of the most frequently performed digestive surgeries in the world. The degree of urgency of this surgery and the increasingly proven efficacy of antibiotics still remains a debate. The main objective of our study is to compare the therapeutic results of a programmed appendectomy initially treated by antibiotic versus emergency appendectomies performed from the outset in cases of simple acute appendicitis. *Patients and method:* Our comparative study was carried out at the Joseph Ravoahangy Andrianavalona University Hospital from 01th August 2021 to 31th July 2022. Group A included simple acute appendicitis patients who underwent emergency surgery, while group B included patients who had been treated with antibiotics for ten days before undergoing surgery. *Results:* Our cohort of 95 patients comprised 70 patients (group A) versus 25 patients (group B). Twenty-three patients (92%) in group B had a Clavien-Dindo I score compared with 74.3% in group A. Parietal infections were 21% (group A) vs 4% (group B). There was no significant difference in patient outcome between the two groups. *Conclusion:* Antibiotic therapy has already proved effective in the treatment of simple acute appendicitis in recent years, and means that emergency surgery can be avoided. However, the timing of surgery remains debatable in fragile patients.

## Keywords

Antibiotic, Appendectomy, Appendicitis, Emergency Treatment

## 1. Introduction

Appendicitis is an acute inflammation of the appendix. The standard treatment is appendectomy, which accounts for 30% of digestive tract surgery [1-3]. Acute appendicitis is one of the most frequent pathologies in the world. In the United States, the annual incidence of appendicitis is estimated at 250,000 cases per year [4]. In 2014, 60,000 patients under-

went appendectomy in France, with an estimated incidence of 40-60 cases per 10,000 inhabitants per year. It's much higher than in other European or North American countries, where the rate is between 11 and 18 per 10,000 inhabitants [1]. In Africa: Senegal, Niger and Mali, acute appendicitis accounts for 33%, 38.9% and 57.2% of surgical emergencies respec-

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tively [1, 4]. At present, the role of antibiotic therapy as an alternative treatment of choice for acute uncomplicated appendicitis following health crises remains to be discussed, taking into account the risk of distant recurrence [5]. During the Covid-19 pandemic, intra-hospital saturation and the risk of contamination of non-Covid-19 patients led to controversy between immediate surgery and initial antibiotic treatment during acute catarrhal appendicitis, hence the interest of our study [4, 5].

The main objective of this study was to compare the therapeutic results of scheduled appendectomy with initial antibiotic treatment compared with surgery from the outset, in the management of acute catarrhal appendicitis.

## 2. Patients and Method

Our comparative study was conducted at the Joseph Ravoahangy Andrianavalona University Hospital from 01<sup>st</sup> August 2021 to 31<sup>th</sup> July 2022. Patients admitted for appendicitis represented the source population. Group A included patients who had undergone an immediate Mac Burney appendectomy. Group B included patients who had received initial antibiotic therapy. The protocol consisted of Amoxicillin-clavulanic acid 1g three times a day for ten days. Laparoscopic appendectomy was then scheduled. The selection process was randomized.

Appendicular peritonitis was not included in our study. This complication was a surgical emergency. Also Appendicular plastrons were not included because the antibiotic treatment had to be a few weeks for appendicular plastrons. Patients included in group B but who refused surgery after ten days of antibiotic therapy were excluded. Variables included: age, gender, surgical technique, delay of bowel transit, post-operative complications, Clavien-Dindo score, length of stay.

## 3. Results

Our cohort of 95 patients comprised 70 patients (group A) versus 25 patients (group B). The population had a sex ratio of 2.2 (group A) vs 1.8 (group B) and a median age of 32.5 years (18; 42) (group A) vs 33 (23;55) (group B). The 51 patients in Group A had undergone emergency Mac Burney appendectomy, eight of whom were converted to laparotomy. All 23 patients in this group had undergone laparoscopic appendectomy. Ten patients (group A) vs two patients (group B) had abdominal drainage.

**Table 1.** Delay of bowel transit.

	≤72h	>72h	p-value
Group A	65 (92,8%)	5 (7,2 %)	
Group B	24 (96%)	1 (4%)	0,57

The delay of bowel transit was less than or equal to 72 hours in 92.8% (group A) compared vs 96% (group B) (p=0.13) (Table 1).

Wound infections were 21% in the initial group A compared to 4% in group B. This difference was statistically significant (p=0.04) (Table 2).

**Table 2.** The occurrence of wound infection.

	Wound infection	No wound infection	p-value
Group A	15 (21%)	55 (79 %)	
Group B	1 (4%)	24 (96%)	0,04

Twenty-three patients (92%) in group B had a Clavien Dindo stage I score compared with 74.3% in group A (Table 3).

**Table 3.** Clavien-Dindo score.

	Stage			p-value
	I	II	III	
Group A	52 (74,3%)	17 (24,3%)	1 (1,4 %)	
Group B	23 (92%)	2 (8%)	0 (0%)	1,12

Statistically, there was no significant difference in patient outcome between the two study groups. The cure rate was 100% (group B) compared with 98.6% (group A).

The length of hospital stay exceeding the first five days was 22.9% (group A) vs 8% (group B).

This difference was not statistically significant (Table 4).

**Table 4.** Comparison between the length of stay.

	≤ 2 jours	> 2 jours	P-value
Group A	54 (77,1%)	16 (22,9 %)	
Group B	23 (92%)	2 (8%)	0,1

## 4. Discussion

Appendicitis tends to affect people between the ages of 15 and 30 years old. In elderly subjects when the diagnosis is delayed, the mortality is higher. In our study, the population was young.

In the literature, appendicitis affects men more than women. This is consistent with our results.

All patients in group B had undergone laparoscopic surgery. In our hospital, only scheduled surgeries can be

performed laparoscopically. The debate between the benefit of open or laparoscopic appendectomy remains a live one. Although a meta-analysis of randomised trials has shown less infectious complications in laparoscopy. Mortality after appendectomy for acute uncomplicated appendicitis is exceptional and is estimated at 0.054% regardless of the approach [5, 6].

Despite the possible occurrence of complications, the length of hospital stay is generally short for acute appendicitis [7]. In this study, the average length of hospital stay was 2.3 days  $\pm$  1.7, most of which (81.1%) was within the first five days for both groups. This length stays comparable to several studies [8, 9].

During the analysis of the data from our study, a statistically significant difference ( $p=0.04$ ) was found between the two groups of patients among wound infections in this study. Indeed, 21.4% of septic complications were found in the group of patients without initial antibiotic therapy compared with 4% in the group with antibiotic therapy.

Post-operative complications were frequently wound infections (16.8%), and delayed resumption of bowel transit (6.3%) [10]. In the literature, infectious complications were the most prevalent, led by wound infection (WI.) (7.8%), and residual intraperitoneal abscesses (2.1%) [11]. Infectious complications are the most common postoperative morbidity [1, 12, 13].

The other complications were adhesions and incisional hernia. The specific morbidity rate for appendicitis was 20 to 27% in patients treated with antibiotics alone, while the overall incidence of postoperative morbidity after appendectomy varied from 30 to 41% [5, 6, 14, 15].

Some studies have also demonstrated significant benefits from the initial use of antibiotic therapy in cases of acute appendicitis. Initial antibiotic therapy was compared with a placebo in patients with appendicitis who subsequently underwent appendectomy. Patients in the group who received antibiotics prior to appendectomy had a score I complication (74.3%).

On the other hand, in the group with surgery from the outset, most complications were grade I, i.e. 92%.

The study concluded that antibiotic prophylaxis is effective in preventing postoperative complications following appendectomy, whether administered pre-, peri- or postoperatively [1]. Some studies have observed similar trends [8-10].

In 2023, Jacob et al demonstrated that there was no significant difference between waiting times of less than 8 hours and less than 24 hours for surgery. Paradoxically, Claudio et al showed that although the risk of developing peritonitis was not associated with the delay in surgery under antibiotic treatment, an excessively long delay could increase the incidence of morbidity, and mortality. This could occur in older patients. [15-17].

#### *Study Limitations*

Patients who received initial antibiotic therapy were scheduled for laparoscopic appendectomy. The group of patients who underwent emergency surgery had undergone open surgery. This factor could constitute an observation bias

for comparing the two groups. Laparoscopic surgery is known to be a minimally invasive technique with fewer postoperative complications.

## 5. Conclusion

Appendectomy is a common procedure that can be performed within the first 24 hours, but can also be postponed with antibiotic treatment. Antibiotics have already been shown to be effective in the treatment of simple acute appendicitis. Scheduled surgery can be performed after a short antibiotic treatment. Fragile patients and those elder will have to be considered on a case-by-case study, as this population remains the most exposed to postoperative complications related to the anaesthesia or surgery. The others main factors limiting this latter approach are the immune deficiency and for children.

## Abbreviations

W.I      Wound Infection

## Conflicts of Interest

The authors declare no conflicts of interest.

## References

- [1] Xu H, Yang S, Xing J, Wang Y, Sun W, Rong L, Liu H. Comparison of the efficacy and safety of antibiotic treatment and appendectomy for acute uncomplicated appendicitis: a systematic review and meta-analysis. *BMC Surg.* 2023 Jul 24; 23(1): 208.
- [2] Kollias TF, Gallagher CP, Albaashiki A, Burle VS, Slouha E. Sex Differences in Appendicitis: A Systematic Review. *Cureus.* 2024 May 10; 16(5): e60055.
- [3] Weledji EP, Zisuh AV, Ngounou E. Management of appendicitis: appendectomy, antibiotic therapy, or both? *Ann Med Surg (Lond).* 2023 Mar 27; 85(4): 897-901.
- [4] Johnston DB, Coleman HG, Colvin D, Lawther S, Loughrey MB. Impact of COVID-19 on acute appendicitis presentation, management and pathology findings in adult and paediatric populations. *PLoS One.* 2024 Apr 17; 19(4): e0300357. <https://doi.org/10.1371/journal.pone.0300357>
- [5] Mosuka EM, Thilakarathne KN, Mansuri NM, Mann NK, Rizwan S, Mohamed AE, Elshafey AE, Khadka A, Mohammed L. A Systematic Review Comparing Nonoperative Management to Appendectomy for Uncomplicated Appendicitis in Children. *Cureus.* 2021 Oct 19; 13(10): e18901.
- [6] Sauerland S, Lefering R, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. *Cochrane Database Syst Rev.* 2002; (1): CD001546. <https://doi.org/10.1002/14651858.CD001546>

- [7] Yale SH, Tekiner H, Yale ES. Signs and syndromes in acute appendicitis: A pathophysiologic approach. *World J Gastrointest Surg.* 2022 Jul 27; 14(7): 727-730.
- [8] Horattas MC, Horattas IK, Vasiliou EM. Early Uncomplicated Appendicitis-Who Can We Treat Nonoperatively? *Am Surg.* 2018 Feb 1; 84(2): 174-180.
- [9] Talan DA, Saltzman DJ, DeUgarte DA, Moran GJ. Methods of conservative antibiotic treatment of acute uncomplicated appendicitis: A systematic review. *J Trauma Acute Care Surg.* 2019 Apr; 86(4): 722-736.
- [10] Papi S, Pecchini F, Gelmini R. Stump appendicitis: a rare and unusual complication after appendectomy. Case report and review of the literature. *Ann Ital Chir.* 2014 Apr 7; 85(ePub): S2239253X14022270. PMID: 25027013.
- [11] Meljnikov I, Radojčić B, Grebeldinger S, Radojčić N. [History of surgical treatment of appendicitis]. *Med Pregl.* 2009 Sep-Oct; 62(9-10): 489-92. Serbian. PMID: 20391748.
- [12] Bernard ET, Davenport DL, Collins CM, Benton BA, Bernard AC. Time is money: quantifying savings in outpatient appendectomy. *Trauma Surg Acute Care Open.* 2018 Dec 30; 3(1): e000222.
- [13] Moon KS, Jung YH, Lee EH, Hwang YH. Clinical Characteristics and Surgical Safety in Patients with Acute Appendicitis Aged over 80. *J Korean Soc Coloproctol.* 2012 Apr; 28(2): 94-9.
- [14] Meeks DW, Kao LS. Controversies in appendicitis. *Surg Infect (Larchmt).* 2008 Dec; 9(6): 553-8.
- [15] Dimopoulou A, Yfanti A, Argyropoulos T, Evaggelou E, Dimopoulou D, Dimopoulou K, Iakomidis E, Feizidou P, Zavras N. Time between onset of symptoms and definitive treatment in children with acute appendicitis: How it affects length of hospital stay? *Afr J Paediatr Surg.* 2022 Oct-Dec; 19(4): 245-250.  
[https://doi.org/10.4103/ajps.ajps\\_67\\_21](https://doi.org/10.4103/ajps.ajps_67_21)
- [16] Papandria D, Goldstein SD, Rhee D, Salazar JH, Arlikar J, Gorgy A, Ortega G, Zhang Y, Abdullah F. Risk of perforation increases with delay in recognition and surgery for acute appendicitis. *J Surg Res.* 2013 Oct; 184(2): 723-9.  
<https://doi.org/10.1016/j.jss.2012.12.008>
- [17] Ko FN, Ryb GE, Drager L, Goldwater E, Wu JJ, Counihan TC. Ideal timing of surgery for acute uncomplicated appendicitis. *N Am J Med Sci.* 2013 Jan; 5(1): 22-7.