



## Case series

## Case series: Treatment outcome of late presentation of acute appendicitis

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## ABSTRACT

**Introduction and importance:** Late presentation of Acute Appendicitis (AA) is associated with a high risk of perforation-related complications and morbidity. Even though AA is a well-known disease, late presented AA is not uncommon. This study aims to report the treatment outcome of several cases of late presented AA, treated at a government public hospital at Mojokerto, a small town in East Java, Indonesia, where no previous report were known.

**Case presentation:** Eleven patients experienced surgical removal of the appendix during one year period (January 2021 until December 2021). Those patients are treated by one surgeon at Dr. Wahidin Sudiro Husodo Kota Mojokerto Hospital. Furthermore, they were divided into 3 groups, (A: presented within 2 days after onset of abdominal pain; B: presented within 2–5 days after onset of abdominal pain; C: presented more than 5 days after onset of abdominal pain). The morbidities for all patients were studied, which they all followed up until the surgery wound healed completely.

**Clinical discussion:** The perforation of the appendix occurred in 7 patients consisting of 2 in Group A, 2 in Group B, and 3 in Group C. Furthermore, the two patients who experienced extension of surgical resection were all from Group C and this group has 10.67 days of highest Length of Stay (LOS). The two patients with perforated AA, 1 from group A and 1 from group C, developed surgical site infection. The main reason for the late presentation of AA was non-operative treatment due to equivocal clinical findings.

**Conclusion:** The late presentation of AA causes perforation-associated morbidities, including a possible extension of surgical resection, long hospitalization period, and surgical site infection. Some late presented AA does not develop into perforation since perforated and non-perforated AA may represents two different entities.

## 1. Introduction

Acute appendicitis (AA) is a commonly discussed topic, even though it has been recognized for several hundred years [1]. This is due to AA is one of the most common surgical emergency cases [2] and its diagnosis is challenging. It requires a high index of suspicion from the examining physician to facilitate prompt treatment of this condition [1].

Even though several health workers have recognized AA, its late presentation can still be manifested for some reasons. Documented reasons include failure to be recognized by health care workers, treated by non-medical healer (Quacks), refusal of surgery due to financial problems, and self-medication [3].

The late presentation of acute appendicitis leads to morbidity and mortality [1,3]. It develops into perforation, gangrene, appendicular mass, appendicular abscess, and localized peritonitis [3,4]. As the presentation of acute appendicitis proceeds to perforation and gangrene, it needs to be diagnosed and treated in time. In the pediatric population,

perforation occurs in 8–24 h, and adult population, it occurs in 36 h [5].

The standard care of AA is surgery [6,7], despite emerging reports supporting non-surgical treatment options for uncomplicated AA [8–10]. However, complications arise in AA even after the initiation of non-operative treatment [9]. Occasionally, the extension of surgical resection, such as ileocectomy or ileocollectomy, is needed to treat complicated AA [11,12].

This study is conducted because no report has been discovered on the treatment outcomes of late presentation of AA in Mojokerto, East Java, Indonesia. This study also aligns with the SCARE 2020 [13] and PRO-CESS criteria [14].

## 2. Materials and methods

Eleven patients were diagnosed with AA at Dr. Wahidin Sudiro Husodo Kota Mojokerto Hospital for one year period, with or without complications (January 2021 until December 2021). The government

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owns and operates this hospital, which serves the public and functions as a referral center for other hospitals in the area. All patients were admitted to the Emergency Room and treated by one of the hospital's three practicing general surgeons, with 5.5 years of resident training and 5 years of practice experience.

The decision of performing surgery is considered a clinical symptom of AA (right lower quadrant abdominal pain, gastrointestinal symptoms, tenderness of McBurney area) combined with laboratory and ultrasound examination. All 11 patients who had experienced appendix removal were administered antibiotics before the surgery. Meanwhile, fluid resuscitation was provided to the dehydrated patients. They followed up until the surgical wound was completely healed. Data were collected retrospectively, and morbidities were studied and documented.

### 3. Results

The patients are divided into 3 groups to simplify the observation of the results. Patients presented within 2 days of onset of abdominal pain were included in Group A [4], while those presented between 2 and 5 days were included in Group B [4]. Furthermore, patients presented more than 5 days were included in Group C [3]. All 11 patients experienced removal of appendix surgery (Table 1).

A total of 7 patients had perforated AA, namely 2 patients from Group A, 2 from Group B, and 3 patients from Group C. Table 1 presents co-morbidities.

Eight patients had surgery within two days following admission, while 3 of them had surgery for more than two days. Patient number 2 was consulted by Internal Medicine Department after several days of observation in the hospital, while patient number 10 experienced surgery 4 days after admission for an initially diagnosed cecum tumor, and bowel prepared for Abdominal CT scan. Furthermore, patient number 11 had surgery 6 days after admission due to discontinuation of previous blood anticoagulants consumption.

The average LOS was 6.25, 3.75, and 10.67 days for Group A, B, and C, respectively. Five patients needed intra-abdominal drainage, 2 developed surgical site infection, 1 healed within 2 weeks, and 1 healed within 4 weeks after discharge. Also, two patients from Group C had an extension of surgical resection (ileocectomy). Surgery clinic follow-up assessed that all patients had improved their health and adhered well to medications and advice. There was no mortality case documented.

**Table 1**  
Patient characteristics, clinical conditions, complications, morbidities.

Patients	Age	Day(s) since pain onset - presentation	Day(s) since presentation - surgery	Complications	Co-morbidities	LOS	Drain	Morbidities
<b>Group A</b>								
1	23	1	1	Perforation, minimal abscess	-	5	+	Surgical site infection (resolution in 2 weeks)
2	66	2	6	Uncomplicated	Anemia	9	-	-
3	36	2	2	Diffuse peritonitis, perforation, gross abscess	-	7	+	-
4	18	2	1	Uncomplicated	-	4	-	-
<b>Group B</b>								
5	33	3	1	Perforation, minimal abscess	-	4	-	-
6	24	3	2	Perforation, minimal abscess	-	5	-	-
7	37	3	0	Uncomplicated	-	3	-	-
8	18	3	0	Uncomplicated	-	3	-	-
<b>Group C</b>								
9	37	6	1	Diffuse peritonitis; perforation; gross abscess	Gallstones	7	+	Surgical site infection (resolution in 4 weeks)
10	65	7	4	Perforation, minimal abscess, gangrene of cecum	Diabetes mellitus	11	+	Ileocectomy
11	79	7	6	Perforation, minimal abscess, induration of cecum	History of coronary heart disease	14	+	Ileocectomy

LOS = length of stay.

Table 2 shows the causes of late presentation among patients in Group C. These reasons include self-medication (1 patient) and non-operative management from previous hospital/primary health care clinic (2 patients).

### 4. Discussion

Despite the COVID-19 outbreak in Indonesia between 2020 and 2021, the number of appendectomy surgery performed in 2021 was similar to the previous year's procedure. A total of 11 surgeries were conducted in 2019 and 12 surgeries in 2020 (data not provided). This is in contrast to the reports of several studies stating a decrease in the number of AA during the COVID-19 outbreak [15,16]. According to Richmond, AA was presumed to be an uncommon disease in the local population, unlike in Western countries [1].

AA is a well-known disease, but late presented AA is not uncommon. According to this study, the main reason for the late presented AA is non-operative management from the previous healthcare facility. Furthermore, the decision of previous healthcare workers was caused by the equivocal clinical findings of the sick. When patients number 9, 10, and 11 were physically examined, the results showed that they do not have typical McBurney tenderness. Patient number 9 was diagnosed with bowel motility disorder and gall bladder calculus and managed non-operatively for 5 days in the previous hospital before being referred to Dr. Wahidin Sudiro Husodo Hospital, while patient number 10 was treated as an outpatient from the local primary healthcare clinic. Patient number 11 had self-medication without proper consultation with a healthcare worker. Number 10 and 11 were elderly and likely to have atypical results [17]. In ambiguous cases, aggressive diagnostic studies such as ultrasound or Computed Tomography (CT) Scan help increase the accuracy of diagnosis [17].

An investigator stated that financial problems cause late presented

**Table 2**  
Reason for late presentation.

Patients	Reason for late presentation
9	Managed non operatively from the previous facility
10	Managed non operatively from the previous facility
11	Self-medication

AA [3]. However, that reasons was not found in this study, presumably due to high coverage (83.5%) of national healthcare insurance [18,19], facilitating Indonesian citizens' access to healthcare facilities.

Perforation occurred in 7 out of 11 patients, namely 2 patients from Group A, 2 from Group B, and 7 from Group C. From the onset of abdominal pain to surgery, 6 patients had surgery after 4 days of abdominal pain onset, while 1 was after 2 days. Uncomplicated AA was observed in 3 patients operated on 3 days after the onset of abdominal pain and 1 after 8 days. According to these results, perforation was not entirely related to disease duration. Furthermore, it was considered similar to the report, which states that perforated AA and non-perforated AA represent two distinct entities [20].

The average LOS was highest in Group C (10.67 days). Several conditions, including radiology study and treatment observation, affected hospitalization time. From the point of view of surgery to discharge, patients suffering from uncomplicated AA had the least number of days. However, further study was needed to confirm these results.

Extension of surgical resection occasionally performed during surgery encounters complicated AA [11,12]. In this study, 2 out of 3 patients presented late had ileocecectomy caused by gangrene and induration of the cecum. Furthermore, this result are used as information made available to subsequent AA patients, particularly late presented one, with the possibility of extension of surgical resection.

The five patients with intraabdominal drainage and 2 patients with surgical site infection had perforated AA. This condition supports the idea that AA's morbidities are mainly related to perforation [7].

According to some personal experience, it is uncommon in Indonesia to treat any acute appendicitis non-operatively. The principle of non-operative management for any acute appendicitis is not followed, except for patients who do not tolerate surgery. But recently, many studies reported that non-operative management for uncomplicated acute appendicitis is a feasible option [8–10]. Considering the results in this study, which states that perforated appendicitis is not entirely related to the duration of the disease, and reports of successful non-operative treatment of appendicitis, it need further study how to differentiate AA that has more risk to develop perforation and those without. As long as the differentiation of these two conditions is difficult, prompt diagnosis and surgery are beneficial.

This study has several limitations, including a small sample population size and possible inaccurate patient information. However, it will be useful for further study.

## 5. Conclusion

The late presentation of AA causes morbidities related to perforation, including a long hospitalization period, possible extension of surgical resection, and surgical site infection. Meanwhile, some late presented AA does not develop perforation because perforated and non-perforated AA may represents two different entities. Therefore, there is a need to conduct further study to identify AA with more risk of developing a perforation.

## Provenance and peer review

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## Ethical approval

Approved by Dr. Wahidin Sudiro Husodo Kota Mojokerto Hospital's Health Research Ethics Committee.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Author contribution

A single author conducted this study.

## Study registration

N/a.

## Guarantor

Arif Kusumo Rahardjo.

## Declaration of competing interest

None.

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