



## Acute Appendicitis Seen at Analankininina University Hospital during the Covid-19 Pandemic

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### Abstract

Acute appendicitis was often diagnosed at the complication stage during the Covid19 pandemic at CHU Analankininina Toamasina. Our objective was to discuss the particularity of the management of appendicitis during the pandemic. Our study was prospective, descriptive for 6 months and took place in the general surgery department of the Analankininina Toamasina University Hospital Center, Madagascar from March 2020 to August 2020. We had collected 28 patients. The sex ratio was 3.66. The average age was 27.57 years. Appendicular abscess represented 64.29% (n=18) of the appendicular patients operated in emergency. Appendicular plastron occupied 14.29% (n=2) and generalized acute peritonitis was 7.14% (n=2). Post-operative follow-up was simple in 71.43% (n=20). The average length of hospitalization was 4 days. Acute appendicitis is often complicated during the Covid 19 pandemic in our hospital center. Surgery was systematic in our hospital, contrary to some literature which advocated antibiotic therapy at an early stage in front of the health emergency.

## Introduction

Acute appendicitis is one of the most common digestive emergencies. It affects 5.7-57 per 100,000 individuals per year with a very high incidence in children and adults (Wei et al, 2012). SARS-CoV-2 infection affects more than 3.5 million people with 245,000 deaths worldwide and affects 210 countries in May 2020 with a mortality rate of about 7% (Snapiri et al, 2020).

During the Covid-19 pandemic we found that most of the patient operated on tends to have a complicated form. Was this frequency of complication related to the pandemic or to one of the measures taken in response to the pandemic? The objective of our study is to describe the cases of acute appendicitis operated on during the Covid-19 pandemic in the Analankininina Toamasina University Hospital Center, Madagascar.

## Methods

This was a 6-month descriptive prospective study that took place in the general surgery department of the Analankininina Toamasina University Hospital Center, Madagascar from March 2020 to August 2020. We included all patients operated on for acute appendicitis during the study period. Patients operated on for other pathologies were not included. Statistical data were processed using STATA 11.0 software. The procedures proposed for this study complied

with the ethical principles applicable to medical research involving human subjects with respect to confidentiality and informed patient consent. The data were processed with full respect for patient anonymity.

## Results and Discussion

During the study period, we enrolled 28 patients who met our inclusion criteria. The sex ratio was 3.66 in favor of the male sex, with 22 (78.57%) male patients and 6 (21.43%) female patients. The mean age was 27.57 years. [95% CI]. Acute abdominal pain was the reason for consulting all patients operated on for acute appendicitis. Physical examination reported right iliac fossa defence in 78.57% (n=22) and right iliac fossa tenderness in 21.43% (n=6). The average value of hyperleukocytosis was 13892.86 /mm<sup>3</sup>. The most commonly used approach was an enlarged Mc Burney approach in 50% (n=14), median laparotomy in 42.86% (n=12) and conversion to median laparotomy in 7.14% (n=2). Appendectomy was performed in 87.71% (n=24), and 4 patients (14.29%) had an appendicular plastron and an appendectomy was not performed.

The anatomopathologic result confirmed the diagnosis of appendicitis without any sign of malignancy in the 24 patients. 71.43% (n=20) had a simple postoperative follow-up. The postoperative outcome was simple in 71.43% (n=20). 21.43% (n=6) of patients had an infection of the surgical wound and 7.14% (n=2) had a parietal hematoma. The average length of hospitalization was 4 days [95% CI].

Table 1. Distribution according to abdominal ultrasound results

Result of the ultrasound scan	Headcount (n)	Rate (%)
Normal	4	14,28
Inflammation of the appendix	16	57,14
Right iliac fossa collection	8	28,57
Total	28	100

The results of the abdominal ultrasound were very divergent. Some claimed an ultrasound character of simple acute appendicitis in 57.14% (n=16) and only 28.57% (n=8) reported a complicated form.

Table 2. Distribution according to intraoperative diagnosis

Intraoperative diagnosis	Headcount (n)	Rate (%)
Simple appendicitis	4	14,29
Appendicular plastron	4	14,29
Appendicular abscess	18	64,29
Generalized acute peritonitis	2	7,14
Total	28	100

Appendicular abscess accounted for 64.29% (n=18) of the appendicular abscesses operated on in emergency. Appendicular plastron occupied 14.29% (n=2) and generalized acute peritonitis was 7.14% (n=2).

The average age is 27.57143 years, 37 years according to a study by Javanmard-Emanghissi in England. Acute appendicitis during the Covid-19 pandemic is confined to young subjects (Van Dijk et al, 2018). The male gender was most concerned with acute appendicitis during the Covid-19 pandemic. The pandemic with a sex ratio of 3.66. The high frequency of complicated

forms of acute appendicitis in men. The majority of patients have a defence of the right iliac fossa region at the time of clinical examination. This is the typical physical sign of appendicitis in men. This is due to the anatomical localization of the appendix. Its appearance proves that it is a somewhat late form. We notice an increase in the complicated forms of acute appendicitis during the Covid-19 pandemic.

Restriction of exit increases the difficulty of access to care during the period of confinement. Access is made even more difficult by the ban on to circulate leading to a delay in diagnosis and treatment. Fear of visiting a hospital was felt by many patients due to the risk of infection with CoV-2-SARS. These measures contributed to delays in diagnosis and management of acute appendicitis during the pandemic and also increased the delay between diagnosis and surgery (Di Saverio et al, 2020). The longer the procedure was delayed, the more complicated the appendicitis tended to become (Sammalkorpi et al, 2017).

Some patients had already been seen in the emergency department or private centers and had received antibiotic therapy. They returned a little later to the complication stage. Before opting for medical treatment of acute appendicitis, an abdominal CT scan is required to ensure that it is a simple appendicitis. Failure of medical treatment is due to poor patient selection, i.e. at the time of diagnosis the patient is already in the early complicated stage (Kim et al, 2012). All our patients had had an abdominal ultrasound. Most of these ultrasounds had been prescribed before hospitalization.

The abdominal ultrasound had played an important role in the surgical management of acute appendicitis. It was recommended in the diagnostic score (Alvarado, AIR, AAS) at intermediate risk according to the WSE Jerusalem guideline (Gorter et al, 2016). It was the most widely used imaging method in developing countries because it was less expensive than computed tomography. The discrepancy between the results of abdominal ultrasound and those seen intraoperatively (28.57% of patients had a purulent collection on ultrasound and 64.29% of those operated on had an appendicular abscess).

Abdominal CT scan with contrast injection was recommended if diagnostic scores were low (Gorter et al, 2016; De Simone et al, 2020). It has a very high sensitivity and specificity (98.4% and 97%). Abdominal CT is an excellent and efficient imaging test for the diagnosis of acute appendicitis. It allows to avoid and reduce a routine appendectomy on a healthy appendix. The only drawback is the radiation dose and is contraindicated in pregnant women (McBurney, 1894). We did not have an abdominal scanner in our center and the only one available in the region was out of order. On top of that the cost is much higher than that of ultrasound.

An appendectomy is ideal for simple or complicated acute appendicitis. It should be performed as soon as possible within 12 hours of admission to hospital to avoid the transition from simple to complicated (McBurney, 1894). It can be done by open or laparoscopic route. The latter offers more advantages, a reduction in postoperative pain, a shorter daylight period, a reduction in the frequency of postoperative ileus and a low risk of infection of the surgical site (McBurney, 1894). Our surgical centers do not yet have laparoscopy equipment. Moreover, the recommendation refers to precautions to be taken during laparoscopy because we do not yet have confirmation whether or not SARS-CoV-2 is present in the pneumoperitoneum created during laparoscopy and increases the risk of contamination of healthcare workers (Luong-Nguyen et al, 2020). She suggests performing an open procedure rather than laparoscopy during the pandemic to avoid contamination because SARS-CoV-2 is transmitted by aerosol (Champault et al, 1996). All our patients are operated on by open surgery. The McBurney approach is the most commonly used and it is often enlarged during the procedure if complications of appendicitis occur. and it is often enlarged during the procedure if

complications of appendicitis appear. The choice of this approach is based on a suspicion of simple acute appendicitis at the outset with reference to the ultrasound result.

The true definition of appendicitis is histological. Several appendices seen intraoperatively and considered macroscopically healthy are inflammatory during histological examination, hence the interest of this examination during any appendectomy. It allows a decision to be made on the presence of malignant cells in the appendix (Grunewald & Keating, 1993).

The average length of hospitalization is 4 days. In England, it is 3 days for an open operation (Haijanen et al, 2018). This duration is related to the complicated form of acute appendicitis. The patient's discharge depends on the post-operative complication, as some patients had a wound infection, a parietal hematoma requiring a slightly longer stay. On the other hand, shortening the length of hospital stay is ideal to avoid unnecessary saturation of the hospital in order to support the effort against the pandemic and to avoid a nosocomial infection with Covid-19 (Luong-Nguyen et al, 2020).

## Conclusion

Acute appendicitis is often complicated during the Covid 19 pandemic in our hospital center. This complicated form most often concerns males and young people. Diagnosis and management must be early to avoid its complications.

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