

# Epidemiological-Clinical and Therapeutic Aspects of Acute Appendicitis at the Reference Health Center of Commune III (C.S.Ref CIII) of the District of Bamako

Karembé Boubacar, Tounkara Idrissa, Soumaré Modibo Dianguina, Diarra Issaka, Diarra Mouminy, Touré Aboubacar, Traoré Boureima, Camara Aboubacar, Sanogo Seydou, Fall Ibrahim, Coulibaly Abdoulaye, Traoré Abdoulaye, Diarra Drissa, Diakité Mané, Coulibaly Yacaria, Kanté Lassana, Dembélé Bakary Tientigui, Togo Adégné

Département of Surgery, CHU Gabriel Touré, Bamako, Mali  
Email: boubacarkarembé0@gmail.com

**How to cite this paper:** Boubacar, K., Idrissa, T., Dianguina, S.M., Issaka, D., Mouminy, D., Aboubacar, T., Boureima, T., Aboubacar, C., Seydou, S., Ibrahim, F., Abdoulaye, C., Abdoulaye, T., Drissa, D., Mané, D., Yacaria, C., Lassana, K., Tientigui, D.B. and Adégné, T. (2023) Epidemiological-Clinical and Therapeutic Aspects of Acute Appendicitis at the Reference Health Center of Commune III (C.S.Ref CIII) of the District of Bamako. *Surgical Science*, 14, 30-37.  
<https://doi.org/10.4236/ss.2023.141004>

**Received:** December 5, 2022

**Accepted:** January 15, 2023

**Published:** January 18, 2023

Copyright © 2023 by author(s) and Scientific Research Publishing Inc.  
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

**Objectives:** It was to determine the epidemiological-clinical and therapeutic aspects of acute appendicitis at the Reference Health Center of Commune III of the district of Bamako. **Methodology:** This was a prospective study from January 1 to December 31, 2020 including patients operated for acute appendicitis and confirmed at histology and cases of abscess and appendicular plastron. **Results:** We collected 60 cases of acute appendicitis. They accounted for 17.29% of surgical indications. The average age of our patients was 25.5 years. The male sex was the most represented at 63% with a sex ratio of 1.72. The Pain in the right iliac fossa was the most represented reason for consultation with 76.7%. It was at the type of bite 70% of the cases. On physical examination the defense of the right iliac fossa was present in 96.7%. Digestive signs were marked by nausea 28.4% (17 patients) and vomiting 25% (15 patients). The digital rectal exam was painful to the right of the Douglas fir in 76.7% of our patients. In biology a complete blood count (CBC) performed in all our patients has objectified hyper leukocytosis in 80% of cases. The reactive protein (CRP) performed in 36 patients was elevated with values between 18 and 46 mg/ml. The imaging performed was an abdominal ultrasound that found a roundel image of the appendix with increased size in 65%. Surgical treatment consisted of classical Mac Burney appendectomy in 54 patients (90%). The gesture performed was an appendectomy in all our patients. All our appendectomy parts were sent for pathological examination. This examination classified the parts as non-specific appendicitis in 60%, phlegmonous appendicitis in 22% and catarrhal appendicitis in 18% of cases. Surgical follow-up

was simple in 98.4% (59 patients) and morbidity was marked by digestive fistula in one patient. We recorded one case of death (1.6%). **Conclusion:** Acute appendicitis remains the most common surgical emergency in commune III of the district of Bamako. It is a pathology that can be found at all ages of life. Its morbidity and mortality are low subject to early diagnosis and management.

## Keywords

Appendicitis, Surgery, Anatomical Pathology

---

## 1. Introduction

Acute appendicitis is an acute inflammation of the vermiform appendix. It is the most common abdominal surgical emergency and provides multiple complications. It is seen at any age but especially common in children [1]. The incidence of the disease is higher in Western countries with a frequency of 15% [2].

In Europe, it is the leading cause of surgical abdominal emergencies. Approximately 90,000 appendectomies are performed annually in France an incidence of 1.39 per 1000 population [3]. In black Africa, appendicitis had been described as rare (less than 1%), but recent studies have revealed rates close to those of industrialized countries [4].

In 2004 in Nigeria it represented 38.9% of surgical emergencies and 4.4% the same year in Niger [5].

In Mali in 2003 a study carried out at the Gabriel Touré Hospital, found a rate of 28.77% of surgical emergencies, and 37.4% of acute abdomens [6].

His clinical picture is essentially dominated by pain of the right iliac fossa. Its diagnosis is clinical, additional examinations are only adjunct elements [7]. It is accepted that there is no anatomo-clinical parallelism but that the essential prognostic factor is the time elapsed between the onset of signs and management [8].

Treatment of appendicitis is surgical, consisting of appendectomy. This should be done immediately after the diagnosis has been made, to avoid complications [9]. The main risk of appendicitis is the progression to perforation and then generalized peritonitis which is life-threatening. Mortality is 0.1% in the uncomplicated form; it is 1.5% to 5% in case of appendicular perforation [10].

This very first study at the reference health center of Commune III was initiated in order to better understand this pathology.

## 2. Materials & Methods

This was a prospective study from January 1 to December 31, 2020 carried out in the general surgery department of the C.S.Ref CIII of the district of Bamako including patients admitted to the general surgery department of the C.S.Ref CIII for appendicitis diagnosed pre- and intraoperatively and confirmed to histology

and any patient with a complication of appendicitis (abscess and plastron). Cases of appendicular peritonitis were excluded from the study and any appendicitis operated elsewhere. The media used were patient medical records, hospitalization records, operative report records, individual survey records, outpatient consultation records, and anesthesia protocol. All the patients recruited benefited from a careful clinical examination, namely:

- An interrogation looking for functional signs, general signs and medical and surgical history.
- A complete physical examination for physical signs and additional examinations.

The parameters studied were: age, sex, nationality, address, functional signs, general signs, physical signs, evolution of symptoms, additional examinations, postoperative follow-up and duration of hospitalization.

The data was entered and analyzed by the “SPSS” version 25 software, the word processor was done with the “WORD” software version 2016. Text comparison will be made using the Chi2 statistical test with significant  $P < 0.05$ .

### 3. Results

In one year we performed 347 surgical operations including 105 acute surgical abdomens, with 60 cases of acute appendicitis; this accounted for 17.29% of surgical indications. The average age of our patients was 25.5 years with extremities of 6 years and 50 years. The male sex was the most represented at 63.0% with a sex ratio of 1.72.

Abdominal pain was the most represented reason for consultation with 75% of cases (45 patients) and this pain was localized in the right iliac fossa in 76.7% (46) of our patients. It was a bite type in 70% of cases. On physical examination the defense of the right iliac fossa was the most represented physical sign with a frequency of 96.7%; followed by Blumberg’s sign with a frequency of 90%. Digestive signs were marked by nausea and vomiting 28.4% (17 patients) and 25% (15 patients) respectively. We found a fever of 37.9 degrees Celcius in 51 patients or 85% of cases. The digital rectal examination was painful to the right of the Douglas fir in 76.7% of our patients.

Ultrasound was performed in all patients and 65% had a roundel image of the appendix with increased size. Fluid effusion in the right iliac fossa was found in 21.67% of cases. Biologically a complete blood count (CBC) was performed in all our patients objectifying hyper leukocytosis in 80% of cases. C-reactive protein (CRP) performed in 36 patients (60%) was elevated with values between 18 and 46 mg/ml. Medical treatment consisted of pre, per, and postoperative resuscitation by rehydration and administration of analgesics. Antibiotic therapy was performed as appropriate, after evaluation of the patient. We performed antibiotic prophylaxis in 32 patients (53.3%) and antibiotic therapy in 17 patients (28.3%). The anaesthesia technique used was regional anaesthesia in 45 patients (75%) and general anaesthesia in 15 patients (25%).

Surgical treatment consisted of a conventional Mac Burney appendectomy in 54 patients (90%) and Jalaguier first in 6 patients (10%). Intraoperative diagnosis is shown in **Table 1**.

The procedure performed was an appendectomy with stump burial in 37 patients (61.7%) and an appendectomy without burial in 23 patients (38.3%). All our appendectomy pieces have been sent for histopathological examination; The results of this review are shown in **Table 2**.

Postoperative follow-up was simple in 98.4% (59 patients); the complication was marked by a digestive fistula in one patient (1.60%) who died postoperatively in a sepsis chart.

## 4. Discussions

### 4.1. Frequency

Acute appendicitis is a widespread abdominal surgical emergency worldwide. During our study period appendectomy had occupied 17.29% of surgical procedures and 57.1% of surgical emergencies. This rate is comparable to the results obtained by Sanju S [11] in South Africa. And ROHRS *et al.* in France, [12].

### 4.2. Age

In the literature appendicitis is a pathology of the young subject, but it can occur at any age of life, its frequency is low at the extreme ages of life [1]. The average age in our series was 25.5 years with extremes of 6 years and 50 years. Our mean age is comparable to the results found by Oguntola AS *et al.* [13] in Nigeria with  $p > 0.05$ .

### 4.3. Gender

Sex is not a risk factor in the literature. The male sex was the most represented

**Table 1.** Intraoperative diagnosis.

Intraoperative diagnosis	Staff	Percentage
Phlegmonous appendicitis	32	53.30%
Appendicular abscess	15	25.00%
Catarrhal appendicitis	13	21.70%
<b>Total</b>	<b>60</b>	<b>100%</b>

**Table 2.** Histology results.

Histology	Staff	Percentage
Non-specific appendicitis	36	60.00%
Phlegmonous appendicitis	13	21.70%
Catarrhal appendicitis	11	18.30%
<b>Total</b>	<b>60</b>	<b>100%</b>

with a frequency of 63% or a sex ratio of 1.72. This notion has been demonstrated by several authors [11] [13].

#### 4.4. Pain

In appendicitis pain is the first reason for consultation of patients, it was the main functional sign in all patients of our series and the one found in the literature. This pain was associated with other signs including vomiting and nausea with rates of 25% and 28.4% respectively.

#### 4.5. Site of Pain

The pain in appendicitis is located in the right iliac fossa. It may initially be located in the epigastric or periumbilical region and would guide the diagnosis [14]. In our series pain was in IDF in 76.7% of patients, this rate is comparable to that of CHAVDA in Kenya in 2005 [14] ( $p = 0.66$ ). Irradiation of appendicular pain is exceptional and their presence should suggest another diagnosis [14].

In our study this pain was fixed in 51.7%, there was no significant difference with that observed in the Kenyan study [14].

Classically we find a fever around 37.8 in patients with acute appendicitis, it is on average a temperature of 38 degrees Celcius. In our series it was found in the majority of cases or 85% This notion has been reported in the literature by several authors [15] [16]. Normal temperature may be accompanied by severe anatomical damage in acute appendicitis, this explains the absence of anatomo-clinical parallelism, on the other hand the presence of high fever is a sign of complication.

#### 4.6. Physical Signs

Three signs are essential for diagnosis: Blumberg's sign is present in 50% of cases; the sign of Rovsing which does not have too much clinical importance and defense in the right iliac fossa. The absence of defense should lead to doubt the diagnosis of appendicitis in the laterocaecal position but does not rule out appendicitis in the pelvic or retrocaecal position [17]. Blumberg's sign was present in 90% of cases in our study the defense of the right iliac fossa was present in 96.7%. This defense of the right iliac fossa has been found in all series [11] [16].

In the literature the digital rectal examination conventionally awakens a pain to the right of the Douglas. The absence of pain does not eliminate the diagnosis as it can be painless in upper appendicitis and a poorly prepared digital rectal exam can be painful. 76.7% of the right had a painful digital rectal exam. This frequency is statistically different from that of Zoguereh in 2000 in the Central African Republic [4]. This difference can be explained by the sampling technique and the fact that our patients consulted late compared to the Central African series.

#### 4.7. Paraclinical Examinations

- **Complete Blood Count (CBC):** It was performed in all our patients, it objectified neutrophil hyperleukocytosis in 48 patients (80%). Hyperleukocyto-

sis testifies to an inflammatory process without specifying the cause, this hyperleukocytosis is higher in children, its value is discussed in the elderly [18]. In our context, this examination was available urgently.

- **Abdominal Ultrasound:** This examination is not essential for diagnosis because the diagnosis of appendicitis remains clinical until proven otherwise even if it has contributed to reduce white appendectomies. Thus, it constitutes an examination of choice in doubtful cases, it has the advantage of making the differential diagnosis with other etiologies of pain syndromes of the right iliac fossa especially in young women. However, a normal ultrasound does not rule out the diagnosis of acute appendicitis. In our study it was performed in all our patients. Most of our referred patients came with their ultrasound. It objectified appendicular involvement (roundel image of the appendix with increase in size) in 65% of cases.

## 4.8. Treatment and Post-Operative Follow-Up

In the world the treatment of acute appendicitis has always remained the emergency appendectomy. In our structure given the absence of technical platform for laparosurgery, appendectomy is done by laparotomy.

### 4.8.1. Medical Treatment

All patients received pre- and post-operative analgesia. Patients were on a diet, their basic needs for water-electrolyte intake were met by rehydration before the procedure. We performed antibiotic prophylaxis 30 minutes before the incision in 32 patients (53.3%) and antibiotic therapy was performed in 17 patients (28.3%). We had indicated this in front of perforated appendicitis and the cooling of the plastrons. The molecules used were ceftriaxone and metronidazole. The choice of these molecules was their availability at the pharmacy of the C.S.Réf and the cost effectiveness. Mumtaz KH *et al.* [19] in Baghdad in a cohort of 90 patients had selected cefotaxime and metronidazole in the medical treatment of appendicitis.

### 4.8.2. Surgical Treatment

#### Anesthesia Techniques:

Regional anesthesia has been the anesthesia technique used in most of our patients.

#### Ways First:

The first route was that of Mac Burney in 90% of cases and Jallaguier in 10% of patients. This is the way of election and its minimally invasive nature argues in its favor. The Mac Burney incision without muscle section is in itself a minimally invasive approach. It allows only limited exploration of the abdominal cavity. Currently the first topical way is the laparoscopic way. Laparoscopy does not exist in our C.S.Ref, we did not perform the appendectomy laparoscopically.

According to some authors [20], the laparoscopic approach would have the following advantages:

- Reduction of parietal complications,
- Reduction of postoperative pain,
- Reduction in the length of hospitalization

#### **Appendectomy Technique:**

Appendectomy with burial was done in 37 patients or 61.7%, it was not done in 23 patients or 38.3%. In the literature this practice considered dangerous because of the septic risk by constitution of an intramural abscess.

#### **-Operative Follow-Up**

They were simple in 98.4%. Morbidity in our series was a digestive fistula with wall abscess in 1.6%. Our morbidity rate is comparable to that of Champault in 2008 [21] in France  $p = 0.28$  which found in a series of 2074 patients a morbidity of 4.5%. In the literature, the frequency of wall infections has been estimated at 2.5%. We have reported one death.

Despite the small size of our sample, we were able to identify the frequency, clinical and therapeutic aspects of appendicitis in our general surgery department of the CSRef of Commune III.

## **5. Conclusion**

Acute appendicitis remains the most common surgical emergency in commune III of the district of Bamako. It is a pathology that can be found at all ages of life. Its clinical symptomatology is polymorphic. His diagnosis is clinical. It is a pathology whose morbidity and mortality are low subject to early diagnosis and management.

## **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

## **References**

- [1] Crombe, A., *et al.* (2000) Echographie abdomino-pelvienne en cas de suspicion d'appendicite aiguë: Évaluation prospective chez l'adulte. *Annales de Chirurgie*, **125**, 57-61. [https://doi.org/10.1016/S0001-4001\(00\)00111-2](https://doi.org/10.1016/S0001-4001(00)00111-2)
- [2] Krukowski, Z.H. and O'Kelly, T.J. (1997) Appendicitis. *Surgery*, **15**, 76-81.
- [3] College National des Universitaires Français. Chirurgie générale, viscérale et digestive Item: 351.
- [4] David, D.Z., Xavier, L., *et al.* (2001) Les appendicites aiguës au centre national hospitalier universitaire de Bangui, Centrafrique: Aspects épidémiologiques, cliniques, para cliniques et thérapeutiques. *Cahiers d'études et de recherches francophones/ Santé*, **11**, 117-125.
- [5] Mungadi IA, J.B. and Agwu, N.P. (2004) A Review of Appendicectomy Sokoto, North-West Nigeria. *Nigerian Journal of Medicine*, **13**, 240-243.
- [6] Madiassa, K. (2003) Les urgences chirurgicales à l'hôpital Gabriel Touré. Thèse de Médecine, No. 215.
- [7] Harouna, Y., Amadou, S., Gazi, M., *et al.* (2000) Les appendicites au Niger: Pronos-

tic actuel. *Bulletin de la Société de Pathologie Exotique*, **93**, 314-316.

- [8] Société Nationale Française de Gastroenterologie (SNFG) (2008) Appendicitis. Reims: Encycl Méd Chir Radiodiagnostic Appareil digestif, 33-472-G-10.
- [9] Poudiougou, B. (2015) Appendicites aiguës: Aspect épidémiologique et thérapeutique au Centre de santé de référence de la commune I. Thèse de Médecine. 15M59.
- [10] Mathias, J., Bruot, O., Ganne, P.A., Laurent, V. and Regent, D. (2008) Radiologie et imagerie médicale abdominale-digestive. Elsevier Masson, Amsterdam, 33.
- [11] Sobnach, S. (2017) A Study Comparing Outcomes of Appendectomy between HIV-Infected and HIV-Negative Patients in South Africa. Master of Medicine, University of Cape Town, Cape Town.
- [12] Rohr, S., *et al.* (1999) Appendicites aiguës EMC EL Sevier, Paris, Gastroentérol, 9066A-10, P11.
- [13] Oguntola, A.S. and Oyemolade, T.A. (2010) Appendicitis: Trends in Incidence, Age, Sex, and Seasonal Variations in South-Western Nigeria. *Annals of African Medicine*, **9**, 213-217. <https://doi.org/10.4103/1596-3519.70956>
- [14] Chavda, S.K. and Mohoha, G.A. (2005) Appendicitis at Kenyatta National, Nairobi. *East African Medical Journal*, **82**, 526-530. <https://doi.org/10.4314/eamj.v82i10.9351>
- [15] Delattre, J.F. (1994) Appendicite aigue et ses complications diagnostic, Traitement impact internat 1997, 356. *Scandinavian Journal of Gastroenterology*, **29**, 1145-1149.
- [16] Engbang, J.P., Motah, M., *et al.* (2020) Appendicites Aigües: Aspects Epidémiologique, Clinicopathologique, Thérapeutique et évolutif dans les Hôpitaux de Douala (Cameroun). *EAS Journal of Medicine and Surgery*, **2**, 93-97.
- [17] Calcouye, Y. (2007) Appendiciteaigue à l'hôpital de Sikasso. Thèse de Médecine, Bamako.
- [18] Encyclopédiemédico-Chirurgicale (2009) Appendiciteaigue Gastroentérologie Manuel du résidentexclusivité.
- [19] Mumtaz, K.H. (2017) Effectiveness of Conservative Management of Uncomplicated Acute Appendicitis: A Single Hospital Based Prospective Study. *International Journal of Surgery Open*, **10**, 1-4.
- [20] Ohene, Y.M., Togbe, B., Ohene Yeboah, M., Togbe, B., *et al.* (2006) Appendicite et appendicectomie à Kulassi, Ghana. Etude rétrospective à propos de 638 cas à l'hôpital de Kompo. *Ghana Medical Journal*, **25**, 138-143. <https://doi.org/10.4314/wajm.v25i2.28265>
- [21] Champault, A., Polliand, C. and Costa, P. (2008) Appendicectomieslaparoscopiques: Etudes rétrospectives de 2074 cas. *Surgical Laparoscopy, Endoscopy & Percutaneous Techniques*, **18**, 168-172. <https://doi.org/10.1097/SLE.0b013e31816618f2>