

Clinical, Diagnostic and Therapeutic Aspects of Acute Appendicitis at the Reference Health Center of Commune I-Bamako

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Abstract

Original Research Article

Acute appendicitis is the most frequent abdominal surgical emergency in the world. The aim of this study was to analyse the results of surgical management of acute appendicitis. **Methodology:** This was a prospective study from January 2020 to December 2020 in the reference health centre in Commune I of Bamako. **Results:** During this period, we operated on 108 patients for acute appendicitis, including 78 men and 30 women, for a sex ratio of 2.5. The mean age was 26.92 years, ranging from 5 to 70 years. Abdominal pain was the main reason for consultation. Physical signs were dominated by a positive Blumberg's sign in 99.1% of cases, right iliac fossa defensiveness in 97.2% of cases, Rovsing's sign in 50% of cases, psoitus (Psoitus) in 18.5% and pain on the right in the cul de sac of Douglas in 69.4%. This physical examination enabled the diagnosis to be made in the majority of cases. In some doubtful cases, we requested an abdominal ultrasound scan. Locoregional anaesthesia was the most commonly used anaesthetic technique (63.9%). Classic Mac Burney appendectomy with burial of the stump was the surgical technique most frequently used. Postoperative recovery was straightforward in 97.2% of cases. However, we recorded one case of death. **Conclusion:** Acute appendicitis remains the most frequent abdominal surgical emergency in the community. Early diagnosis and rapid management improve prognosis. Treatment is essentially surgical.

Keywords: Appendicitis, appendectomy, clinical aspects, treatment, post-operative course, length of hospital stay.

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INTRODUCTION

Acute appendicitis is acute inflammation of the ileo-caecal appendix, and is a surgical emergency [1]. This pathology occupies an important place in digestive surgical emergencies due to its frequency and the relative nature of the emergency, even though it is a source of multiple complications. It is mainly seen in young people and children, but not exclusively. Diagnosis is essentially clinical, despite the diagnostic criteria of Alvarado and Saint Jones [2]. There is no anatomical-clinical parallelism. The essential prognostic factor is the time elapsed between the onset of clinical signs and treatment [3]. Its aetiology appears to be multifactorial. Throughout the western world, appendicitis operations are declining. France had just 83,000 appendectomies in 2010, compared with

300,000 in 1990. However, doctors in France are still adept at this type of operation. They still perform 140 per 100,000 inhabitants, a little fewer than in Germany (nearly 160) but many more than in Italy (80) or Denmark (less than 40), according to a study by the French National Health Insurance (Assurance Maladie) [4]. The number of appendicitis operations continues to fall steadily in France, dropping to just 83,400 in 2012, compared with some 300,000 in the 1980s, according to a Drees report, but the number of appendectomies for complicated appendicitis has increased. The decline was particularly marked in the early 2000s, at around 8% per year, when ultrasound and CT scans became the reference examinations for diagnosing the disease. According to Drees in France, the trend began before the use of new medical imaging techniques and "is

more likely to be the result of a change in perception of the dangers" [5].

More than 60,000 adult and paediatric patients underwent surgery for appendicitis in France in 2014 [6]. In Nigeria in 2004, it accounted for 38.9% of abdominal surgeries, and 4.4% in the same year in Niger [7]. A study carried out at the Nianankoro Fomba hospital in Ségou in 2009 found a frequency of 12.3%, the third most common cause of surgery in general surgery [8]. In 2015, in Barthelemy Poudiougou's study, it represented 52.17% of surgical emergencies at CS Réf CI [9]. The standard treatment for acute appendicitis is appendectomy under laparoscopic surgery. In laparoscopic surgery, treatment can be carried out on an outpatient basis [10]. The current challenge is to adopt an appropriate diagnostic approach that will reduce both the risk of complications from appendicitis and the number of inappropriate appendectomies [11]. In order to update the data, we propose to carry out this study, the objectives of which are to determine the frequency of appendicitis at the C.S. Réf in Commune I, to describe the clinical, anatomic-pathological and therapeutic aspects of appendicitis, to analyse the operative follow-up and subsequently to evaluate the cost of treatment.

METHODOLOGY

This was a 12-month prospective study from 1 January to 31 December 2020, carried out in the general surgery department of the commune I referral health centre in the Bamako district. We included all patients operated on in the department for acute appendicitis,

regardless of sex or age, and also patients presenting with a complication of appendicitis, with the exception of cases of appendicular peritonitis. To carry out this study, a file was prepared for each patient, taking into account administrative, anatomic-clinical and para-clinical data, changes during hospitalisation and even after discharge from the centre. The data were collected on a survey form and analysed using SPSS version 25 software. The texts were compared using the Chi2 statistical test with P significant < 0.05. Word processing was carried out using WORD version 2016, and ENDNOTE X 9 was used to manage bibliographic references.

RESULTS

In the course of our study, we carried out 1,420 consultations and 485 hospitalisations; 386 surgical procedures, including 180 acute abdominal operations, and 108 appendicitis operations. Appendicitis accounted for 22.2% of hospitalisations, 28% of surgical indications and 60% of emergency indications. The age group 15 to 24 years was the most represented, i.e. 34.4%; the mean age was 26.92 years with extremes ranging from 5 to 70 years; standard deviation= 16.11. The majority of cases were male (72%), with a sex ratio of 2.5. Pupils/students and housewives accounted for 53.7% of cases. In 64.8% of cases, the disease progressed over a period of 1 to 4 days, with an average duration of 3 days and extremes of 1 to 7 days. Abdominal pain was the reason for consultation in all our patients and was located in the right iliac fossa in 77.8% of cases. The pain was sting-like in 69.4% of cases.

Table 1: Frequency according to physical signs and lingual condition

| Authors | Diallo B, 2009 Mali [76] N=120 | Poudiougou B, Mali2015 [11] N=72 | Our series N=108 |
|-------------------|--------------------------------|----------------------------------|------------------|
| Physical signs | | | |
| Blumberg sign | P=0,059 | P=0,0027 | 99,1 |
| Defending the IDF | P=0,0014 | P=0,18 | 97,2 |
| Rovsing sign | P=0,03 | P=0,043 | 50 |
| Sabral tongue | P=0,0048 | - | 42,6 |
| Mass in the FID | P=0,000031 | - | 19,4 |
| Psoïtis | P=0,0076 | P=0,008 | 18,5 |

Blumberg's sign was the most common physical sign, with a frequency of 99.1%, followed by right iliac fossa pain in 77.8% of cases.

Table 2: Distribution of patients according to ultrasound result

| Ultrasound results | Workforce | Percentage |
|--|------------|--------------|
| Cocard image of the appendix with increased size | 63 | 58,3 |
| Collection in the right iliac fossa | 18 | 16,7 |
| Agglutination of the handles | 11 | 11,2 |
| Infiltration of peri-appendicular fat | 7 | 6,5 |
| Appendix not seen | 7 | 6,5 |
| Not done | 2 | 1,8 |
| Total | 108 | 100,0 |

Ultrasound revealed a cocoon image with an increase in the size of the appendix in the majority of cases (58.3%). An emergency blood count (CBC) is a difficult test to carry out given our technical resources. It can reinforce the diagnosis when there is neutrophil hyperleukocytosis. A CBC was performed in 13 of our patients. Phlegmonous appendicitis was the most common intraoperative diagnosis in 50% of cases.

Locoregional anaesthesia was the most commonly used anaesthetic technique (63.9%). The approach was a Mac Burney incision in 88.9% of cases; the latero-coecal location of the appendix was the most common, accounting for 72.2% of cases. Appendectomy plus burial of the stump was the most commonly used technique (99.1%).

Table 3: Macroscopic appearance of the appendix

| Author | Workforce | Percentage | Statistical test |
|--------------------------|-----------|------------|------------------|
| Diallo B, 2009 Mali [76] | 120 | 15 | p=0 |
| Our series | 76 | 50 | |

In our series, phlegmonous appendicitis accounted for 50% of the histological aspects of appendicular inflammation. This result differs from that

of Diallo B [76] in 2009 (p=0). This difference could be explained by the delay in consulting our patients, which can lead to advanced lesions.

Table 4: Breakdown of patients by pathological examination 32/108 patients did not undergo pathological examination. Only 76 patients underwent this examination

| Results of the anatomopathological examination | Workforce | Percentage |
|--|-----------|------------|
| Phlegmonous appendicitis | 38 | 50 |
| Acute non-specific appendicitis | 16 | 21 |
| Acute appendicitis with signs of peritonitis | 14 | 18,4 |
| Gangrenous appendicitis | 7 | 9,2 |
| Parasitic eosinophilic appendicitis | 1 | 1,3 |
| Total | 76 | 100 |

Phlegmonous appendicitis was the most common, accounting for 50% of the sample. We found one case of eosinophilic appendicitis of parasitic origin. The average cost of treatment was 94,400 CFA francs, ranging from 92,400 to 98,400 CFA francs. The average length of hospitalisation was 1.76 days, or 42.24 hours, with extremes of 1 and 4 days. Standard deviation= 1.031. Post-operative follow-up was straightforward in 97.2% of cases, and was dominated by parietal suppuration (1.9%). We recorded one case of death (0.9%).

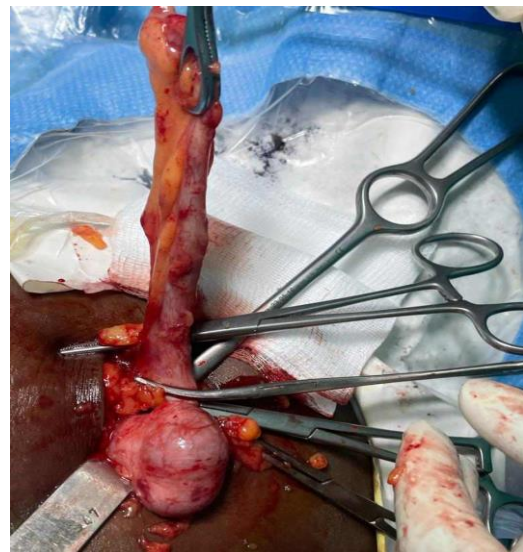


Figure 2: Externalization of appendix

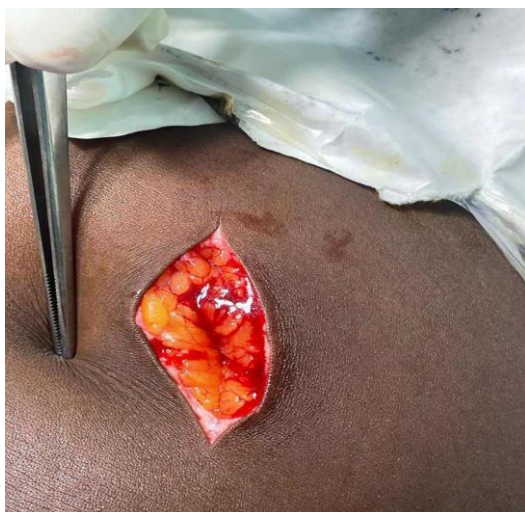


Figure 1: McBurney incision

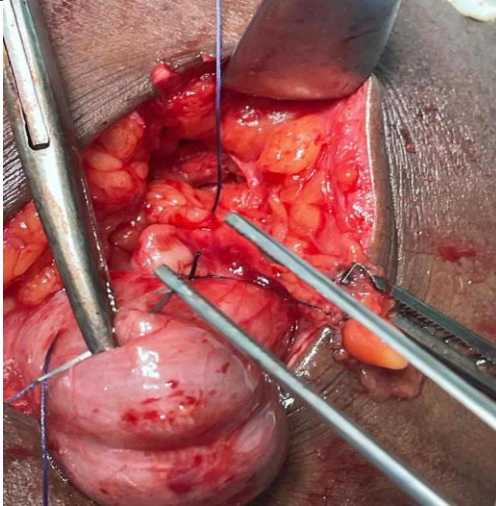


Figure 3: Burying the appendicular stump



Figure 4: Surgical specimen



Figure 5: Closure of the surgical wound

We conducted a prospective study in the general surgery department of the commune I referral health centre in Bamako. During the study period, we operated on and hospitalised 108 cases of acute appendicitis. We were confronted with a number of difficulties, including the systematic abuse of analgesics and antibiotics by patients who often misdiagnosed the problem, the lack of additional emergency tests, our patients' low purchasing power, the lack of a social service, and the absence of a laparoscopic operating theatre, which meant that we had to resort to conventional appendectomy surgery. During this study, acute appendicitis represented 28% of surgical procedures, i.e. the 2^{ème} surgical indication after hernias. This rate differs from those of the authors [9, 12, 13, 14, 15, 16] but is comparable to the results of the systematic review by Sanju [17] in South Africa. In our series, acute appendicitis accounted for 60% of surgical emergencies, and our rate is comparable to that of other authors [18, 19, 20].

In Mali, Gao Diarra D *et al* [21] and in France ROHRS *et al* [22] ranked acute appendicular syndrome as the leading aetiology in abdominal surgical emergencies. This frequency differs from that of Yalcouye Y [16] in 2006. Gender is not a risk factor in the general literature. The male sex has been the most represented, with a frequency of 72%, i.e. a sex ratio of 2.5. This notion has been demonstrated by several authors [8, 9, 23, 24]. Explanations for this male predilection remain controversial and studies proving the contrary [25, 26]. In the literature, appendicitis is a disease of the young, but it can occur at any age. Its frequency is low at the extremes of life [1]. The mean age in our study was 26.9 years, ranging from 4 to 75 years. The mean age of our patients is comparable to the results of Oguntola AS *et al* [65] in Nigeria, Samaké B A [27], Maiga S E [9] at the Nianankoro Fomba hospital in Segou and Poudiougou B [9] in 2015 in our department. In appendicitis, pain is the first reason for patients to consult a specialist, and was the first functional sign in all patients in our series, as well as in those of Yalcouyé Y in 2006 at the hospital....de Sikasso [61] and Poudiougou B in 2015 [9].

This pain was associated with other signs including nausea and vomiting at very similar frequencies in our study (63.9% and 63% respectively). They had identical frequencies in the Poudiougou B study, i.e. 44.4% [9]. Our results are comparable to those of these authors [9, 16]. In the literature, appendicular pain occurs in the right iliac fossa. It may initially be located in the epigastric or peri-umbilical region, which may help orient the diagnosis [28]. Pain was located in the right iliac fossa in 77.8% of our patients; this rate is comparable to that of CHAVDA in Kenya in 2005 [29] (P=0.66) and Mariko L in Mali in 2014 (P=0.34) [15]. Patients with acute appendicitis typically have a fever of 37.8 to 38.5 degrees Celsius. The average temperature is 38 degrees Celsius. In our

DISCUSSION

series, it was found in the majority of cases (63.9%). This notion was reported by Yalcouyé Y [16] who found 58.5%. We observed fever at a frequency of 26.3%, i.e. a fever greater than 38.5 degrees Celsius. There is a significant difference between this result and those reported by Keita B [30], Yalcouyé Y [16], Poudiougou B [9].

A normal temperature may be accompanied by severe anatomical lesions in acute appendicitis, reflecting the absence of anatomical-clinical parallelism, but the presence of a high fever is a sign of complication. The clinical appearance of acute appendicitis is polymorphous, rich in clinical signs despite the atypical forms that may be encountered. Three signs are essential to the diagnosis: Blumberg's sign, which is present in 50% of cases; Rovsing's sign, which is of little clinical importance; and right iliac fossa defensiveness. The absence of defensiveness should cast doubt on the diagnosis of latero-caecal appendicitis, but does not rule out pelvic or retro-caecal appendicitis [28]. Blumberg's sign was positive in 99.1% of cases; there was no significant difference between this frequency and that of Diallo B ($P=0.059$). Our results differ from those of Poudiougou B ($P=0.0027$) [9]. Defence of the right iliac fossa was present in 97.2% of patients. This rate is different from that of Poudiougou B ($P=0.00014$) and Diallo B ($P=0.0027$); this difference could be explained by the high frequency of analgesia prior to diagnosis in their patients compared with ours. The rectal examination was painful on the right in 69.4% of cases. This frequency is statistically different from those of the authors [9, 13]. This difference could be explained by the sampling technique and the fact that our patients consulted earlier than those in Poudiougou B, and later than those in Zogureh in the Central African Republic.

Appendicitis is diagnosed clinically. An emergency blood count (CBC) is a difficult test to perform, given the poor performance of our laboratories. It can reinforce the diagnosis when there is a predominantly neutrophilic hyperleukocytosis. A CBC was performed in 13 of our patients (12.03%). Abdominal ultrasound is not essential for diagnosis, which is clinical until proven otherwise, although it has helped to reduce the number of white appendectomies. It is therefore the examination of choice in doubtful cases, and has the advantage of making the diagnosis in young women. In our study, it was performed in 107 patients, i.e. 99.99%. It revealed appendicular involvement (a cocoon-shaped image of the appendix with an increase in size) in 70 cases, giving a sensitivity of 66.03%. The treatment for acute appendicitis is an emergency appendectomy. In the case of uncomplicated appendicitis, this is accompanied by systematic antibiotic prophylaxis to reduce post-operative infectious complications. In the case of complicated appendicitis (suppurative appendicitis, peritonitis),

antibiotic therapy will be curative against anaerobic germs in particular [31, 32].

Locoregional anaesthesia was the most commonly used anaesthetic technique, accounting for 63.9% of cases, followed by general anaesthesia in 34.3% of cases. The Mac Burney approach was used in 88.9% of our patients. This is the preferred approach and its minimally invasive nature argues in favour of it, which is in agreement with the data in the literature and the study by Yalcouyé Y [16] in a series of 163 patients (95.8% $p=0.095$) and different from that of Keita M B [33] in a series of 110 patients (98.2% $p=0.005$). This difference could be explained by our high frequency of ectopic appendicitis compared with these authors. The current approach is laparoscopy. The average hospital stay was 1.76 days, with extremes ranging from 1 to 4 days. This is shorter than that reported by Maiga I E in 2009 at Ségou hospital [8]. This discrepancy could be explained by the difference between the frequencies of the Mac Burney approach. In the literature, it is reported that the return home may be earlier, at 48^{ème} hours in the presence of uncomplicated appendicitis. Phlegmonous appendicitis accounted for 50% of the histological aspects of appendicular inflammation. This rate differs from that of Diallo B [30] in 2005 ($p=0$). This difference could be explained by the delay in consulting our patients, which can lead to advanced lesions. Post-operative follow-up was straightforward in 97.2% of cases, with parietal suppuration in 1.9%, and we recorded one case of death. Our rate is comparable to that of Champault in 2008 in France (Chi-square of Yats=1.13 $p=0.28$) who found, in a series of 2074 patients, a morbidity of 4.5%. Our morbidity rate was comparable to that of laparoscopic surgery. In addition, some authors have reported stump fistula, 5^{ème} day syndrome and thrombosis of the ilio-colic vein [16, 34]. The literature estimates the frequency of wall infections at 2.5%. Our mortality rate of 0.9% (in an obese 54-year-old patient with hypertensive heart failure complicated by pulmonary embolism) is comparable to the rate of Maiga I E [8] 3 cases of death in a series of 101 patients with $p=0.56$. In industrialised countries, the rate varies from 0.1 to 0.25 and depends on the existence of appendiceal perforation and the age of the patient. The average cost of treatment was 94,400 FCFA. This cost is higher than the Malian minimum wage, which is currently 38,000 CFA francs. It is increased by the complications. Our cost is higher than that obtained by Keita MB [33] which was 55,921 FCFA and this is explained by the fact that our operating kit is complete.

CONCLUSION

Acute appendicitis remains the most frequent surgical emergency in Commune I of Bamako. It affects young adults, but can occur at any age. Its symptoms are polymorphic. It is diagnosed clinically. There is no anatomo-clinical parallelism. Ultrasound can reduce the

number of white appendectomies. Confirmation is histological. The morbidity and mortality rates are low, provided the condition is diagnosed and treated early.

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