

# Usefulness of a Clinico-Biological François' Score in the Diagnosis of Acute Appendicitis: Experience of the University Hospital Center of Parakou, Benin

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## Abstract

**Introduction:** Diagnostic wanderings of acute appendicitis are responsible for serious complications or abusive appendectomies. Existing Clinico-biological scores are efficient. **Objective:** To determine the diagnostic efficiency of François' score in acute appendicitis. **Methodology:** over 10 months, all the patients admitted in the CHUD-Parakou Emergency Department for pain in the right iliac fossa had been examined by resident students who calculated François' score. After verification by the surgeon, patients were put into three categories: category 1 score  $\geq 2$ ; category 2, score between  $-6$  and  $2$ ; category 3, score below  $-6$ . Sensitivity and specificity were calculated. **Results:** out of 54 patients selected (29 men and 25 women), 29 were classified as group 1; 19 as group 2 and 6 as group 3. An ultrasound was performed in all patients in group 2, and signs in favor of appendicitis were found in 12 patients. Of the 41 appendectomies performed, the histologic analysis of 33 operative specimens found a pathological appendix. Sensitivity, specificity and negative predictive value per group were 100%. It has prevented almost in one every four patients (24.07%) an abusive appendectomy. **Conclusion:** This score would reduce diagnostic wanderings and target patient groups for imaging studies.

## Keywords

Acute Appendicitis, François Score, Sensitivity, Specificity, Resource-Limited Countries

## 1. Introduction

Acute appendicitis is inflammation of the vermicular appendix. The most common non-traumatic abdominal surgical emergency, the incidence of acute appendicitis varies between 100 - 122 cases per 100 thousand inhabitants in the West [1] [2].

In Africa, its frequency is 63.4% in the Central African Republic [3], 40.4% in Benin [4] and in Mali. It was ranked as the second non-traumatic surgical emergency after intestinal occlusion [5]. But in reality, the incidence of appendectomy is greater than that of acute appendicitis, estimated at 40 - 60 appendectomies per 10,000 inhabitants [6] [7]. The rate of appendectomy on healthy appendix is therefore high, estimated at 15% - 45% [2]. This discrepancy is related to the clinical polymorphism of the condition and its unpredictable clinical course. Because of the serious or even fatal complications that misunderstanding of this condition may cause, any suspicion of non-inverted appendicitis must be surgically performed: appendectomy. While in the West, CT scans have reduced diagnostic inaccuracies. In Africa, this complementary examination is still not very accessible. The advent of clinico-biological scores is an alternative to reduce diagnostic errors in our contexts. François' score is one of those many scores developed, which seems to us simple and feasible in our context. The objective of this study was to verify the reproducibility of the score and to verify its diagnostic efficiency.

## 2. Patients and Methods

This was a descriptive and analytical cross-sectional study covering a 10-month period from 01 July 2012 to 31 July 2013 taking into account patients aged 15 years and over admitted for acute localized pain in the iliac right fossa to the Emergency Department of the University Hospital of Borgou in Parakou. Those who had a palpable mass in the right iliac fossa or in whom it had not been possible to perform a leukocyte count had been excluded. The patients were examined by medical resident students. They were trained for the François score items [8] (Table 1) to identify the patients eligible for appendectomy. The surgeon confirmed the score and ranked each patient in the three categories offered by the François score on which the therapeutic indications depend (Table 2). The data has been studied in EPIINFO version 3.5.1. Sensitivity, specificity and diagnostic efficiency of the test were calculated.

## 3. Results

### 3.1. Frequency and Socio-Demographic Characteristics

We had received 670 patients during the period, 430 had been hospitalized including 128 cases of non-traumatic surgical acute abdomens. Among them, 54 cases of suspicion of acute appendicitis were retained, thus representing: 8.05% of admissions (all pathologies combined); 12.56% of hospitalizations (all pathologies combined) and 42.19% of non-traumatic surgical acute abdomens. The

**Table 1.** François score items.

Signs in favor of appendicitis diagnosis		Signs against diagnosis of appendicitis	
Male	+2	Female	-1
Age $\geq$ 50 ans	+3	Age 20 - 39 ans	-1
Duration of symptoms		Duration of symptoms	
36 hours	+2	3 days or plus	-3
48 hours	+1	Right rectal mass	-3
Existence of defense	+3	No defense	-3
Leukocytosis > 13 G/l	+2	Leukocytosis < 10 G/L	-3
		Genito-urinary Signs	-3

**Global Score: arithmetical sum of points per item.**  
**When item values are not described, the number of points awarded is nil.**

**Table 2.** Interpretation and therapeutic attitude according to the François Score groups.

Score $\geq$ +2	-6 < Score < +2	Score $\leq$ -6
⬇	⬇	⬇
Very likely appendicitis	Doubt of appendicitis diagnosis	Appendicitis very unlikely
To behave: appendectomy	To behave: Abdominal ultrasound	To behave: observation
GROUP 1	GROUP 2	GROUP 3

average age was 30.57 years ( $\pm$  12.42) with extremes of 15 and 70 years. Twenty nine (29) were men and 25 women.

### 3.2. Clinical Features

Taking into account François' score, the group 1 was in the majority (53.7%) (Table 3). The 19 patients in group 2 were ultrasonographically examined by the same sonographer and 12 (63.2%) were confirmed as acute appendicitis, not "cc".

### 3.3. Therapeutic Characteristics

Patients in group 3 and 2 whose ultrasound was not in favor of appendicitis had been treated medically, for a total of 13 out of 54. Patients in group 1 and those in group 2 with ultrasound in favor of acute appendicitis were operated (appendectomy), 41 of the 54 patients. Thirty-three of the 41 patients who underwent surgery had an anatomopathological examination of the operative specimen. All the specimen analyzed were in favor of acute appendicitis (Table 4).

### 3.4. Outcome Characteristics

Group 3 patients and negative group 2 ultrasound patients, a total of 13 were followed for 3 months. None were readmitted for appendicitis.



### 3.5. Diagnostic Value of François' Score

In our experience François' score diagnostic efficacy was 77.8%, sensitivity was at 77.7%, specificity was 100%, positive predictive value 100% and negative predictive value 52.0%. Taking the extreme groups, the sensitivity was 100% in group 1 and the negative predictive value was 100% in group 3 (Table 5).

## 4. Discussion

Acute appendicitis remains one of the most common digestive surgical conditions and one every ten people is at risk for acute appendicitis before the end of life [9]. Because of its clinical polymorphism the diagnosis sometimes remained a challenge before the era of the CT scan and even after [10]. However, acute appendicitis remains a fatal pathology. Mehinto DK *et al.* in 2004 reports 0.44% mortality in appendectomies [11]. It is therefore important to find simple and inexpensive diagnostic means for underprivileged areas such as ours. Drake and Flum [12] have established that the diagnostic means for acute appendicitis

**Table 3.** Patient distribution by group according to François' score.

	Effective	Percentage %
Group 1	29	53.7
Group 2	19	35.2
Group 3	6	11.1
Total	54	100

**Table 4.** Histological result of the surgical specimens.

	Effective	Percentage %
Phlegmonous	12	36.4
Bluetongue	10	30.3
Gangrenous	8	24.2
Empyema	2	6.1
Perforated	1	3
Total	33	100

**Table 5.** Statistical values of François' score according to the three groups.

	Group 1 (n = 29)	Group 2 (n = 19)	Group 3 (n = 06)
Sensitivity	100	100	-
Specificity	-	100	100
VPP	100	100	-
VPN	-	100	100
BD	100	100	100

depend on the experience of the practitioner, the location of the exercise and the facilities of that exercise site. These diagnostic means can range from simple use of scores to the CT scan. For Alvarado [13] the scores are suitable and must be an important tool to refine the diagnosis. The important role of the scores is thus demonstrated by all authors [12] [13] [14] [15]. Yu YR *et al.* [15] demonstrated that appendicitis diagnosis can be made in most patients without CT scan. Since the Alvarado score, several other clinical research Institutions have developed other scores to facilitate the diagnosis of acute appendicitis [16] [17]. François's score is one of them, and is easy to apply. In our study its sensitivity of 100% in group 1 and its negative predictive value of 100% in group 3 are comparable to 94.7% and 97.4% respectively found by Brigand C. *et al.* in 2009 in France [14]. Our results are also comparable to those of James DL *et al.* in Niamey (sensitivity 100% per group) [18]. The low specificity (around 50%) found in the studies is the criticism of this score [9]. James DL *et al.* had false positive in group 1 (3/63 cases) while all our group 1 cases were confirmed after surgical procedures. None of the patients in group 3, after three months of follow-up had been readmitted for appendicitis. Other authors [18] [19] have had to perform appendicitis in group 3. Our sample is weak compared to those authors. With such good sensitivity, this score is effective in the diagnosis at lower cost which is a significant benefit in resource-limited countries where the patient is forced to pay for all care and balance. This score, in our study, made it possible to avoid unnecessary appendectomies on healthy appendix in 13 out of 54 patients (24.07%) representing nearly one every four patients with right iliac fossa pain. Similarly, this score was used to select those in whom imaging is necessary to confirm the diagnosis, thereby reducing the cost of managing acute appendicitis.

## 5. Conclusion

François score is simple, sensitive and specific tool for a proper diagnosis of acute appendicitis to avoid errors and inappropriate imaging demands. It has a great interest in developing countries.

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