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Acute Coronary Syndrome of Young Subjects at the Luxembourg Mother-Child University Hospital in Bamako

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Abstract

Introduction: Acute coronary syndrome is often the first event of coronary disease of young subjects. **Objective:** To study sociodemographic, clinical, paraclinical, therapeutic and evolutionary aspects of acute coronary syndrome of young subjects. **Patients and Methods:** Descriptive cross-sectional study with prospective recruitment from October 01, 2020 to March 31, 2022. Were included all patients admitted for acute coronary syndrome whose age was less or equal to 45 years and who had undergone coronary angiography at the Mother-Child University Hospital on Luxembourg from Bamako. **Results:** During the study period, we collected 60 patient files out of 198. These 60 patient files met our inclusion criteria. Hospital frequency was 30.30%. Average age of patients was 40.43 ± 3.9 years. Sex ratio M/F was 5.3. Main cardiovascular risk factor was smoking tobacco (23.42%), followed by dyslipidemia (13.92%). Functional signs were dominated by angina 62% followed by dyspnea 25.3%. Persistent ST-segment elevation on electrocardiogram was present in 76.4%. Left ventricular systolic dysfunction was present in 26.5%. Time to first medical contact was more than 12 hours in 62.7% of cases. Radial approach was adopted in 94% of cases. Coronary angiography was pathological in 85% (n = 51) of cases. Lesions were single-vessel disease in 47.1% and culprit artery was anterior interventricular in 51% of cases. Dual anti-platelet aggregation was aspirin and ticagrelor in 91.8% of cases. Angioplasty was performed in all patients who had significant abnormalities at coronary an-

giography. In-hospital mortality was 3.9%. **Conclusion:** Acute coronary syndromes exist in young Africans with a male predominance. Main cardiovascular risk factor is smoking tobacco. Coronary lesions are single vessel disease in the majority of case. Most of patients meet medical team after 12 hours. Time to first medical contact is a main challenge in our country.

1. Introduction

Ischemic heart disease is a major public health problem worldwide. It accounts for a quarter of all deaths, and myocardial infarction is the leading cause of morbidity and mortality in industrialized countries [1].

Acute coronary syndrome is often the first event of coronary disease of young subjects. Myocardial infarction (MI) is not uncommon in patients under 40 with cardiovascular risk factors such as male sex, smoking tobacco and early coronary heredity [2].

Depending on the study, the upper age limit for the occurrence of ACS in young subjects is set at 40, 45 or 50 years, and represents 2.6%, 6.5% and 23.9% respectively of patients admitted to cardiac intensive care units [2]. Its incidence is increasing under the influence of modifiable risk factors [3].

Few epidemiological data have been reported in this population, particularly in Black Africa; hence the motivation for this study of the clinical, paraclinical, therapeutic and evolutionary aspects of acute coronary syndrome of young subjects.

2. Patients and Method

This study was carried out in the interventional cardiology unit of the cardiology department of the CHU Mère-Enfant "Le Luxembourg" in Bamako, Mali. This was a cross-sectional, descriptive and prospective study. It was carried out over 18-month between October 01, 2020 and March 31, 2022. All patients hospitalized in the interventional cardiology unit for coronary angiography which indication was acute coronary syndrome and with patients age less or equal to 45 years were included. Coronary angiography with or without coronary angioplasty were performed for these patients.

2.1. Data Collection

Informations were obtained by examination and medical files. Following data were collected: socio-demographic factors (age, sex), clinical presentation (chest pain, dyspnea, syncope, palpitations, pulse rate, and blood pressure), cardiovascular risk factors, electrocardiogram characteristics, echocardiography characteristics, troponin dosage, coronary angiography aspects, medical treatment, an-

gioplasty with drug eluting stent, hospital outcome, outcome at 1 month and three months after hospitalization.

Variables analyzed were sociodemographic, clinical, paraclinical therapeutic and evolution at hospital, one and three months after hospitalization. These data were collected on individual survey forms.

2.2. Data Analysis

Continuous variables were expressed as mean standard deviation. Dichotomous variables were expressed as counts and percentages.

Data were analyzed on Microsoft Office Word 2013 and SPSS software. P value ≤ 0.05 was considered significant.

2.3. Study Parameters

Parameters of study were: socio-demographic data (age and sex), cardiovascular risk factors, diagnosis (frequency, clinical and paraclinical exams), medication used for the initial treatment, hospital outcome of inpatients.

ACS was defined as persistent ST-segment elevation (ACS ST+) or any electrical appearance associated with elevated ultrasensitive troponin (ACS ST−), all in a clinical context suggestive of myocardial ischemia.

The cardiovascular risk factors studied were active or passive smoking, hypertension, diabetes, dyslipidemia, obesity or overweight, sedentary lifestyle and stress.

Ethical aspects: verbal informed consent was obtained from patients regarding the use of their data for study purposes, and confidentiality was respected.

3. Results

We enrolled 60 out of 198 patients with acute coronary syndrome, representing a hospital frequency of 30.30%. The mean age of the patients was 40.43 ± 3.9 years, with extremes of 29 and 45 years. Patients were predominantly male, with an M/F sex ratio of 5.3. Smoking was the main risk factor (23.42%), followed by dyslipidemia (13.92%) (Figure 1). The reason for consultation was angina pain in 62%, followed by exertional dyspnea stage 2 to 3 in 25.3%. Persistent ST-segment elevation on electrocardiogram was present in 76.47% (Figure 2). Left ventricular systolic dysfunction was present in 26.5% of patients. Time to treatment was greater than 12 hours after first medical contact in 62.7% of patients (Figure 3). Radial approach was adopted in 94% of cases. Coronary angiography was pathological in 85% (n = 51) of our patients. Lesions were single vessel disease in 47.1%, and culprit artery was anterior interventricular artery in 51% of cases (Figure 4 and Figure 5). Dual anti-platelet aggregation was aspirin and ticagrelor in 91.8% of cases (Figure 6). Angioplasty was performed in all patients with pathological coronary angiography. In-hospital mortality was 3.9% (n = 2). Evolution was good after 1 and 3 months in 89.8% and 93.9% of cases respectively (Table 1).
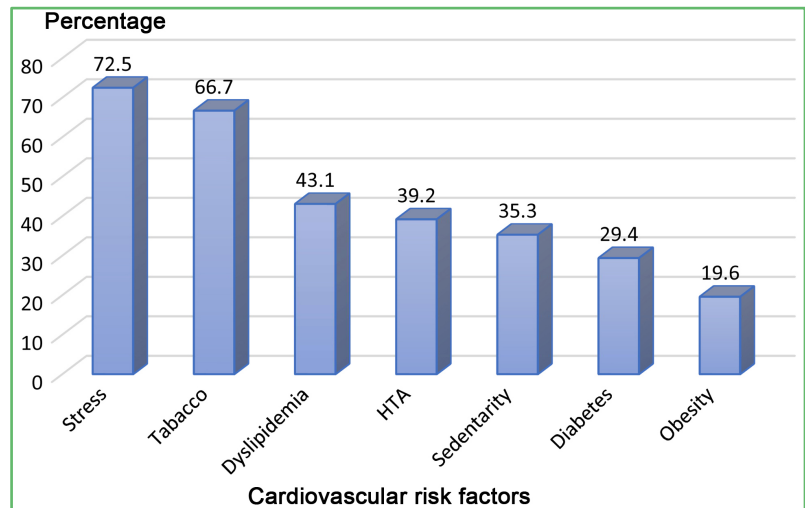
Figure 1. Cardiovascular risk factors.
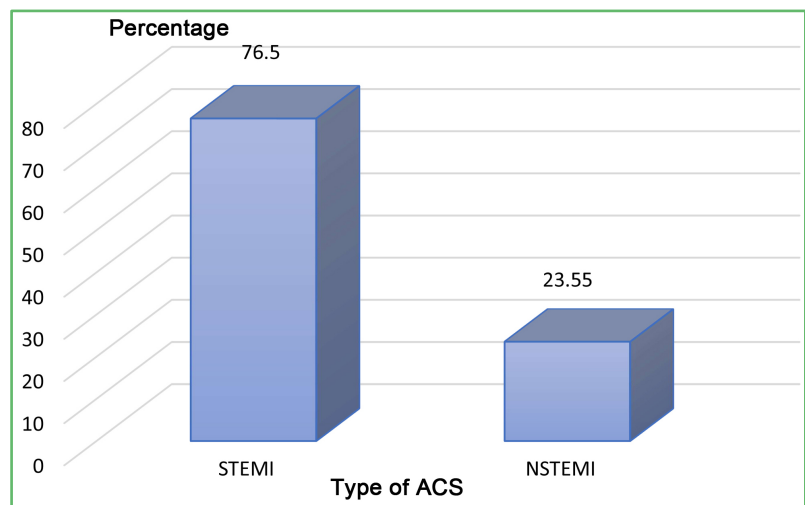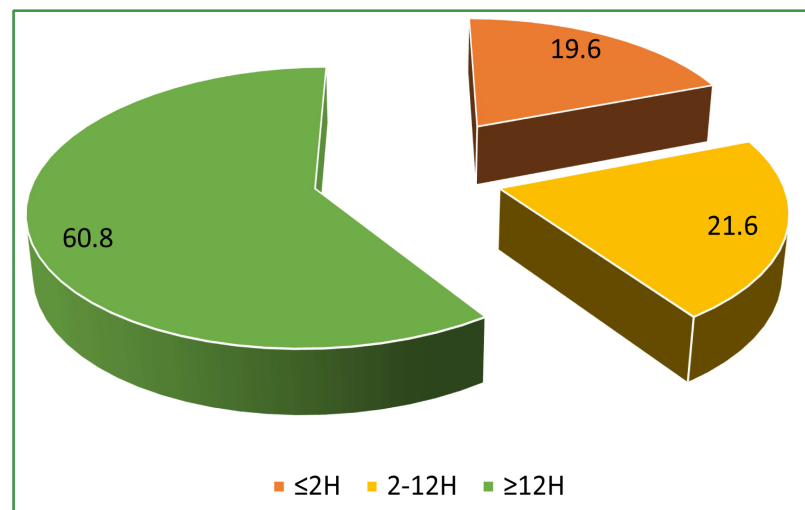

Figure 2. Type of ACS.

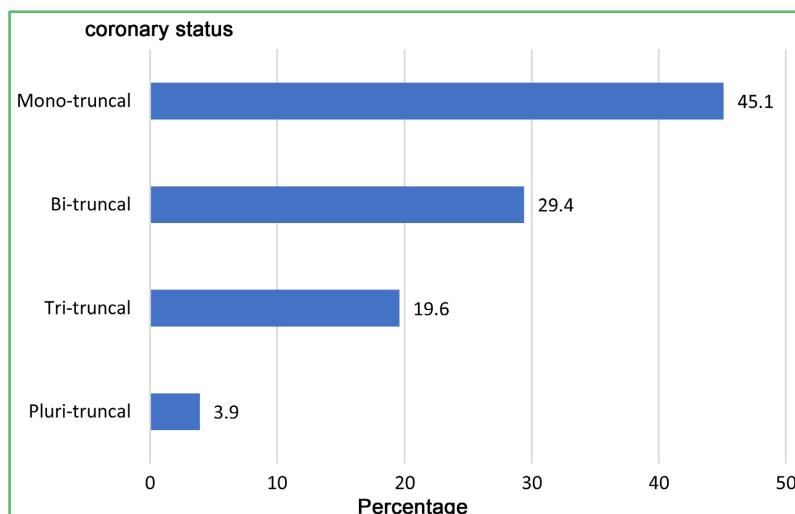**Figure 3.** Distribution by time to admission.

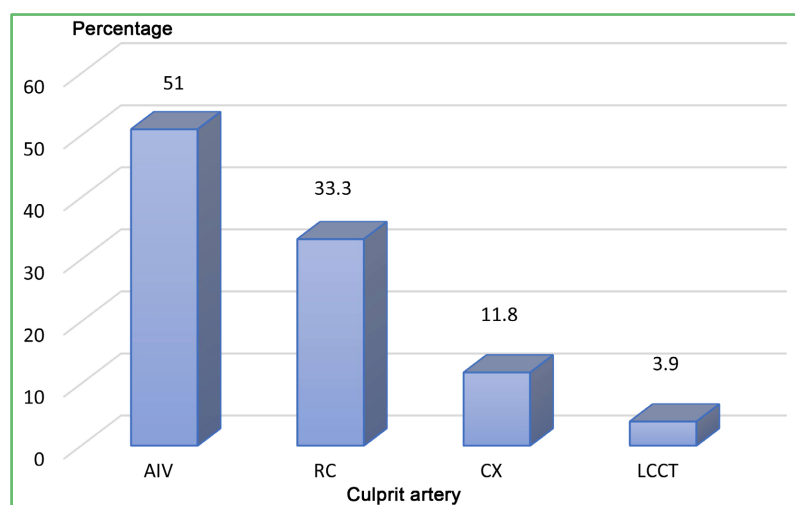**Figure 4.** Distribution by coronary lesions.
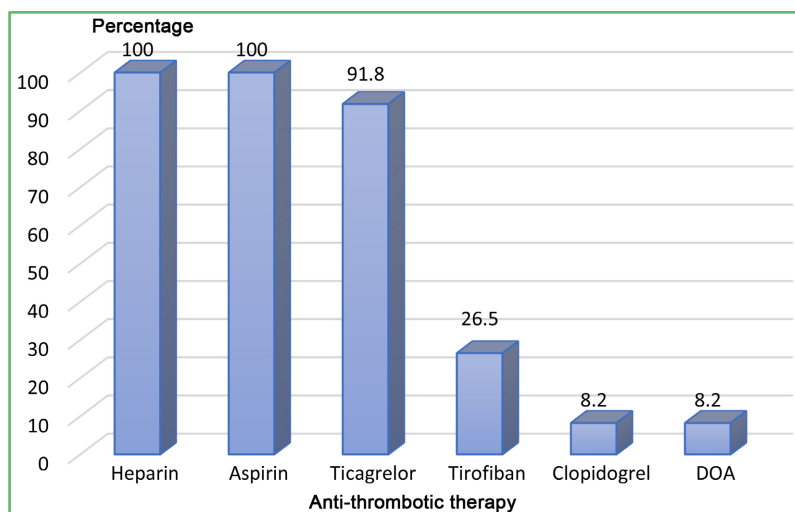

Figure 5. Distribution by culprit artery.

Figure 6. Distribution by anti-thrombotic therapy.

Table 1. Distribution by long-term trends.

Long-term evolution		Frequency	% N = 49
At 1 month	Favorable	44	89.8
	Angina	3	6.12
	FA	2	4.08
At 3 months	Favorable	46	93.88
	FA	2	4.08
	Death	1	2.04

4. Discussion

Acute coronary syndrome in young people remains a rare entity, it is unusual but not exceptional and its incidence is not negligible. As far as the impact is concerned, the results are very different depending on the source, the time period and the definition used [2]. In our study, the proportion of ACS in young subjects was 21.43%, similar to that observed by Mingou [4] in Dakar who found 21.31%, but it was higher than that of Allouche in Tunisia (8.5%) [5]. This notable proportion in our series could be related to a change in the lifestyle of the population, and to the epidemiological transition; confirming the progress of the SCA in Africa. The vast majority of young ACS affects men, with a prevalence of between 79% and 95% depending on the series [6]. In our study, 84.31% of patients were male with a sex ratio of 5.3; This observed male predominance is in agreement with the literature [2] [5] [7], in contrast to Mingou [4] who had regained a female predominance (61.5%). The mean age of our patients was 40.43 ± 3.9 years with extremes of 29 and 45 years. The 40 - 45 age group was the most represented (68.8%). This rate is consistent with the proportion found by Allouche *et al.* [5] (39.51 ± 5.5 years) with an age limit of 45 years. Chest pain was the main mode of development of acute coronary syndrome in our patients (62%), this proportion was close to those of Coulibaly and Aw who found 70% and 71.9% respectively [8] [9] [10]. The main cardiovascular risk factor in our patients was smoking (72.5%), in agreement with data from the literature [2] [9] [10]. Dyslipidemia was found in 43.1% of our patients, this rate is similar to that of Hamadou [11] (43.5%). The majority of our patients (76.47%) had SCA with persistent ST elevation (SCA-ST+) in agreement with Hoit [12] who had found 88% of SCA ST+, in contrast to Hamadou [11] who had found 60% of SCA without ST shift. The lesions were mono truncular in 47.1% of our patients, with the anterior interventricular artery as the culprit in 51% of cases consistent with the data in the literature [2] [5] [7] [9] [10]. Coronary angiography was normal in 15% of our patients, in agreement with Lopez-Pais [13] who found in his series 16.9% of normal coronary angiography. The time between the onset of pain and the first medical contact was more than twelve hours in 62.7% of our patients. This is true in Africa, as almost all African studies show a delay of more than 12 hours in the majority of cases [4] [5] [9] [10] [11]. This delay is due to a

lack of awareness among the population about cardiovascular emergencies, the scarcity of adapted infrastructure and medical transport. Left ventricular systolic function was low in 26.53% of our patients, higher than that found by Morillas [14] who found 7% in young patients with myocardial infarction. LVEF was greater than or equal to 50% in 44.9% of our patients, lower than that found by Esteban [15] which was 65.6% for LVEF greater than 54%. Primary angioplasty was performed in 11.8% of revascularized patients and delayed angioplasty in 88.2%. N'Guetta had performed primary angioplasty in 24.2% and delayed angioplasty in 64.5% of patients [16]. These proportions of primary angioplasty are lower than that found in the FAST-MI 2015 survey in France which was 76% [7]. This low prevalence of primary angioplasty observed in our study is largely explained by the delay in diagnosis, but also by the lack of financial means of our patients. In 78.43% of cases, angioplasty of the culprit lesion and in 21.57% revascularization involved the culprit lesion associated with other lesions.

The success rate of primary angioplasty was 96.4% in our series, superimposed on N'guetta's 97% [16] and lower than Hamadou's 100% [11]. In agreement with recommendations [17] [18], ticagrelor was the most prescribed P2Y12 inhibitor in our patients (91.8%) followed by clopidogrel (8.2%). Tirofiban was used in 26.5%. Heparin and aspirin were used in all of our patients. The hospital course was simple in 82.4% of patients, with complications observed in 13.7% curbed by optimized medical treatment and mortality was 3.9% of cases. The hospital course of young subjects is most often favourable with a good short-term prognosis [2] [5] [7]. This could be explained by less severe coronary artery disease and a low number of cardiovascular risk factors and/or comorbidities in this population. In-hospital mortality was 3.9% (n = 2) comparable to that of Morillas [14] who found 3.7%. The evolution at 1 month and 3 months was favorable in 89.8% and 93.9% of patients respectively. At 3 months, this evolution was marked by an improvement in LV systolic function (≥50%) in 73.5% (n = 36), residual angina in 6.12%, persistent atrial fibrillation (AF) in 4.08% and death (2.04%). Morillas [14] in his study found residual angina in 7.4% and AF in 1.4% in the cardiac intensive care unit.

5. Conclusion

ACS can affect young people, especially those with cardiovascular risk factors such as active smoking and dyslipidemia. The lesions objectified are mainly mono-truncular. The preferred mode of revascularization is coronary angioplasty. The course is favorable in the majority of cases after coronary revascularization. Despite the availability of the catheterization room in Mali, the management of ACS is still problematic because of the long delays in treatment. As a result, prevention remains the best way to avoid or delay the progression of coronary artery disease through the control of cardiovascular risk factors.

Conflicts of Interest

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

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