

Stemi in Dakar Registry: Evaluation of Data at 06 Months

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Abstract

Introduction: ST-elevation myocardial infarction (STEMI) remains a worldwide scourge with dramatic consequences both functionally and prognostically. In Senegal, since 2014, enormous progress has been made to improve the management of this disease. However, some challenges remain. The overall objective of this study was to assess the overall management of patients with STEMI.

Methodology: This is a prospective, descriptive and analytical study over a period of 06 months from April 1st, 2023 to September 31st, 2023. All patients admitted to the four major cardiology departments in Dakar for STEMI were included. The socio-demographic, diagnostic, therapeutic and evolutionary parameters were studied. We entered the data with the Kobotoolbox software and analyzed the results using the SPSS software. The threshold of significance was a value of $p < 0.05$.

Results: We included 157 patients, the hospital prevalence was 11.7%. The sex ratio H/F was 2.48. The mean age of patients was 58 years. The average time between onset of pain and first medical contact (FMC) was 10.57 hours. The proportion of patients received before the first 12 hours was 79.6%. The coronary angiography rate was 66.5% and it was abnormal for 96.3%. It was predominantly one-vessel coronary artery disease (51%). The rate of completion of primary percutaneous coronary intervention (PCI) was 24.2%. Thrombolysis was performed in 32.5% of patients with a success rate of 49%. Hospital mortality was 10.8% or 17 patients. The factors of poor prognosis identified were: number of medical facilities consulted before admission to cardiology (p value = 0.04), presence of conductive disorders (p value = 0.006) and absence of PCI (p value = 0.04).

Conclusion: STEMI is on the rise in our country. Diagnostic delays remain long. The management is suboptimal and sometimes dramatic consequences.

Keywords: acute coronary syndrome; stemi-dakar registry; treatment

Introduction

ST-elevation myocardial infarction (STEMI) remains a worldwide scourge with dramatic consequences both functionally and prognostically. It is a disease that is clearly on the increase in Africa and particularly in sub-Saharan Africa [1-2-3]. Enormous progress has been made in these countries, particularly in Senegal, to improve the diagnosis and management of this disease. However, some difficulties remain: significant delays in diagnosis, lack of a real care system, insufficient use of interventional revascularization techniques due to lack of qualified or inadequate medical personnel and an adequate or deficient technical facilities [4-5-6]. The objective of this study was to establish a STEMI

registry in Dakar to assess all diagnostic, therapeutic and evolutionary aspects.

Methodology:

Our work was carried out in the four major cardiological services of Dakar including the National University Hospital of Fann, the Hospital Principal of Dakar, the hospital Dalal Jamm of Guediawaye and the General Hospital Idrissa Pouye of Dakar.

This is a cross-sectional, multicentre, prospective, descriptive and analytical study over a period of 06 months (from April 1st, 2023 to September 30th, 2023).

All patients treated for STEMI in these cardiology departments during the study period were included in this study. The diagnosis of STEMI was based on clinical evidence (pain and its equivalents) and changes in the electrocardiogram (ECG) with persistent ST-segment elevation.

The parameters studied were socio-demographic data, history and cardiovascular risk factors. The clinical presentation of the patient, diagnostic delays and admission modes were recorded. At the echocardiography, we looked for segmental kinetics disorders and evaluated the left ventricular systolic function. Coronarography was used to assess the coronary lesion and vessel status [7]. The treatments received in the pre-hospital and hospital phases (thrombolysis, revascularization by PCI or coronary artery bypass grafting CABG and other treatments received). The evolutionary data were also observed.

The collection of all patients was carried out in a registry: The «REGISTRY DAKAR-STEMI» using the software KoboToolbox. Patient data was collected on survey sheets and entered into the software. Data analysis was performed by SPSS software. The threshold of significance was set at a value of $p < 0.05$.

Results:

The total number of patients included in this registry was 157 out of a total of 1 340 hospitalized patients in these services during the period, representing a hospital prevalence of 11.7%. Mean age of patients was

58.3 ± 12.3 years, with extremes of 24 and 90 years. The largest age group was 55-65, accounting for 34.3% of the population. Male predominance (71.3%) and sex ratio was 2.49. Most patients lived in Dakar and its suburbs (70.8%). Financial coverage was at the patient's expense in 79% of cases. Only 11% of patients were covered. Patients were referred in 95% of cases. The ambulance was the most used method of transfer in 84.7% of cases and it was mainly medically used in 67.7% of cases. For 14.3% of the patients, the transfer was done with the means of the board (taxi or personal cars). The average number of facilities consulted before admission to cardiology was 2 with extremes of 1 and 4. More than half, 64.7% of patients had consulted at least two health facilities before receiving an accurate diagnosis. The admission schedule of patients was mainly between 08H-20H in 68.2% of cases. Cardiovascular risk factors were dominated by physical inactivity (72.6%), followed by hypertension (47.1%) and diabetes (28.7%). The clinical presentation of patients was dominated by chest pain which was present in almost all patients (156 patients, or 99%). It was typical in 89.9% of the cases. Four patients (2.5%) were admitted after a recovered cardio-respiratory arrest.

The mean time between pain onset and first medical contact (PMC) was 10.57 hours [30 min - 144 h] with a significant proportion of patients (79.6%) admitted within 12 hours after pain onset. The different patient diagnostic delays are summarized in Table I.

<i>Diagnostic delays</i>	Hourly average
Onset of pain and FMC (H)	10.57 hours [0.5H-144H]
FMC and first ECG realization (min)	129.23 [2 min - 6,912 min]
Time to admission in cardiology (H)	35.78 H [1H - 144 H]
Delay in coronary admission (H)	45.34 H [2 H - 432 H]

FMC : First Medical Contact

Table I: Patient Delay Characteristics

The number of patients who had a coronary angiography was 101, or 64.3% achieved. Coronary angiography was abnormal in 94% of patients. It was normal in 6% of patients. More than half of the lesions (57.3%) were located on the left descending artery (LAD). One-vessel lesions were more common (51%). Therapeutically, the administration of the charge doses was effective in almost all patients (153 patients) and was mostly pre-hospital in 113 patients (73.9%). PCI was performed in 60 patients (38.2%), of which 38 primary PCI (24.2%) and 6 rescue PCI (3.8%). Sixteen patients had delayed PCI.

Thrombolysis was performed at a rate of 32.5% of which more than half were pre-hospital. Only one patient had a successful thrombolysis within 2 hours of pain onset. In 17 patients (33.3%), thrombolysis was performed between H2 and H6 of pain with a success rate of 64.7%. In 33 patients (64.7%), thrombolysis was performed between H6 and H12 after the onset of pain for a success rate of 41.4%. The different therapeutic means were listed in table II.

Healthcare modalities	Number	Percentage (%)
Charge dose	n = 153	97,4
Pre-hospital	113	73,9
In hospital	44	26,1
Heparinotherapy	n = 87	55,4
Pre-hospital	46	52,9
In hospital	41	47,1
PCI	n = 60	38,2
Primary	38	63,3
Rescue	6	10
Scheduled	16	26,7
Thrombolysis	n = 51	32,5
Pre-hospital	26	51
In hospital	25	49
Coronary artery bypass grafting (CABG)	n = 3	0,16

PCI : Percutaneous coronary intervention

Table II: Distribution of patients by management modality (n = 157 patients)

The evolution was mostly favorable, but with some complications in pre-hospitalization summarized in table III. We had recorded 17 deaths, a hospital mortality of 10.8%. The factors of poor prognosis identified in our registry were: number of medical facilities consulted before

admission to cardiology (p value = 0.04), presence of conduction disorders (p value = 0.006) and the absence of angioplasty (p value = 0.04).

Complications	Number (n = 157)	Percentage (%)
Kidney failure	64	40,6
Heart failure	18	11,4
Thrombopenia	18	11,4
Cardiogenic shock	12	7,6
Pericardial effusion	11	7
Thrombocytosis	9	6
Conduction disorders	5	3,1
Rhythm disorders	4	2,5
Hemorrhage	3	1,9
Ventricular Septal Defect VSD (Septal Rupture)	1	0,6
Stroke	1	0,6
Peripheral artery disease (PAD)	1	0,6
Death	17	10,8

Table III: Summary table of the different complications during hospitalization.

Discussion:

The hospital prevalence of STEMI is 11.7% in our registry. This is further confirmation of the progression of coronary artery disease in our continent, confirming the long-announced epidemiological transition in the various studies [5-8]. Several hypotheses explain this evolution: the western way of life, the poor diet and the improvement and availability of diagnostic means with the electrocardiogram.

The average age of patients was 58, a relatively young age as in most African studies [4-9-10]. In the European and North American series, patients are older, about a decade [11-12]. This disparity could be explained on the one hand by the much higher life expectancy in these countries, but also by the very early presence of cardiovascular risk factors in the African population.

The mean time in our study between onset of pain and FMC was 10.57 hours. This delay is significantly improved compared to the 48-hour delay found in 2012 in Ouagadougou [9] and much less than the 1.53-hour delay found in France 2019 [13]. The lengthening of consultation times in our African countries, which has a real impact on patient morbidity and mortality [14-15]. This is inherent in many phenomena: the lack of knowledge of this disease both at the level of the population and hospital practitioners, the absence of medical coverage; This contributes to the exclusion of specialized health facilities because of the expenses that are often high. Other delays were related to the lack of a real patient management channel but also to the time taken to complete the

electrocardiogram after the FMC which is 129 min in our register, where the ESC recommends a delay of 10 min [16].

The coronary angiography completion rate was 64.3% in our series. This rate is relatively low compared to the results of the French FAST-MI 2010 registry [11] with a rate of 96%, but remains higher than the results of Yao in Ivory Coast which had regained a rate of 44.1% [6]. The low coronary heart rate in Africa is mainly due to the weak economic environment [17]. We also note in our series that the time to admission to the catheterization room was extended, estimated at 45H. This phenomenon also reported in other African series [6] is partly explained

by the large number of patients received out of time and the absence of a coronary artery [18]. This coronary angiography was mostly abnormal in 94% of cases and normal in 5% of cases. According to the number of coronary arteries reached, 51% of patients had one-vessel disease, 31.1% two-vessel CAD and 17.8% three-vessel CAD. Similar rates were found in Ivory coast [6-19]. Therapeutically, the administration of the charge doses was done in 97.4%. Thrombolysis was performed at a rate of 32.5% of which more than half were pre-hospital. Thrombolysis could still maintain its indications in Africa, especially if it is carried out in pre-hospital settings to meet the recommendations [16] and given the enormous organizational difficulties and the inadequacy of interventional cardiology centres. PCI remains the gold standard [20]. It was performed in 38.2% of patients, including 24.2% primary PCI and 3.8% rescue PCI. In Europe, according to the FAST-MI 2015 registry, primary PCI was performed in 76% of patients [11]. In the ACCESS study [21], 40% of patients had primary PCI. These better results observed in developed countries are supported by the existence of a well-organized network of treatment including the SAMU on a quasi-systematic basis and medical coverage. These difficulties encountered in the management of these patients are not solved with a mortality rate of 10.8%. This rate remains high and not negligible and should encourage more to review the weaknesses of this care stream in order to save lives.

Conclusion:

The STEMI, long considered rare in Africa, has become an African scourge with the latest known developments. It affects the middle-aged adult population with several cardiovascular risk factors. Diagnostic delays remain long. The management is suboptimal, sometimes with dramatic consequences, hence the need to set up a chain of management for coronary patients.

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