

Evaluation of Thrombolysis in the Management of St-Elevation Myocardial Infarction (STEMI) in Isolated Cardiology Unit

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ABSTRACT

Introduction: The ST-Elevation Myocardial Infarction (STEMI) is a serious cardiac emergency that requires urgent management from the setting. Thrombolysis appears to be one the rapid methods of revascularization of the coronary arteries.

Objective: The aim of the study was to assess the result of thrombolysis for STEMI in the context of isolated cardiology unit.

Patients and Methods: It consisted of prospective and descriptive study from 31 July 2012 to 30 June 2014 in the Hospital of Sikasso. It included the patients admitted for STEMI treated by thrombolysis. The studied parameters were epidemiology, clinical and para clinical profiles. The fibrinolysis consisted of administrating 1.5 million international unit of streptokinase in a syringe driver during 1 hour.

Results: Overall, 1237 patients were admitted in the hospital of Sikasso during the study period. 177 (14.3%) patients presented with ischemic heart syndrome; amongst them, 37 patients (2.99%) were diagnosed with STEMI. Only 24 patients benefited from fibrinolysis which represented 64.86% of patients with STEMI and 1.94% of all the hospitalized patients in the hospital of Sikasso. Male to female sex-ratio was 3. The average age was 50 years old. 50% of the patients were civil servants and more than the half (83%) were Malian. The main risk factors included smoking associated to stress (20.8%) and the association of high blood pressure and diabetes (16.7%). Regarding the clinical symptoms, 20 patients (83.33%) presented with the classic typical chest pain of acute coronary disease. The cardiovascular examination was normal in 10 patients (41.66%). Troponin test was positive in 7 patient (29.2%). On ECG, the extended anterior area was more representative (41.7%) followed by inferior area (20.8%). All the patients have benefited from echocardiogram and 19 patients (79.16%) presented a preserved left ventricle function; akinesia was the most frequent motion pathology (n=10). Four (04) patients underwent coronary angiography abroad; we noticed 1 vessel disease in 1 patient, 2 vessels disease in 2 patients and 3 vessels disease in 1 patient. The left anterior descending was the most diseased artery. The patient with 3 vessels disease underwent triple coronary artery bypass grafting. All patients were treated with streptokinase and 29.2% of patients presented complications including hemorrhagic stroke (8.3%). Mortality represented 25%. All patients treated within the first 6 hours presented clinical improvement while 37.5% of fatal cases represented those who were treated after the first six hours.

Conclusion: STEMI is a huge public health issue as it can lead to high rate of morbidity and mortality. The prognosis depends on the precocity of the thrombolysis which is clearly beneficial during the first hours.

Keywords

STEMI, Fibrinolysis, Streptokinase, Coronary artery bypass grafting, Surgery Sikasso.

Introduction

Cardiovascular disease is the leading cause of death in developed countries (200,000 deaths / year in France) and myocardial infarction (MI) is the first etiology [1]. Approximately 70,000 IDM occur in France per year. Men predominate before age 60 because premenopausal women are protected by estrogen [2].

Affection is considered less frequent in sub-Saharan Africa compared to the West, the prevalence of ischemic heart disease is estimated at 2.1 to 5 per 100,000 inhabitants unlike in Europe where it is between 25 to 640 per 100,000 inhabitants. On the other hand, its incidence rate increases by decade in decade probably because of the more efficient means of diagnosis, but can also be of changes of the way of life especially in urban areas [3]. Fifty to sixty per cent of MI deaths occur in the first hour (sudden death from ventricular arrhythmias), resulting in the need for medical transport (UAS) and hospitalization at ICU. During the last 15 years, mortality rates by infarction have been decreasing, not so much by better control of risk factors but by management in specialized settings [4]. For the past 15 years, and thanks to De Wood's coronarographic work [5], it has been established that myocardial infarction (in its most common form) is related to coronary thrombotic occlusion secondary to rupture of an atheromatous plaque. To limit the size of the infarction, a major determinant of the prognosis, it is necessary to obtain the early reperfusion of the artery by rapidly destructing the thrombus responsible for the coronary occlusion. This is the beginning of the era of fibrinolysis [6].

This study, the first of its kind in Mali and specifically in Sikasso, aims to evaluate STEMI fibrinolysis in the peripheral cardiological environment.

Patients and Methods

This is a prospective descriptive study of patients presenting with a STEMI who have had fibrinolysis. The study was conducted from 31 July 2012 to 30 June 2014 (2 years) at the cardiology department of Sikasso Hospital Mali.

The diagnosis was retained on the basis of clinical and electrocardiographic arguments. Fibrinolysis was performed with streptokinase at a dose of 1.5 million international units in an electric syringe during 1 hour under monitoring.

The parameters studied concerned epidemiological data and antecedents. The economic profile was assessed by occupation, number of persons in charge, monthly income of the patient.

All the parameters collected had been recorded and the treatment instituted had been noted. The patients were followed during the hospitalization and after discharge to know their evolution. Mask, data entry and analysis were done with the Word 2007 and SPSS

17.0 French version for Windows software.

Results

Of 1237 patients hospitalized in the cardiology department of the hospital of Sikasso, 177 patients had ischemic heart disease either a prevalence of 14.3% and 37 patients for acute coronary syndrome or 2.99%. Only 24 patients had fibrinolysis, a prevalence of (64.86%) ACS and a hospital prevalence of 1.94% with a male predominance (sex ratio of 3). The average age was 50 years old. Half of the patients were civilian servants (50%). More than half of the patients (83.3%) were Malians. Stress-related smoking being the highest in patients (20.8%), followed by the association of high blood pressure and diabetes (16%). These risk factors are represented in figure 1.

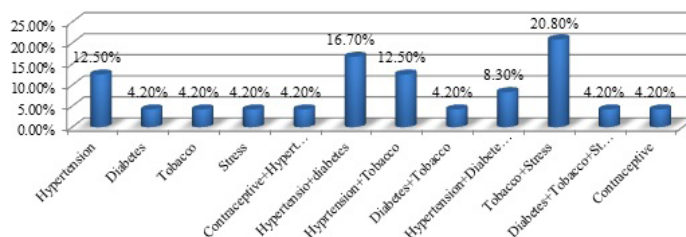


Figure 1: Dispatching of risk factors cardiovascular.

The symptomatology dominated by angina, typical in 20 patients (83.33%). The cardiovascular examination was abnormal in 10 patients (41.66%). The troponin was positive in 7 patients (29%). In a decreasing order, on the ECG, the extended anterior territory was the most affected (41.7%) followed by the inferior territory (20.8%). All patients (100%) benefited from ultrasound, left ventricular systolic function was preserved in 19 patients (79.16%), akinesia was the most frequent kinetic abnormality (n = 10), and anterior wall involvement predominated (n = 10). 15 Four patients underwent coronary angiography in a foreign setting; mono-truncular lesion in 1 patient, bi-truncular in 2 patients and tri-truncular in 1 patient. The tri-truncular lesion benefited from quadruple coronary bypass grafting with the left internal thoracic artery bridged to the anterior ventricular and circumflex arteries; and a saphenous graft with retro-ventricular and posterior interventricular. All patients (100%) had fibrinolysis with streptokinase. Twenty-nine point two percent (29.2%) of patients had complications during fibrinolysis with (8.3%) haemorrhagic stroke. The lethality in the series was 25%. One hundred percent (100%) of patients who had fibrinolysis before the first 6 hours had a favorable outcome, while 37.5% of patients had died after the first 6 hours. the complications of thrombolysis are shown in Tables I and II.

Fibrinolysis complication	Effective	Percentage
Stroke hemorrhage	2	8,3
Hemorrhage digestive	1	4,2
None	21	87,5
Total	24	100

Table 1: Dispatching of fibrinolysis complication.

		Exit to department		Total
		Favorable	Death	
Interval of start fibrinolysis	Before 6 hours	8 (100%)	0 (0%)	8 (100%)
	After 6 hours	10 (62,5%)	6 (37,5%)	16 (100%)
Total				

Table 2: Dispatching of interval start fibrinolysis and exit to department.

Discussion

STEMI is a major public health problem because of its frequency in the world. In the study their hospital prevalence was 1.94%, in the literature [2,7], it was 4.7% in Noundjeu F and Yolande Y. This difference would be explained by the duration of our studies, difficulties of access to care, the lack of information, the absence of pre-hospital medicine and the size of our serie. Men are more represented (75%) with a sex ratio of 3. This result is comparable to those of Noundjeu F [7], in Bamako and Koffi J [8], in Abidjan respectively 76% and 82%. In agreement with the literature [7], the age group of 40 to 50 years is more represented (45,8%). This severely affected age group is related to African life expectancy but also to the importance of cardiovascular risk factors in the juvenile population. In women, it should be noted the absence of STEMI between 30 to 40 years whose explanation is the presence of estrogen before menopause that would protect against the occurrence of ACS. Half of the patients were civilian servants (50%), which is much higher than that of Traoré SI (5.5%) [9], because of the impact of work stress, the level of education, the financial resources but also by greater attendance of this social stratum at the first signs of the disease. More than half of the patients (83.3%) were Malians, the reason for this is the proximity of the cardiology service, with stress-related smoking being the most common in patients (20.8%) followed by hypertension-Diabetes (16.7%), unlike our study Yolande Y [2], and Noundjeu F [7], had a high frequency of the combination Tobacco-hypertension respectively 10% and 16.6%. Because of this comparison, we note the weight of hypertension and smoking that warrants careful surveillance Twenty-nine point two percent (29.2%) of patients had a troponin positive, much higher than that of Yolande Y [2], (12%) .In a decreasing order,on ecg, the extended anterior territory was most affected (41.7%) followed by the inferior territory (20.8%) These results are close to those of Yolande Y [2], (55.5%) and (33.3%) of cases Ba A [10], observed 69.4% of previous MI cases in his study. Sanchez S [11], confirms this topography with a predominant anterior location in 64.7% of cases. Kingue S in Cameroon found anterior location in 73% of cases of infarction [12]. One hundred percent of our patients benefited from trans-thoracic echocardiography. In their series Yolande. Y [2], and Sanchez S [11], reported 72 and 70.58% respectively.

Segmental or global kinetic abnormalities are frequently encountered in coronary disease, especially since echocardiography is used to locate the necrotic zone.

Forty-one point seven percent (41.7%) of the patients in the study had septal akinesia on cardiac ultrasound. In our series 62.5% of patients had a hospital stay of between 5 to 10 days. This result

corroborates the data from the literature [7,8]. Seventy point eight percent (70.8%) of the patients had no complication during thrombolysis. This rate is almost equal to that of Traoré G (70%) [13], but higher than the Yolande rate. Y (58%) [2]. The lethality in the series was 25%. Wade A [14], reported in his study 21% of deaths and Yolande Y [2], in Senegal recorded 70% of deaths in his study. One hundred percent (100%) of patients who had thrombolysis before the first 6 hours had a favorable outcome, whereas 37.5% of deaths were recorded in patients undergoing fibrinolysis after the first 6 hours. The therapeutic benefits of thrombolysis before the first 6 hours of the onset of pain are optimal, which probably explains the absence of death at this time in the study. The handling of thrombolysis in our regions remains shy. This lack of enthusiasm is especially justified by the expensive prices of thrombolytic drugs which remain the privilege of a wealthy social category. Research that focused on the ideal thrombolytic design also considered costs as a function of efficacy (ASSENT-3). Therefore, this economic question, far from being African, also concerns the developed countries. Data on the use of financial resources in the global management of acute coronary syndrome in our countries, are difficult to estimate. At Sikasso hospital, the average cost of hospitalization in the cardiology department of an acute coronary syndrome thrombolysed by streptokinase is about 200,000 CFA francs (308 Euros): this is a high amount relatively to average income of the general population of Sikasso. In developed countries, the average cost is 3429 euros for a patient hospitalized and benefiting fibrinolysis with streptokinase.

Conclusion

For a long time considered as the particularity of the industrialized countries, the STEMI is characterized in our context, by severe and evolved forms, attested by the clinical aspect at the admission and by a high hospital mortality rate.

The prognosis of the patient depends on the precocity of the fibrinolysis whose benefits are optimal in the first hours.

Particular emphasis should be placed on the prevention and early detection of the scourge of atherosclerosis and other risk factors associated with it.

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