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## Hyperglycaemia and Prognosis of Acute Coronary Syndrome in Black Patients in Lome (Togo)

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**Abstract:** The objectives of the study were to estimate the vital prognosis while taking into accounts the glycaemia of patients having done an ACS. It is a prospective study carried-out over a year, from January 1st to December 31st 2008 in 3 sanitary institutions of Lome town. All the patients benefited from a cardiovascular investigation comprising a surface EKG with 12 leads and dosage of troponine and glycaemia. The data were treated by a computer tool. A total of 32 patients were admitted for acute coronary syndrome. Five (15.62%) patients were known diabetics before the event. The glycaemia on admission was  $8.96 \pm 4.89$  mmol L<sup>-1</sup> ( $4.29$ - $25.14$  mmol L<sup>-1</sup>) on average. Glycaemia superior to 7 mmol L<sup>-1</sup> was found in 20 (62.5%) patients and a glycaemia between 3.9-7 mmol l in 3 (9.37%) patients. In 12 (28.12%) patients the glycaemia on admission was normal. Three (9.37%) patients died in hospital environment that is two (6.25%) by cardiogenic shock and one (3.12%) by diabetic coma. All the patients whose died had a glycaemia superior to 7 mmol L<sup>-1</sup> on admission. The mortality rate was 15%. This rate increased to 25% during a 4 months follow-up. Hyperglycaemia must be systematically found in patients admitted for acute coronary syndrome because it constitutes a bad prognostic factor.

**Key words:** Acute coronary syndrome, black race, glycaemia, mortality, Lome

### INTRODUCTION

During the Acute Coronary Syndrome (ACS), an admission hyperglycaemia is found at more than 50% of the patients (Cottin *et al.*, 2005). This hyperglycaemia is not only due to the acute metabolic stress dependent on the infarction but also on a pre-existent anomaly of the metabolism of glucose among these patients (Norhammar *et al.*, 2002).

With regular increase in the prevalence of the diabetes, an increasingly important proportion of the coronary patients is diabetic. In the RICO study (Zeller *et al.*, 2004) the frequency of the anomalies of the glucidic metabolism was evaluated in a population all coming from 999 hospitalized infarctions. An authenticated diabetes, characterized by a glycaemia with jeun  $\geq 7$  mmol L<sup>-1</sup> or a clinical history of diabetes is found at 38% of the patients. In addition to this group, 15% have an intolerance with glucose (glycemia with jeun ranging between 6,1 and 7 mmol L<sup>-1</sup>). Of long time, the diabetes was recognized like a factor of bad forecast in myocardial infarction and, more generally, in the acute coronary syndromes, as well as regards the hospital mortality as of clinical evolution in the long run (Malmberg and Ryden, 1988; Malmberg *et al.*, 1999, 2005). More recently, attention is related to importance of the glucidic metabolism at the acute stage of myocardial infarction

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among patients who were not known until there like diabetics (Norhammar *et al.*, 2002; Stranders *et al.*, 2004; Zeller *et al.*, 2004). Starting from concordant observations emanating several recent clinical work, it is now established that the anomalies of the glucidic metabolism, being able to answer the definition; an authentic diabetes or with that a simple intolerance with glucose are particularly frequent during the acute coronary syndromes and that noted admission hyperglycaemia among patients not diabetics is a powerful marker of early and long-term mortality (Kadri *et al.*, 2005). Present objectives were to estimate the vital prognosis while taking into accounts the glycaemia of patients having done an ACS in Lome (Togo).

## **MATERIALS AND METHODS**

It is a prospective multicentric study concerning patients admitted for acute coronary syndrome, over a period of one year, from January 1st to December 31st 2008. The study was carried-out in three sanitary institutions of Lome town: the campus University Teaching Hospital (UTH) (2nd national reference center) the Bè hospital (reference center of council 3 of Lome area, representing the 6th sanitary area of Togo) and the medical center Bonne Espérance. All the patients were followed by a cardiologist doctor were included in our study, patients of black race admitted during the period of our study, in whom an acute coronary syndrome was diagnosed and a glycaemia done on admission.

Surface EKG with 12 leads was done at rest. The recording of the EKG was done following the conventional technique with portable camera of make Marquette Hellige stallionned at 1 millivolt for 10 m sec. The paper speed of sequence was 25 mm sec<sup>-1</sup>. The lines were interpreted by the same cardiologist.

The analysis of blood samples and interpretation of results were done by the laboratories of haematology-biochemistry of Campus UTH and Bè hospital.

- The normal glycaemia was between 3.9 and 5.6 mmol L<sup>-1</sup>. A glycaemia >5.6 mmol L<sup>-1</sup> and <7 mmol L<sup>-1</sup> was defined as non diabetic hyperglycaemia (NDHG) and a glycaemia >7 mmol L<sup>-1</sup> was defined as a diabetic hyperglycaemia
- Myocardial infarction with a gap of ST segment (MIST+) was defined by the association of a chest pain, EKG signs (ST segment gap including T wave) and biology (elevated troponine I)
- Myocardial infarction without a gap of ST segment (MIST-) was defined by the association of chest pain, EKG signs (T wave negative or positive) and biological (Troponine I high)
- Unstable Angina Pectoris (AP) was defined by the association of chest pain, EKG signs (T wave negative or positive) and biological (Normal troponine I)

Treatment of data was achieved by soft ware Epi – Info version 6.04 fr

## **RESULTS AND DISCUSSION**

Five hundred and sixteen patients were hospitalized including 32 cases (6.2%) of acute coronary syndrome. Fifteen patients (46.90%) were males and 17 (53.10%) were female, sex-ratio was 0.88. The Middle age of our patients was of 53.03±15.31 years with extremes of 30 and 92 years. The statistical difference observed between the Middle age of the women (56.23±14.56) and that of the men (49.6±15.71) was not significant with the threshold of 5% (p = 0.22).

Table 1 shows the distribution of patients according to the glycaemia on admission. The glycaemia on admission was measured out in all the patients. It was  $8.96 \pm 4.89 \text{ mmol L}^{-1}$  ( $4.29\text{-}25.14 \text{ mmol L}^{-1}$ ) on average. A hyperglycaemia was present in 71.87% of patients. Three (9.4%) patients had a non diabetic hyperglycaemia (NDHG) and 62.50% a diabetic hyperglycaemia. Only 5 (15.62%) patients were known diabetic before the event. Insulin was used in 15.63% of cases and oral anti diabetics in 46.87% of cases.

Three (9.37%) patients died in hospital environment that is two (6.25%) by cardiogenic shock and one (3.12%) by diabetic coma. All the patients dead had hyperglycaemia on admission. The mortality rate was 15%. This rate increased to 25% in a course of a follow-up of 4 months. All the five patients dead were diabetic. Table 2 shows the distribution of deaths according to age, the sex, the diagnosis, the circumstance of occurrence and the period of follow-up.

Persnet study took place in a specialized environment. In the absence of financing, patients took care of all the investigations fees; this explains why complete investigations (daily glycaemia, haemoglobin) were not done for all the patients.

The rate of admission hyperglycaemia in our study (71.87%) was superior to that of RICO's study (53%) (Zeller *et al.*, 2004). However, the rate of known diabetic before the event was higher in RICO's study (21%) than in our's. The difference between hyperglycaemia on admission of RICO study and our study could be explained by the small size of on specimen. Stress hyperglycaemia occurring during myocardial infarction is a gravity factor (Cottin *et al.*, 2005). The meta-analysis of Capes *et al.* (2000) has showed that a glycaemia on admission between  $6.1$  and  $8.0 \text{ mmol L}^{-1}$  in a non diabetic population is associated to an increase risk of hospital mortality and also to the occurrence of cardiac failure and cardiogenic shock. In present study, among the patients not known diabetic who had diabetic hyperglycaemia on admission, five (15.62%) patients presented a left ventricular failure that is 4 (12.5%) of class II of Killip and one (3.12%) of class IV of Killip.

The 15.63% patients benefited of insulin therapy on admission. The use of insulin for balance of hyperglycaemia in these patients lies on the results of DIGAMI study. In this study, which the objective was to avoid glycaemia superior to  $11.83 \text{ mmol L}^{-1}$ , intensive insulin therapy might enable to reduce the mortality by 11%. One life was saved out of nine patients treated (Malmberg *et al.*, 1999). However, DIGAMI 2 study didn't confirm these results and justifies the use of oral anti diabetic in fifteen (46.87%) others patients to obtain a glycaemia balance.

In a diabetic patient diagnosed before the occurrence of ACS and whatever be the anti diabetic treatment, the value of glycaemia on admission is a major diagnostic element (Cottin *et al.*, 2005). In present study, all the five patients' dead were diabetic.

The hospital mortality rate in the diabetic population of our study (9.37%) was inferior to that of Wahab *et al.* (2002) (18.3%) however, the mortality rate after a 4 months follow

Table 1: The distribution of patients according to the glycaemia on admission

Glycaemia on admission	Number	Percentage
$<3.9 \text{ mmol L}^{-1}$	9	28.12
$3.9\text{-}7 \text{ mmol L}^{-1}$	3	9.37
$>7 \text{ mmol L}^{-1}$	20	62.50
Total	32	100.00

Table 2: Distribution of deaths according to the sex, diagnosis, circumstance of occurrence and period of follow-up

Age (years)	Sex	Diagnosis	Circumstance of deaths	Period of follow up
92	Male	MIST+	Cardiogenic shock	3 h
66	Female	MIST+	Cardiogenic shock	4 h
67	Male	MIST+	Diabetic coma	7 days
70	Female	MIST+	Sudden death at home	1 months
80	Female	MIST-	Sudden death at home	4 months

up was 100% in the diabetic population. This shows the prognostic value of hyperglycaemia at the acute phase of myocardial infarction in a diabetic subject. The difference of death rate between our study and Wahab *et al.* (2002) can explain by the small size of our sample.

### CONCLUSION

The glycaemia thus constitutes a simple marker making it possible to contribute to the stratification of the risk among patients presenting an acute coronary syndrome and that including at the subjects not diabetics. Hyperglycaemia is frequent in acute coronary syndrome. It remains a factor of bad forecast in myocardial infarction. The measurement of the glycaemia must belong to the systematic assessment of any patient admitted for acute coronary syndrome.

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