

Factors Associated to the Acute Metabolic Decompensation of Diabetes in Lome

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Abstract

The purpose of the study was to define basic factors of the acute metabolic decompensations of diabetes mellitus at the medical emergency units at the CHU-SO of Lomé. The question is about a prospective study carried on along 12 months from 1st January, to December 31, 2013. It implicated 83 diabetes patients known or unknown admitted at the casualty department for an acute metabolic complication. In total the frequency of acute metabolic complications of diabetes mellitus that have been essentially done through the ketoacidosis model (73.49%) and hypoglycaemic (26.5%) is of 23.38%. Majority of diabetes patients were of type 2 (68.66%) and aged 50 and over with a sex-ratio of 0.76. The ketoacidosis revealed the disease in 43.37% cases. The main factors of ketoacidosis decompensations were infections, treatment termination and myocarditis ischaemia. Hypoglycemia decompensation factors were due to the absence or deficiency of food, the overdosage. Metabolic complications of diabetes then remain frequent. Infection and treatment termination are the major factors of ketoacidosis decompensation whereas those of the absence or deficiency of food are that of hypoglycemia. The prevention is compulsory through early screening of the disease and high treatment awareness of diabetes patients.

Keywords

Diabetes, Ketoacidosis Hypoglycemia, Cause, Prevention

1. Introduction

Diabetes is a chronic disease that affects a great number of people worldwide. [1]. If in the past diabetes caused the death of people in developed countries, de-

veloping countries today are not in safety [1] [2]. Its evolution is speckled with complications namely acute metabolic complications which caused the admission of a great number of people at the emergency services and intensive care unit at a mortality rate estimated at 30.8% [3] in Morocco and at 28.1% in Mali [4]. The gravity of these complications leads to the recognition of its factors leading to their right treatment and their prevention. Hence the interest of our study aims to study the factors profile at the origin of the acute metabolic complications of the disease in Lomé.

2. Patients and Methods

It was a prospective transversal and descriptive study over twelve months, from 1st January to December 31, 2013. It took place in the medical emergency department of Sylvanus Olympio Teaching Hospital of Lomé. Our study concerned all known and unknown diabetic patients who were admitted to medical emergencies for acute metabolic complications (ketoacidosis, hyperosmolar hyperglycemia syndrome, hypoglycemia). The diagnosis of ketoacidosis was based on a hyperglycemia superior or equal to 2.5 g/l, glycosuria and ketonuria. The diagnosis of hyperglycemia-hyperosmolar syndrome was based on dehydration, hyperglycemia superior or equal to 6 g/l, an absence of ketonuria, and hyperosmolarity above 350 mmol/l. The diagnosis of hypoglycemia was based on a glycemia inferior to 0.6 g/l. Were not included patients who don't agree to participate to this study.

Parameters studied for each patient are as follow: epidemiological factors (age, sex, socio-professional status), type of diabetes, clinical manifestations at admission, type of acute metabolic decompensation, decompensation factors (at clinical and paraclinical examination). The systematic paraclinical check-up of all patients was glycemia, urinary test strip (glycosuria, ketonuria, albuminuria, nitrites, PH); hemogram, blood ionogram, uremia, serum creatinine, thick blood (looking for plasmodium), cytobacteriological study of urine, and electrocardiogram. Other assessments were as a result of the symptomatology and the progressive modalities under treatment. The Khi-2 test was used to assess the significance while associated with $p < 0.05$.

3. Results

3.1. Epidemiological Aspects

During our period of listening, 83 had suffered acute metabolic complications out of 355 diabetics admitted to the unit that is 23.83% of rate. The frequency of metabolic complications increased to 60 years old people and regresses beyond. The females were the most concerned with a sex ratio of 0.76 (36 men versus 47 women). In most cases housewives were represented at a rate of 45.78%. Noninsulin-dependent diabetes was represented in 68.66% compared to 31.34% for insulin-dependent diabetes. If 43.37% of diabetes patients are unaware of their disease, 56.62% were known and were under treatment of which 33 under an

oral antidiabetic and 14 under insulin.

3.2. Clinical Aspects

The most frequent clinical manifestations at polypnee admission (N = 35), coma (N = 29), fever (N = 25), deterioration of general state of health (N = 23), dehydration (N = 18), polyuria-polydipsia (N = 17).

The types of metabolic decompensation were ketoacidosis (73.49%) and hypoglycemia (26.51%).

3.3. Decompensation Factors

The most common ketoacidosis decompensation factors were infection (52.46%) and treatment termination (23%) as shown in **Table 1**.

These different factors of decompensation were statistically connected to the ketoacidosis with a χ^2 to 127.89 and a $p < 0.01$.

The most frequent found infections were those in soft tissues (28.12%), malaria (25%) and urinary infections (12.5%) as shown in **Table 2**.

Table 1. Distribution of patients according to decompensation factors.

Decompensation factors acidocetosique (ketoacidosis)	Number	Percentage
Infection	32	52.46
Treatment termination	14	23
Myocardic ischemia	4	6.56
Corticotherapy	2	3.28
Pregnancy	1	1.64
Thrombophlebitis	1	1.64
Traditional medicine	2	3.28
Unspecified factors	14	23

Table 2. Distribution of patients regarding infection.

Infection	Effective	Percentage
Infection of the skin and soft part	9	28.12
Malaria	8	25
urinary infections	4	12.5
General infection	3	9.37
Pulmonary Tuberculosis	3	9.37
Lung disease of trivial germ	2	6.25
Feverish acute gastroenteritis	2	6.25
Viral B Hepatitis	1	3.12
Total	32	100

Concerning hypoglycemia, factors associated with the hypoglycemic decompensation were respectively due to the absence or deficiency of food after taking antidiabetic medicines (81.81%) and the overdosage of antidiabetic medicines (9.09%) with a test of khi2 a p to 0.0029.

4. Discussion

4.1. Epidemiological Aspects

We recorded 83 cases of acute metabolic complications of diabetes out of 355 diabetics admitted at the unit, that is to say a frequency of 23.38%, similar to those reported by Sow [5] in Dakar and by Ouédraogo [6] in Ouagadougou respectively 23% and 22.86%. But one should note that the frequency of these complications is differently appreciated by African authors [4] [7] [8].

Our study observed a frequent growth of metabolic complications of people getting to 60 years of age and a regression after this age. This gradual decrease in these complications could be explained by the short life expectancy in our countries. This same observation was made by Diakité [4] in Mali in 2010, but its peak was 70 years, coping with the European data especially the French ones which estimate that the increase is observed up to 75 years and strongly decreases beyond due to the excess of diabetic mortality [9]. As we consider sex, the sex ratio is differently reported according to sets of studies [4] [6] [10].

Acute metabolic complications have more affected low-income groups in our study. This same observation was made by Wright [11] in England in 2009 whom study reported nearly 32% of decompensation patients being unemployed. The predominance of metabolic complications in this socio-economic level may be explained not only by the lack of therapeutic respect but also by that of medical follow-up due to limited financial means.

4.2. Clinical Aspects

Clinical manifestations at admission are dominated by coma (34.91%), fever (30.12%), impairment of general health (27.71%), digestive disorders (31.32%) and dehydration (20.48%). This clinical profile remains classic. But it is reported at various frequencies according to sets of studies [4] [6] [10].

4.3. Hyperglycemia Decompensation Factors

4.3.1. Infections

They were the main mode of hyperglycemic decompensation. Infections are one of the most frequent and serious of recurrent complications of diabetes. [12]. On the one hand diabetes favours immunodepression for infections and on the other hand, infections favour the decompensation of diabetes. It results in a vicious circle hard to separate [13]. The infectious sites remain the same with a distribution, reported in various ways in the study [10]. Infections of the skin and soft tissues (leg erysipelas, boil, diabetes at the foot, over-infected bed sore) mostly drew our attention as well as in [14] series opposed to some studies which con-

sider them in the second place [4] [8] [15]. This difference of opinion could be explained by the particularity of the bacterial area, climate or lifestyle (poor corporal hygiene) with regard to the regions where the works are carried out. Regarding the 5 cases of pulmonary infections, lung tuberculosis has been noted with three patients. Indeed, the incidence of tuberculosis remains two to three times greater in diabetes patients than in non-diabetics. Radi reported two cases in his sets of study (6.6%) of pleuropneumonia infections including one Fendi tuberculosis [16] and Mbadinga-Mupangu [17] got respectively in their series 15% and 5.2% of respiratory infections. Urogenital infections caused the ketoacidosis decompensation in 7 patients. Indeed, most of the time, urinary infection in the diabetes patient is asymptomatic and therefore develop silently and can be complicated by pyelonephritis in patients already at a risk, some of nephropathy diabetes.

4.3.2. Termination of Treatment

It is preceded by infection in second position. The reasons for this treatment termination were: weariness of treatment, financial issues and religious beliefs. Indeed, the quality of treatment observance remains a major problem in the caring of chronic diseases, and the financial problem as well as religious beliefs constitute the major obstacles to access to treatment in developing countries [17] [18] [19]. A national policy of free antidiabetic drugs must be considered in our countries. Moreover, ethno-cultural approach of the disease has to be taken into account in therapy education so as to optimize the caring of patients.

4.3.3. Myocardial Ischemia

We dealt with four of our patients. In his set Sarr [10] also reported myocardial ischemia as a factor of ketoacidosis decompensation. Painless ischemia occurrence and an acute myocardial infarct in a diabetes patient is much higher compared to non-diabetics [20]. These patients with myocardial infarction have a poor prognosis and hyperglycemia on admission and is as a result a predictive hospital mortality factor.

4.3.4. Corticotherapy

Two of our patients have decompensated because of corticosteroid treatment. Corticosteroids induce insulin resistance. They reduce the effect of insulin by increasing gluconeogenesis and lowering the collecting and use of possibilities of glucose by peripheral tissues [21]. However, diabetes imbalance is higher if the level of glyceric hemoglobin exceeds 8% and when age and body mass index are high [21].

4.3.5. The Pregnancy

Pregnancy originated the inaugural ketoacidosis decompensation in one of our patients. It was a question of an extra-uterine pregnancy. One must note that the retention of dead egg has been reported as a cause of ketoacidosis decompensation by Sarr [10]. So one must insist more on diabetes screening of our people

and on treatment awareness because a pregnancy does with metabolic preparation and the conception must be conceived by controlling glycaemia and consider a perfect normalized glycemic hemoglobin.

4.3.6. Undefined Factors

In our sets, it was not possible to find the active factor in 16.87%. In the Fendi sets [16], ketosis remains unclear in two cases. In Sarr's [10], no etiological factor was found in 6.84% cases. As for Mbadanga-Mupangu [17], he reported 12.3% of undefined factors.

4.4. Hypoglycemic Decompensation Factors

The absence or deficiency of meals after taking antidiabetic medicine has been the most frequent cause of hypoglycemia in our study. This result matches with that of Sihem's [22] which requires a good education of diabetes treatment. The overdose of antidiabetic drugs reported in our sets has also been reported by Sihem [22].

5. Conclusion

Despite the improvement of diabetes patients' caretaking, the acute metabolic complications of diabetes mellitus remain relatively frequent still with a little and unclear prognosis. Prevention of these decompensations necessarily is possible not only by an early screening of the disease but also by quality of treatment awareness of any diabetic patient and people around him.

Conflicts of Interest

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

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