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Research Article

Hypoglycemia and Alcoholic Coma in the Polyvalent Resuscitation Department of the Chu Tambohobe Fianarantsoa

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Abstract

Introduction: Alcoholic coma is a pathology frequently encountered in intensive care. The presence of hypoglycemia is an aggravating factor that is associated with high morbidity. Our goal is to determine the prevalence of hypoglycemia in hospitalized patients undergoing resuscitation for alcoholic coma.

Methods: This is a retrospective descriptive study performed in the multipurpose intensive care unit of the Tambohobe University Hospital Center in Fianarantsoa, Madagascar. The study period was 24 months from January 2015 to December 2016. The study involved patients admitted for alcoholic coma

Results: Thirty patients were retained. Their average age was 43.43 years old. Male predominance was noted (90%). The prevalence of hypoglycemia was 40%. Chronic alcoholism was reported in 83%. Factors associated with the occurrence of hypoglycemia were low body mass index (p = 0.007) and fasting prior to alcohol intake (p = 0.014). The mortality rate was 43%. Hypoglycemia was significantly associated with the occurrence of death (p = 0.004).

Conclusion: The prevalence of hypoglycemia during alcoholic coma is high. The presence of hypoglycemia is associated with a pejorative evolution. Routine capillary blood glucose measurement with acute ethyl intoxication is recommended with rapid correction in the presence of hypoglycemia.

Keywords: *Alcoholic Coma; Hypoglycemia; Chronic Alcoholism; Mortality*

Introduction

The term "alcohol" includes ethanol, methanol, propanol, isopropyl alcohol, and other alcohols. Consumption of alcohol during fasting state, in subjects without diabetes and/or liver disease, may cause severe hypoglycemia often misdiagnosed [1]. Alcoholic hypoglycemia is due to inhibition of gluconeogenesis by ethanol [2]. In France, a ten-year study from 2000 to 2009 reported a prevalence of alcoholic hypoglycemia of 0.42% [3]. One of the possible consequences of this alcoholic hypoglycemia is the occurrence of an alcoholic coma, the most common of which is ethyl coma [1]. Ethyl coma usually occurs between 2 to 4 grams of alcohol per liter of blood. In Madagascar, hypoglycemia of less than 0.5 g/l is observed in 48.07% of patients intoxicated with alcohol [4]. In our department, no studies have been conducted to determine the prevalence of alcoholic hypoglycemia. The objective of this study is to determine the prevalence of hypoglycemia in hospitalized patients for alcoholic coma in multi-site resuscitation.

Patients and Methods

This was a retrospective study performed in the Resuscitation Department of the Fianarantsoa Teaching Hospital for a period of 24 months, from January 2015 to December 2016.

The medical file and the hospitalization record of the intensive care unit constituted the data sources. All patients admitted to the adult intensive care unit for alcoholic coma after a stay in the Emergency Department were recruited. The study included, all patients hospitalized for alcoholic coma in the resuscitation department of Tambohobe Teaching Hospital, Fianarantsoa. The criteria for non-inclusion were non-alcoholic coma, non-comatose acute alcoholic intoxications, acute alcohol poisoning associated with other toxic products and hypoglycemic drugs. The patients had a determination of the capillary blood glucose before the implementation of a glucose infusion and after starting a perfusion of glucose serum. The exclusion criteria were incomplete files. The diagnosis of an alcoholic coma was made on the basis of the collection of the anamnesis and the clinical examination with a Glasgow score of less than 9. The alcoholic coma was secondary to either an ethyl alcohol or a methyl alcohol or to an alcohol. As alcoholic hypoglycemia, we used a blood glucose level of less than 0.5 g/l. The parameters studied were age, gender, body mass index, activity sector, fasting before ethanol intake, chronic liver disease associated with a biological diagnosis based on the existence of thrombocytopenia and decreased prothrombin levels, a history of diabetes, chronic alcoholism, and discharge (transfer to a care unit or death in the intensive care unit). The addict was considered fasting when the last meal is at least 6 hours before drinking. For any patient suspected of being intoxicated, the time of the last meal was routinely recorded by the emergency department staff, as well as a capillary blood glucose level. Chronic alcoholism is due to excessive alcohol consumption (more than 3 drinks a day for men and 2 drinks a day for women). Data was entered on Excel software and data analysis was performed on IBM SPSS Statistics 22.0 software.

The Chi-square test was used to study the comparison of qualitative variables. The threshold of significance retained from p was 0.05.

Results

Thirty patients were selected for this study. The socio-demographic characteristics of the patients are summarized in table 1. The mean age of the patients was 43.43 years (range 18 days to 68 years). Alcoholic coma affected men in 90% of cases (n = 27), with a sex ratio of 9/1.

Parameters		Number (n)	Frequency (%)
Age bracket	[15-30]	7	23
	[30-45]	10	33
	[45-60]	9	30
	> 60	4	13
Sex	Male	27	90
	Female	3	10
Body Mass Index	< 18.5	22	73
	[18.5 - 24.9]	8	26
Sector of activity	Primary	22	73
	Secondary	8	26
Alcoholic habit	Chronic alcoholism	25	83
	Occasional	5	5
Meal before taking alcohol	With an empty stomach	23	76
	Food intake	7	23
Biological hepatitis	Biological anomaly	12	40
	Without biological anomaly	18	60
Blood glucose level	≤ 0,50 g/L	12	40
	≥ 0,51 g/L	18	60
Output mode	Death	13	43
	Living	17	57

Table 1: *Socio-demographic characteristics of patients (n = 30).*

Twelve patients (40%) had hypoglycemia less than 0.5 g/L. The characteristic of the patients according to their glycemia are summarized in table 2. The Body Mass Index less than 18.5 was 73% (n = 22) of alcoholic comatose. Of the 22 patients with Body Mass Index less than 18.5, twelve (54%) had hypoglycemia less than 0.5 g / L (p = 0.007). The majority of patients drank alcohol on an empty stomach (76.7%, n = 23). Hypoglycemia affected 56% of fasting patients (p = 0.014). Alcoholic coma affected workers in the primary sector in 73% (n = 22). Thrombocytopenia and decreased prothrombin levels were observed in 40% (n = 12) of alcoholic comas. Thrombocytopenia and decreased prothrombin levels were associated with hypoglycemia in 58% (7 out of 12) (p = 0.094) but the difference was not significant. Chronic alcoholism was observed in 83% (n = 25) of alcoholic comas with 11 cases of hypoglycemia. The mortality rate was 43% (n = 13). Nine patients who died had hypoglycemia (p = 0.004).

Characteristic of the patients according to their glycemia		Glycemia ≥ 0.51 g/L (n = 18)	Glycemia ≤ 0.50 g/L (n = 12)	P value
Age bracket	[15 - 30]	4	3	NS
	[30 - 45]	7	3	NS
	[45 - 60]	4	5	NS
	> 60	3	1	NS
Sex	male	16	11	NS
	female	2	1	NS
Body Mass Index	< 18.5	10	12	0.007
	[18.5 - 24.9]	8	0	0.007
Sector of activity	Primary	12	10	NS
	Secondary	6	2	NS
Alcoholic habit	Chronic alcoholism	14	11	NS
	Occasional	4	1	NS
Meal before taking alcohol	With an empty stomach	11	12	0,014
	Food intake	7	0	0,014
Biological hepatitis	Biological anomaly	6	6	NS
	Without biological anomaly	12	6	NS
Output mode	Death	4	9	0,004
	Living	14	3	0,004

Table 2: *Characteristic of the patients according to their glycemia.*
NS= Not Significant

Discussion

This study shows a high frequency of hypoglycemia in alcoholic comatose (12/18 patients). The contributing factors of alcoholic hypoglycemia are precarious stool-weight status and fasting alcoholism. Indeed, the liver plays a key role in carbohydrate homeostasis through its "capacity" for glycogenolysis and gluconeogenesis. During fasting, the ability of hepatic gluconeogenesis is paramount. Its deficiency can induce hypoglycemia. The hypoglycemic effect of alcohol was first attributed to toxic contaminants in beverages, but it is now established that it results from the inhibition of gluconeogenesis by ethanol, secondarily to changes in potential redox intra-hepatic [5,6].

The occurrence of alcoholic coma in patients over 40 years of age is well established [3,6]. After midlife, chronic alcoholics would no longer be able to control their alcohol consumption. One study reported that the prevalence of alcoholic hypoglycemia increases with age [3].

The rate of hypoglycemia of 40% that we found is much higher than those of the developed countries as the France [3], where the prevalence of alcohol hypoglycemia (less than 0.5 g/L) was 0.42%. The prevalence of alcohol hypoglycemia is lower in the absence of favoring factors [3]. Diabetes was found in more than one case out of two, liver disease one time out of three and undernutrition or a young one in three. A hypoglycemic drug is found six times out of ten [3]. In developing countries, the frequent occurrence of alcohol hypoglycemia can be explained by the precarious state of weight of the intoxicated as shown by our study. Chronic malnutrition is also noticed in alcoholics that in turn inhibits release of free fatty acids from adipose tissue and decreases the gluconeogenesis [7]. The disadvantaged social classes are more affected by alcoholic coma [4] as our 73.3% of patients working in the primary sector which is part of the disadvantaged social classes. This explains the intake of fasting alcohol which is becoming more common.

The alcoholic would prefer to buy alcohol at the expense of food. On the other hand, acute alcoholism increases the secretion of insulin, resulting in hypoglycemia. In fact, acute alcoholism leads to hyperinsulinism linked to a specific increase in blood flow in the islets of Langerhans [8,9].

In developed countries, alcohol hypoglycemia is rare and occurs in fasting or under-nourished subjects within 6 to 24 hours of ingestion [1]. Other contributing factors include malnutrition, hepatitis, diabetes and hypoglycemic medication [3]. In other words, alcohol is not the only factor that promotes hypoglycemia in alcohol-addicted patients [3].

The incidence of alcohol-induced hypoglycemia varies according to the social and ethnic origin of the population studied [1]. For our patients, alcoholic hypoglycemia seems to be favored by fasting before and during alcohol ingestion and undernutrition. Alcoholic subjects belonging to the underprivileged social class are used to drinking on an empty stomach. They replace food with alcohol.

The very high mortality rate that we found could be explained by undernutrition and fasting before and during the ingestion of alcohol. Hypoglycemia is one of the factors of mortality of alcoholic comas and its research must be systematic before any coma alcoholic, as well as the factors favoring its occurrence. Early management of hypoglycemia and other factors of severity may lower mortality from this intoxication.

Conclusion

This study shows that the prevalence of alcoholic hypoglycemia remains high in the resource-poor country like ours. The contributing factors of hypoglycemia observed were fasting before ingestion of alcohol and undernutrition. To reduce the mortality rate of alcoholic comas, it would be necessary to systematically look for hypoglycemia in alcoholic comatose and monitor blood sugar.

This study would benefit from another study with more staff on the incidence of hypoglycemia in patients exposed to alcohol and patients not exposed to alcohol.

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