ORIGINAL RESEARCH PAPER

Toxicology

KEY WORDS: Acute Poisoning, Muscarinic Syndrome, Toxicology, Madagascar

ACUTE POISONING AT THE CRITICAL CARE AND TOXICOLOGY UNIT OF THE JOSEPH RAVOAHANGY ANDRIANAVALONA TEACHING HOSPITAL, ANTANANARIVO, MADAGASCAR

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ABSTRACT

BACKGROUND : Acute poisoning (APP) constitutes a serious problem of public health worldwide. Our aims are to determinate the clinical characteristics and the outcome of these intoxication and to identify the factors which are associated to the mortality.

METHODOLOGY : A 12 month retrospective and cross-sectional study was carried out at the critical care and toxicology unit of the Joseph Ravoahangy Andrianavalona teaching hospital, Antananarivo, Madagascar, from January to December 2013.

RESULTS: Of the 485 cases of intoxication identified, 56.1% were male. The average age of the patients was 27.13+/-14.28 years. Agricultural and industrial products were the most reported poisoning agents (33.5%). The muscarinic syndrome was the most toxic syndrome observed (24.7%). Hypoglycaemia (9.3%) was the most frequent biological abnormalities. The mortality rate was 16.7%. The factors associated with mortality were the male gender, the advanced age, the existence of comorbidities, the suicide, the existence of co-intoxication and radiologic abnormalities ($p<0.05$).

CONCLUSION: The admission for acute poisoning is frequent at our unit. The mortality remains high. Multiple interventions are needed to reduce the prevalence of intoxication.

INTRODUCTION

The acute poisoning is defined as an ensemble of patho logical signs due to the intake of a food or other products or a medicine, which comports like a poison in the organism [1]. Those intoxications may be voluntary (suicide, addiction), accidental (paediatric intoxication, therapeutic overdose, etc.) or criminal. They could be individual or collective. The incidence of poisoning is increasing day by day, and it interested the young people. It is considered a real global health problem and is a frequent reason for admission to the hospital [2]. The World Health Organization (WHO) has estimated that there were 2.9 deaths per 100,000 people due to unintentional poisoning in 2004 [3]. The objectives of our study is to determinate the clinical characteristics and the outcome of acute poisoning and to identify the factors which are associated to mortality.

METHODOLOGY

It was a cross-sectional retrospective study, which carried out at the critical care and toxicology unit of the Joseph Ravoahangy Andrianavalona teaching hospital, Antananarivo, Madagascar, from January to December 2013 (12 months). All patients admitted for an acute poisoning during the period of the study were included. Secondary, patients with food intoxications, those with incomplete data were excluded. The evaluated variables were age, gender, medical history, toxic agent, route of the intoxication, circumstance of the intoxication, co-intoxication, admission delay, toxic syndr ome, biological abnormalities, length of stay, death status. The data were analysed through Epi Info 7.1.1.14© of the Center for Disease Control and Prevention (United States of America). Qualitative variables were represented by proportion. Quantitative variables were represented by the mean and standard deviation or by median with the minimal and the maximal values.

For determination the factors which are associated to mortality, means were compared using the t test of Student. The comparison of proportion was made by the chi-square test or by the Fisher exact test. The difference was considered as significant for a p value under 0,05.

RESULTS

During our period of study, 505 cases of acute intoxication were admitted at our unit, representing the 43.1% of our admittance. After the exclusion of 20 patients, 485 finally constituted our study population. A male predominance was observed (n=274, 56.5%). The average age was 27.13+/-14.28 years. The median time from the symptom onset to admission was 60 minutes, ranging from 10 minutes to 2 880 minutes (48 hours). A high proportion of patients did not present a particular medical history (n=470, 96.9%). Agricultural and industrial products constitute the most frequent toxic agents in our study (n=170, 33.5%). The table I represent the repartition of the intoxication regarding the toxic agents involved.

Table I- Toxic agents of the acute poisoning

Toxic agent	Number (n=485)	Proportion (%)
Agricultural and industrial agents	170	33,5
Alcohol	150	29,5
Medicines	134	26,3
Domestic agents	42	8,3
Animal and plants toxic	07	1,4
Unknown agents	05	1,0

The intoxication was voluntary in 441 patients (90.9%). Individual intoxication was observed in 99.4% of cases (482 patients). The route of the intoxication was oral intake in 474 patients (97.7%). A co-intoxication was observed in 23 cases (4.3%). One hundred and nine patients (22.5%) were asymptomatic on the arrival. Muscarinic syndrome was the commonest toxic syndrome observed (24.7%). The table II show the patients repartition regarding the presented toxic syndrome.

Table II- Toxic syndrome

Toxic syndrome	Number (n=485)	Proportion (%)
No toxic syndrome Muscarinic syndrome	362 120	74,7 24,7
Nicotinic syndrome	68	14
Central syndrome	24	4,9

Abdominal (present in 384 patients, 79.2%), neuromuscular (n=278, 57.4%) and cardiovascular signs (n=270, 55.7%) were the most frequent signs that were noted. The table III represent the principle observed signs.

Table III- Observed signs in acute poisoning

Signs	Number (n=485)	Proportion (%)
Digestive Neuromuscular	384 278	79.2 57.4
Cardiovascular	270	55.7
Respiratory	171	35.3
Genito-urinary	53	11.0

Hypoglycaemia (9.3%) and hyperglycemia (5.1%) were the commonest biological abnormalities. An abnormal electroc ardiograph was noted in 0.2% of patients consisting on a sinus tachycardia after an alcohol intake. Abnormalities of the chest radiography were observed in 0.6% of cases, consisting on an interstitial syndrome. The length of stay was less than 24 hours for 56.3% of the patients (n=273) and was between 24 and 72 hours for 24.1% (n=117). The mortality rate was 16.7%. The factors, which were identified as associated to mortality, were the male gender (p<0.0005), voluntary intoxication (p=0,001), history of hypertension (p<0.0005) or heart failure (p=0.0255), co-intoxication (p=0.038) and the presence of abnormal radiography (p=0.02). The table IV represents those parameters.

Table IV- Comparison of the characteristics of deceased and survived patients

Characteristics	Survived (n=404)	Deceased (n=81)	P
Gender			
Male	205	69	<0,0005
Female	199	12	
Age (Mean +/-SD)	26,76 +/- 12,94	41,18 +/- 14,69	< 0,0005
Toxic agents			
Domestic agents Other products	40 364	2 79	0,029
Medicine Other products	133 271	1 80	<0,0005
Animal/plants toxic Other products	7 397	0 81	0,371
Agricultural and industrial Other products	160 244	10 74	0,146
Type of intoxication			
Voluntary Others	355 49	81 0	0,001
Unknown Others	5 399	0 81	0,596
Intoxication mode			
Individual	401	81	0,6794
Collective	3	0	
Route of intoxication			
Oral intake Others	393 11	81 0	0,225
Injection Others	5 399	0 81	0,596
Inhalation Others	4 400	0 81	0,612
Medical history			
Hypertension No hypertension	7 397	9 72	<0,0005
Heart failure No heart failure	0 404	1 80	0,0255
Epilepsia No epilepsia	2 402	1 80	0,4389
Diabetes mellitus No Diabetes mellitus Other comorbidities No other comorbidities	1 403 18 395	0 81 7 75	0,6543 0,162
Cointoxication			
Cointoxication	23	0	0,038
No cointoxication	381	81	
Abnormal radiography			
Abnormal radiography	1	2	0,02
Normal radiography	403	72	

DISCUSSION

In our study, the acute poisoning represented the 43.1% of the admittance. Its prevalence is high compared to another data from non-specialized emergency department (ED). In Turkey, the admittance for acute poisoning represented 1.40% of all cases [4]. Its proportion was 5.40% in an Iranian study [5].

This difference could result from the fact that our study was performed in a unit, which is specialized in toxicology cases.

The predominance of the gender differs according the study, the circumstance of the intoxication and the considered population. Contrarily to our results, the female predomi nance was observed in the study of Samake et al in Mali [6], Mahdeb et al in Algeria [7] and Toilabiya et al in Morocco [8]. The high frequency of the alcoholic intoxication in our study could explain our male predominance.

The average age of our patients was 27.13+/-14.28 years and 83.1% of cases were more than 18 years old. Our observation is in accordance of the bibliographic data. In the study of Echahbi et al, this average age was 22+/-15 years in Morocco [9]. It was 28.77+/-12.11 years in the study of Zohre et al in Iran (12), and 26.26+/-10.70 years in the study of Hayat et al in Tunisia [10]. The high proportion of suicide could explain the

high proportion of patients between 20 and 40 years in this age interval. Its age is also the predilection of the happening of mental disorders [11].

In our study, the commonest toxic agents were agricultural and industrial agents like pesticide (33.5%), alcohol (29.5%) and medicines (26.3%). The principle toxic agents differ according to studies and are influenced by the patient age and the product availability. For example, agrochemical agents, which are freely sailed, are frequently reported in the developing countries series and the intoxication by medicine is more frequent in the developed countries [12]. In the deserted and tropical area, a high proportion of venom poisoning is noted [13].

The muscarinic syndrome was the most observed in our study (24.7%). Digestive (79.2%), neuromuscular (57.3%) and cardiovascular signs (55.7%) were the most frequent clinical signs observed. There are the most relevant signs, which are reported in other studies. In Pakistan, neurologic symptoms were presents in more than half of patients and 21.4% presented a vomiting [14]. In a Turkish study, the principle signs were comatose and seizure [15].

Our mortality rate was 16.7%. Its result is in accordance with the observation of Indranil et al (16.2%) [16]. with an adequate management in critical care area, the outcome is generally favourable. In absence of treatment, severe intoxication results in death by respiratory distress in less than 24 hours [17].

The factors associated to mortality in our study were the male gender, the advanced age, history of hypertension and heart failure, voluntary intoxication, co-intoxication and radiologic abnormalities. According to bibliographic data, multiple factors could affect the acute intoxication prognosis. They could be present at the admittance of the patients are related to secondary complications. In the study of Khodabandeh et al [18], a significant correlation between acute poisoning death and sex (P=.000), age group (P=.004), referral place (P=.02), type of poisonous substance (P=.000), post ingestion interval (P=.001) were seen.

Other reported factors were thrombopenia, hyperleu cocytosis, hypotension (PAM<70mmHg), renal dysfunction, renal failure and respiratory distress, an elevated poisoning severiry score (PSS), organophosphate intoxication, nosocomial pneumonia and the use of mechanical ventilation [19,20].

CONCLUSION

The acute poisoning is a frequent cause of admittance at the critical care and toxicology unit of our teaching hospital. The associated mortality rate is high. This study allows us to know the clinical characteristics of acute poisoning and permits the identification of some factors, which were associated to mortality. The prevention of that intoxication should be emphasised. The technical resource of our unit should be improved for a better management of this pathology.

CONFLICTS OF INTEREST

The authors declare no conflict of interest

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