

An Epidemiological Study of Adult Acute Poisoning in Fez: Morocco

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Abstract

Introduction: Acute poisoning represents a real health problem in the world. It's a frequent cause of admission to emergency departments and in the intensive care unit. This study aims to analysis epidemiological aspects, clinics, therapeutic, outcome and the factors of mortality of poisoning in Fez, Morocco.

Methods: It's a retrospective study, concerned all patients admitted for poisoning at the intensive care unit, from January 2009 to December 2012.

Results: There were 201 patients admitted for acute poisoning. The median age was 26.26 years with a female predominance (74.1%). The circumstances of poisoning were suicidal, accidental and unknown in 85%, 10% and 5% respectively. Ingestion was the major route of exposure (94.5%), followed by inhalation (5.5%). The most frequent main toxic agents were pesticides (64.17%), medication (22.38%), carbon monoxide (5.5%) and caustic agents (5.5%). The main symptoms were nausea, vomiting and abdominal pain in 117 cases (58.2%). Disorders of consciousness were reported in 62 cases (30.8%). Hemodynamic instability was associated especially with acute aluminum phosphide poisoning. Increase of Troponin Ic was observed in 23 cases (12.7%). The electrocardiogram was abnormal in 21 cases (10.4%) especially with acute aluminum phosphide and carbon monoxide poisonings. Gastric lavage was done for 158 patients (78.60%). 33 patients (16.6%) were need mechanical ventilation. 19 patients (9.5%) of aluminium phosphide poisoning were needed vasoactive. The rate of mortality was 10.9%. The aluminium phosphide poisoning was responsible for 18 (81.8%) deaths. Apart from AIP poisoning, the mortality rate was 2.18%. The statistically significant prognosis factors for death were aluminium phosphide poisoning, cardiovascular signs as shock, myocarditis, electrocardiogram abnormalities, elevated cardiac troponin levels, respiratory distress, need for mechanical ventilation and vasoactive drugs.

Conclusion: This epidemiological study revealed the high mortality associated with acute poisonings, especially to aluminium phosphide. The prevention remains the best approach for reducing morbidity and mortality.

Keywords: Acute poisoning; Intensive care unit; Mortality; Prevention

Introduction

Acute poisoning is exposure to a poison on one occasion or during a short period of time. The exposure may be oral Ingestion, dermal or ophthalmic contact, inhalation and parenteral injection [1]. The incidence of accidental and suicidal 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]. In developing countries, the mortality related to acute poisoning is very high. This high mortality reflects the wide availability of highly toxic compounds such as pesticides and limited resources to treat poisoned patients. The management of poisoning consists of symptomatic treatment, decontamination, general supportive and specific antidotal therapy [3]. The prevention remains the best approach for reducing morbidity and mortality. This study aims to analysis epidemiological aspects, clinics, therapeutic, outcome and the factors of mortality of poisoning in one of developing countries, Morocco.

Patients and Methods

In this retrospective study, all patients older than 16 years of age with acute poisoning and treated in the emergency ward and intensive care unit at the University Hospital Hassan II of Fez, during the period of four years between January 2009 and December 2012 were included.

We collected for each patient the following specifications: age, sex, past history of psychological disorder, past suicidal attempts, type and number of toxic agent, route of exposure, reason of poisoning, signs and symptoms of intoxication, delay in presentation to hospital, therapeutic intervention, and duration of hospitalization, outcome, rate and factors of mortality. Patient records are classified in the archives in the CHU Hassan II of Fez. The study was approved by the institutional ethics committee of Fez.

All data were analyzed with SPSS software version 12. The data were expressed as mean \pm SD for quantitative variables and percentage for qualitative variables. The comparison between variables was conducted using the Student's t test and Chi-square tests for quantitative and qualitative variables, respectively. P values less than 0.05 were considered statistically significant.

Results

During the study period, 201 patients with acute poisoning were admitted. The majority of patients were young with a median age of 26.26 years (range 16-72). Maximum number of cases (52.2%) were recorded in the age group of 20-40 years. 36.8% of the patients are under 20 years. 149 patients were women (74.1%) and 52 were men (25.9%). 31 patients had a history of depression in their past (15.5%). Suicide was the most common mode of poisoning (85%). The circumstances of poisoning were accidental in 20 cases (10%) and unknown in 10 cases (5%). Ingestion was the major route of exposure (94.5%), followed by inhalation (5.5%). This study revealed that the high risk months for suicide attempts are April and July. Six patients (3%) had a history of suicidal attempts. There was a mean delay of 2.81 ± 3 hours before presenting to the hospital. The toxic agents most often involved in acute poisoning in descending order of frequency were pesticides poisoning (64.17%), medication poisoning (22.38%), carbon monoxide poisoning (5.5%), ingestion of caustic agents (5.5%), and paraphenylenediamine (1.5%) (Table 1).

Type of poisoning	Number of cases	Percentage (%)
Pesticides	129	64.17
Medication	45	22.38
Carbon monoxide	11	5.5
Caustic agents	11	5.5
Paraphenylene Diamine	3	1.5

Table 1: Incidence and types of acute poisoning.

Among the pesticides, organophosphates (33.9%) followed by aluminium phosphide (23.38%) and alphachloralose (7.9%) were the agents used for intentional poisoning (Table 2). The drugs most frequently involved in poisoning are benzodiazepines in 14 cases (31.11%), antidepressants in 9 patients (20%), paracetamol in 5 cases (11.11%), and neuroleptics in 4 cases (8.88%).

Type of pesticides	Number of cases	Percentage (%)
Organophosphates	68	33.9
Aluminium phosphide	47	23.38
Alphachloralose	16	7.9

Table 2: Pesticides incriminated in acute poisoning.

Medicines like antihistamines, corticosteroids, antiemetics, acetylsalicylic acid and non-steroidal anti-inflammatory drugs (NSAIDs) were used rarely for intentional poisoning. There were 5 cases of multiple drugs poisoning (11.11%) (Table 3). The main symptoms were nausea, vomiting and abdominal pain in 117 cases (58.2%). Neurological and autonomic disorders were present in 88 cases (43.8%). Disorders of consciousness were reported in 62 cases (30.8%). The mean Glasgow Coma Score (GCS) was 13.77. The agents most frequently associated with Neurological disorders were drugs (benzodiazepines, antidepressants) in 14.42% of cases, organophosphates in 12.9% of cases, carbon monoxide, alphachloralose and aluminum phosphide in 4.4% case. Convulsions were noted in ten patients (5%). 66 patients (32.8%) had

cardiovascular signs. Tachycardia in 52 cases (25.9%), and hypotension in 31 cases (15.4%).

Drugs	Number of cases	Percentage (%)
Benzodiazepines	14	33.11
Antidepressants	9	20
Paracetamol	5	11.11
Neuroleptics	4	8.88
Antihistamines	2	4.44
Corticosteroids	2	4.44
Antiemetics	2	4.44
Acetylsalicylic acid	1	2.2
Non-steroidal anti-inflammatory drugs (NSAIDs)	1	2.2

Table 3: Drugs incriminated in acute poisoning.

Hemodynamic instability was associated especially with acute aluminum phosphide (AIP) poisoning. One patient with severe alphachloralose poisoning was presented cardiac arrest, 10 minutes after admission to the emergency room. 39 patients (19.9%) had respiratory distress at admission. The average respiratory rate was 20 ± 4.2 /min. 8 patients with ingestion of caustic agents were presented oral cavity and pharynx lesions, and 6 patients an acute oligoanuria. 7 patients were presented an acute rhabdomyolysis. We reported 6 cases of peripheral cyanosis in carbon monoxide poisoning, and one case of macroglossia and swelling of the neck in paraphenylenediamine poisoning. 21 patients (10.4%) were asymptomatic.

In a biologically, the authors found an increase of Troponin Ic in 23 cases (12.7%), with a maximum value at 8.28 ng/ml. The average troponin value was 1.97 ± 0.3 ng/ml (Table 4).

Type of poisoning	Number of cases	Percentage (%)
Aluminum phosphide	13	6.4
Carbon monoxide	4	2
Drugs (antiemetics, antidepressants)	2	0.1
Organophosphates	2	0.1
Alphachloralose	1	0.05
Paraphenylenediamine	1	0.05

Table 4: Type of poisoning causing elevated cardiac troponin levels.

The electrocardiogram was abnormal in 21 cases (10.4%). Electrocardiogram abnormalities were associated especially with acute aluminum phosphide and carbon monoxide poisonings. The most disorders reported in acute aluminum phosphide poisoning were 5 cases of atrial fibrillation, 6 cases of left bundle branch block, 6 cases of right bundle branch block, 6 cases of T-wave inversion, 5 cases of elevated ST segment, and 2 cases of ST segment depression. Admission chest radiographs showed abnormalities in 18 cases (9%), especially in

pesticides poisoning and ingestion of caustic agents. The chest X-ray lung revealed tracheobronchitis in 9 cases, interstitial syndrome in 4 cases, pleural effusion in 4 cases, and acute pulmonary edema in one case. The patients with caustic agent ingestion underwent the upper gastrointestinal (UGI) endoscopy within 24 hours of admission and mucosal damage was graded using Zargar's endoscopy classification. The UGI showed grade 2b injuries (n=4), grade 3a (n=1) and grade 3b (n=3) in esophagus; grade 2b (n=3) and 3b (n=3) in stomach; and grade 2b (n=1) in duodenum.

On arrival of the patient to emergency ward, the following parameters were monitored (heart rate, respiratory rate, blood pressure, SpO₂). Gastric lavage was done for 158 patients (78.60%). There was an average of 3.5 hours between consuming poison and gastric lavage. 33 patients (16.6%) were need mechanical ventilation and 10 patients (5%) treatment with anticonvulsants. 19 patients (9.5%) of aluminium phosphide poisoning have been placed under vasoactive drugs in intensive care unit (ICU). The most used drug was dobutamine.

10 patients received specific antidotes, atropine for organophosphate poisoning in 9 cases and N-acetylcysteine for paracetamol poisoning in one case.

During hospitalization, 38 patients (19.1%) were presented complications with 25 cases of shock, 10 cases of myocarditis, 9 cases of hepatic cytolysis, 5 cases of hospital-acquired pneumonia and 5 cases of acute kidney failure. These complications were especially associated with aluminium phosphide poisoning, which was responsible of 20 cases of shock, 7 cases of myocarditis, 3 cases of hepatic cytolysis, and 3 cases of acute kidney failure. 22 patients died. The rate of mortality was 10.9%. Aluminium phosphide poisoning was responsible for 18 (81.8%) deaths. Apart from AIP poisoning, the mortality rate was 2.18% (Table 5).

Type of poisoning	Number of cases	Percentage (%)
Aluminum phosphide	18	81.1
Organophosphates	2	9.1
Alphachloralose	1	4.5
Caustic agents	1	4.5

Table 5: Type of poisoning causing mortality.

All survivors have received psychiatric treatment. The authors found statistically significant prognosis eight factors for death, aluminium phosphide poisoning (p=0,000), respiratory distress (p=0,012), cardiovascular signs as tachycardia, hypotension, and shock (p=0,000), myocarditis (p=0,000), electrocardiogram abnormalities (p=0,000), elevated cardiac troponin levels (p=0,000), need for mechanical ventilation (p=0,038) and for vasoactive drugs (p=0,000) (Table 6).

	Survivors (mean or %)	Dead (mean or %)	p
Age (years)	26.11	27.50	NS
Genre (female)	74.86	68.18	NS
Past history of psychological disorder	15.7	13.6	NS

delay in presentation to hospital ≤ 3h	68.5	57.9	NS
delay in presentation to hospital > 3h	31.5	42.1	NS
AIP poisoning	63.82	38.3	0.000
Organophosphates	97	3	NS
Alphachloralose	93.33	6.66	NS
Caustic agents	91	9	NS
Glasgow coma scale	13.72	14.13	NS
Vomiting	56.4	72.7	NS
Respiratory distress	16.8	40.9	0.012
Cardiovascular signs:			
Tachycardia	26.3	86.4	0.000
Hypotension	21.2	63.6	0.000
	8.4	72.7	0.000
Disorders of consciousness	44.7	36.4	NS
Rhabdomyolysis	4	0	NS
Macroglossia and swelling of the neck	11.5	4.5	NS
Leukocytosis	17.9	20.5	NS
Thrombocytopenia	6.7	13.6	NS
Elevated cardiac troponin levels	7.5	47.4	0.000
Electrocardiogram abnormalities	6.7	40.9	0.000
Gastric lavage	75.4	54.5	NS
Vasoactive drugs	0.6	81.8	0.000
Anticonvulsants	5.6	0	NS
Mechanical ventilation	14.6	33.3	0.038
Acute kidney failure	1.7	10	NS
Hospital-acquired pneumonia	2.8	0	NS
Myocarditis	2.2	30	0.000
Hemodynamic instability	4.5	90	0.000
Cytolysis	3.9	10	NS

Table 6: Prognostic factors (NS= no significant).

Discussion

The incidence of hospitalization for poisoning cases is steadily increasing. Acute poisoning is a major public health problem worldwide. World Health Organization (WHO) estimated 3 million cases of acute poisoning each year with about 200000 deaths [4]. The exact incidence of poisoning in Morocco is uncertain due to absence of registry data. The present study's results showed 201 cases of acute poisoning, an incidence of 6.77%. Singh and Exiara in their studies, were reported 138 and 223 cases, respectively [5,6]. Acute poisoning accounts for 3-17% of admissions to unit care intensive [7,8]. The majority of our patients were young with a median age of 26.26 years,

which is often reported by the other authors. 36.8% of our patients are under 20 years. The average age in studies of Senarathna and Mortazavi was respectively 24 and 26.82 years [9,10]. Our study revealed that most of the patients were women (74.1%), perhaps because they are psychologically and socially more vulnerable than men in our cultural context. Henderson, Cretikos and O'Brien were reported a male/female ratio of 0.8:1; 2:1 and 2.6:1 respectively [11-13]. The poisoning is mostly suicidal (85%), occasionally accidental. 31 patients had a history of depression in their past and 6 patients a history of suicidal attempts. Pesticides and medications were the most commonly involved agents in our context. They represent 64.17% and 22.38% respectively. Among the pesticides, organophosphates (33.9%) followed by aluminium phosphide (23.38%) and alphachloralose (7.9%) were the agents used for intentional poisoning. The prevalence of pesticides can be explained by the economic status of the region which is mainly based on agriculture, the easy availability and low cost of these agents in the markets for the general population. Chen reported alcohol poisoning in 54.55% cases, medication poisoning in 25.95% cases, pesticides poisoning in 5.65% and drug poisoning in only 4.88% [14]. In a retrospective study conducted in a tertiary care hospital in Karnataka, India, Ramesha showed that the majority of poisoning cases were due to organophosphorus compound (36%), followed by snake bite (16.2%), drugs (11%) and rat poison (7.3%) [15]. In developed countries, the rate of mortality from poisoning is 1% to 2%, but in developing countries the mortality is very high. In India the mortality due to poisoning varies between 15 to 30% and the poisoning is the fourth most common cause of mortality in rural India [16,17]. In our study, 22 patients died. The rate of mortality was 10.9%. Saoraya reported in his study that 75.85% of all poisoning deaths were attributed to pesticide exposures [18]. The rate of mortality in studies of Prajapati, Unnikrishmann, Clark and Lund was respectively 18.6%, 15.7%, 4% and 0.6% [19-22]. The prognostic factors for death in our study are aluminium phosphide poisoning, respiratory distress, cardiovascular signs as tachycardia, hypotension, and shock, myocarditis, electrocardiogram abnormalities, elevated cardiac troponin levels, need for mechanical ventilation and for vasoactive drugs. Indeed, in our study, aluminium phosphide poisoning was responsible for 18 (81.8%) deaths. Apart from AIP poisoning, the mortality rate was 2.18%. Boukatta showed in his retrospective study that aluminium phosphide poisoning was responsible for 38.3% of mortality and the prognostic factors of this poisoning were delay of management, potassium disorders, elevated of Troponin, hypotension, tachycardia, need for mechanical ventilation, vasoactive drugs and shock [23,24]. The prevention remains the best approach for reducing morbidity and mortality. Main preventive measures consist of restricting the sale and pesticides will not be available to general population.

Conclusion

Acute poisoning represents a real health problem in the world. It's a frequent cause of admission to emergency departments and in the intensive care unit. Organophosphorus pesticides are the most common cause, especially in developing countries whose economic activity is based on agriculture, such Morocco. The management of poisoning consists of symptomatic treatment, decontamination, general supportive and specific antidotal therapy. The mortality rate is high and the prevention remains the best approach for reducing morbidity and mortality.

Conflict of Interest

The authors declare that they have no conflict of interest.

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