

Drug intoxication in children: A retrospective study at the University Hospital of Casablanca

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ABSTRACT

Background: The drug intoxication is increasingly a serious problem in pediatrics across the world due to their frequency and management difficulties. In Morocco, the number of studies concerning this subject is few which were made to this day at only some hospitals. **Objective:** The aim of this study is to review the prevalence, severity, the different etiologies, the clinical, and therapeutic aspects, also the possible preventive ways of these underestimated poisonings in Morocco. **Materials and Methods:** It is a retrospective study using 216 cases of drug intoxication who came to the pediatric ward II of the University Hospital of Casablanca. **Results:** All the age groups under 15 years old were hit with two frequency peaks at 3 years and 15 years. In most cases, it was an accidental poisoning, though some suicidal ingestions were also noted, especially in teenagers. In over half of cases, the causal drug was neurotropic (benzodiazepines and antipsychotics). The clinic was dominated by neurological signs: Consciousness disorder, behavioral disorders, or seizures. Treatment varies depending on the delay between the incident and the case management and was limited to symptomatic treatment or detoxification measures were required: Spillway treatment or an antidote. Poison Control Center was consulted in all cases. **Conclusion:** Accidental drug intoxication in children is a public health issue. Legislation and means of prevention must be determined and clarified to confront this problem. Studies on this issue would be appreciated to delimit the real epidemiological and clinical profile of these intoxications.

KEY WORDS: Intoxication; Drug; Children; Clinical Profile; Epidemiological Profile; Prevention

INTRODUCTION

Drug intoxications are a major problem in pediatrics worldwide due to their frequency and management difficulties.^[1] Moroccan studies in this field are limited to few numbers of hospitals. An extended global study investigating the different epidemiological aspects has never been done.^[2]


Drug intoxication in children is a legitimate problem that affects public health. In the majority of cases are accidental,

but the suicidal component should not be ignored, especially in adolescents.^[3]

The aim of this work is to review the prevalence, severity and cause-effects, clinical, therapeutic, and preventive aspects of these intoxications, which are still being underestimated in Morocco, based on epidemiological data from a Moroccan pediatric unit, to optimize the preventive measures and help in the national development of recommendations to security, by instituting such investigations where epidemiological data remain highly insufficient and not updated.

MATERIALS AND METHODS

We conducted a retrospective review of children who were admitted to the pediatric unit 2 of the Abderrahim

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Harouchi Children’s Hospital in Casablanca for drug intoxication over a 4-year period. The data on the children involved were collected on the exploitation files which were completed from the patients’ hospital registers and medical files. The data were anonymized and the study form and conduct were approved by the Biomedical Research Ethics Committee in Casablanca. Each of these sheets contains a number of different parameters concerning intoxication, toxicity, the circumstances of intoxication, and other variables such as the time between intoxication and consultation, the length of hospitalization, and others. The processing and statistical analysis of the data collected were carried out using the SPSS 22.

RESULTS

Characteristics of Intoxicated Children

The number of drug intoxications reported during the study was 216 cases.

Age

We observed the presence of two peaks in the frequency of drug intoxication, which affected children at the age of 3 years and adolescents at the age of 15 years, respectively.

Nevertheless, this intoxication problem has affected all age groups of children from 0 to 15 years of age [Figure 1].

Gender

Boys were the most affected with a rate of 57.6% compared to 42.4% for girls with a sex ratio of 1.36.

Demographic distribution

The majority of drug intoxication cases were from the urban area (69.8%), while those from the countryside represented 30.2%.

Characteristics of the Toxic

Pharmacotherapeutic classes

The identification of the incriminated drug was based mainly on the questioning of the patient or family and the availability of the sample in the proximity of the intoxicated person. Central nervous system drugs were in the first place (51%), strongly represented by benzodiazepines (30.9%) followed by paracetamol (11.7%). In total, more than 15 classes were involved in these poisonings [Table 1].

Intoxication pathway

The per os pathway was the most predominant pathway with 97.9%.

Characteristics of Intoxication

Drug intoxications were the first to be considered (36.6%) of accidental acute intoxications received on duty during the same period.

All cases of intoxication occurred at home. Accidental intoxication was the majority, noted in 81.3% of patients, and was particularly frequent in young children (1–4 years old) with a median of 3.11 years old. However, voluntary intoxication for suicidal purposes was reported in 15.6% of cases and was mainly the domain of older children (10–15 years old) with a median of 13.8 years old. The remaining small percentage (3.1%) corresponded to poisonings following administration errors made by parents and concerned only infants under 1 year of age.

Accidental intoxication was doubly frequent in boys, when comparing the two sexes. Voluntary intoxication was slightly more common among girls than boys, however, there was not a significant difference between the two sexes in terms of intoxications related to medication errors.

Single-drug intoxication was the majority, it was noted in 61% of our patients; however, 9% of children were intoxicated

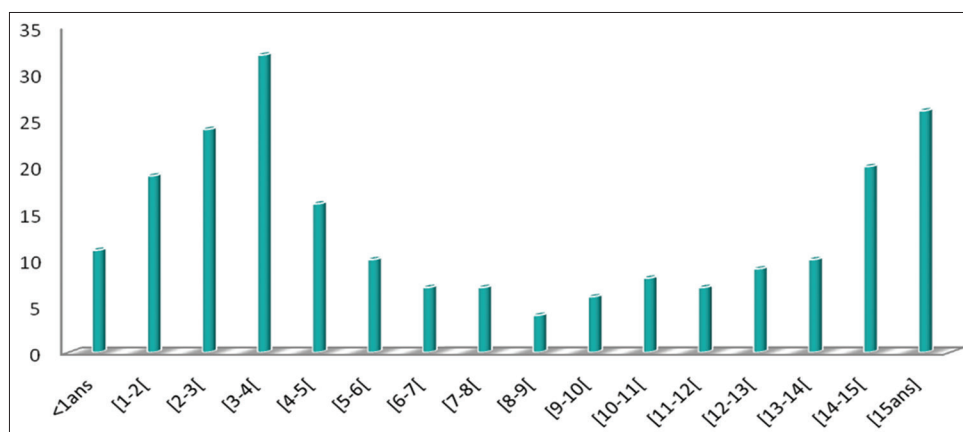


Figure 1: The intoxication cases sorted by age

by two drugs, tri-drug intoxication was reported in 19% of cases, while more than three drugs were responsible for intoxications in 11% of our patients.

Clinical and Paraclinical Study of Intoxication

Clinical toxidromes

The clinical signs at admission were varied. The neurological and digestive components were most described as intoxication symptomatology with 42.3% and 25.8%, respectively [Table 2].

Signs of neurological calls were essentially caused by neuroleptics with a rate of 63.4%. The most common digestive disorders in patients were nausea and vomiting. Bradypnoea was the most reported respiratory dysfunction, caused in most cases by analgesics with a rate of 40.6%. When 16% of children had tachycardia due mainly to neuroleptics (27.8%).

Toxicological Analyses

The blood drug dosage was performed in 30 patients (13.8%). It found hyperparacetamolemia in 17 cases (7.8%) and hyperferritinemia in 4 cases (1.8%). However, the search for drugs in the urine was carried out in 17 patients (7.8%) of whom 7 were positive for benzodiazepines.

Treatment of Intoxicants

The behaviors held at the time of admission of intoxicated persons were based on the admission delay [Table 3].

About 28.7% of patients were observed for a period of <1 day (minimum of 12 h). Others were hospitalized for 24 h in 37.9% of cases and 48 h in 22.4% of cases. The remaining percentage (11%) concerned intoxicated people who needed a period of hospitalization ranging from 3 to 8 days. The average duration of hospitalization was 1.26 days.

The majority of patients had a favorable outcome (98.4%), but only 1.6% of patients were transferred to pediatric intensive care.

All children who were voluntarily intoxicated were referred for child psychiatry consultations when they left the service.

DISCUSSION

Many international studies conducted to evaluate the association between drugs and intoxications. Although in children, this seems to be a public health problem. In Morocco, there are not enough data on this issue, and the objective of this study was to identify the different causes, the drugs involved and to propose prevention strategies. The epidemiology of drug intoxication in children is different from that of adults and varies according to age.^[4] Drug

Table 1: Percentage of causal drugs in reported intoxications

Drug	Percentage
Benzodiazepine	30.9
Neuroleptic drugs	15.1
Paracetamol	11.7
Nonsteroidal anti-inflammatory drug	8.6
H1 antagonist	6.8
Antibiotics	5.1
Antiparkinson drugs	4.2
Antiepileptic drugs	3.6
Codeine and morphine	3.5
Antihypertensive drug	2.6
Ferrous	2.4
Vitamin K antagonist	1.6
Tricyclic antidepressant drugs	1.4
Oral antidiabetic drugs	1.2
Contraceptive pills	0.8
Bêta-2 agonist	0.5

Table 2: Clinical toxidromes in reported intoxications

Toxidromes	Frequency	Percentage
Neurologic	138	42.3
Cardiovascular	43	13.2
Respiratory	39	11.9
Digestive	84	25.8

Table 3: Different treatments started for the reported intoxications

Treatment	Number of cases	Percentage
No treatment	38	17.6
Symptomatic treatment	44	20.4
Spillway treatment		
Gastric lavage	65	30.1
Vomiting	45	20.8
Activated charcoal	3	1.4
Cleaner treatment	0	0
Antidote		
N-acétylcystéine (Exomuc®)	17	7.9
Déféroxamine (Desféral®)	4	1.8

intoxications remain at the top of the list of intoxications in Morocco.^[5] According to the data from the telephone call unit of the anti-poison center in Morocco (CAPM), the rates varied between 29.7%, 32.5%, and 32%, respectively.^[1]

International data also show the importance of this type of intoxication in children compared to others. According to the survey of the 10 French poison control and pharmacovigilance centers, of the 1,932,344 cases recorded, drugs were the cause in 38%.^[6] In Quebec, the frequency of drug poisoning in

children is 40% among all cases of poisoning.^[4] The age group most affected during our study was between 5 and 15 years old with a rate of 53.70% followed by classes 1–4 years (41.2%) and 1–12 months (5.1%). In the United States, according to the data from poison control centers, there were 57 calls in 3,624,063 in 2011 in the National Poison Data System. Children aged 0–12 accounted for 55%.^[7] Overall at the national and international level, the most affected age group was between 1 and 4 years old, which is explained by the fact that children at this age acquire motor autonomy to satisfy their degree of curiosity, gradually discovering the environment, exploring the world around them, and carrying everything they find near their mouth.^[8]

In our study, boys are generally the most affected by this problem, 57.6% of cases are male. This is concordant with national and international data.^[9] Drug intoxications are accidental in 81.3% of cases, voluntary in 15.6%, and related to administration errors made by parents in 3.1%. These data are concordant with international data such as the case of France and the CAP in Bordeaux or Lebanon, where accidental intoxications were 81% and 69.9%, respectively. Self-induced intoxication is more the preserve of adolescents. According to CAPM on child intoxication, voluntary intoxication for suicidal purposes mainly concerned children aged 10–14.^[6] In Turkey, it was reported that the incidence of adolescent suicides in Turkey was between 5.1% and 16.3%.^[10]

Concerning the therapeutic classes implicated in intoxications, psychotropic drugs, more specifically anxiolytics, are at the forefront of the list at the national and international levels. In our study, the rate was 51% while at the Bordeaux CAP level, for example, the rate was 34.7%. This could be explained by their increased prescription and availability in homes within reach of children. The prognosis for the management of intoxication is based on several criteria such as the time between intoxication and consultation; the longer the delay, the longer the length of hospitalization is likely to be. The objective of the toxicological analysis is to identify and/or quantify the ingested toxicant to confirm or not the toxic hypothesis, to evaluate the severity of the intoxication, or to monitor the effectiveness of the treatment.^[11] The treatment of drug intoxications is based on four types of treatment: Symptomatic, evacuator, purifier, and specific (antidotic). Depending on the drug in question, appropriate treatment must be considered and possibly implemented quickly.^[12] Symptomatic treatment prevails over other management components. Its early implementation makes it possible to preserve the vital and functional prognosis during poisonings. Neurological, respiratory, and circulatory disorders are primarily treated symptomatically. This was done in 20.4% of the cases during our study.

Although induced vomiting has been challenged internationally, the procedure has been performed in 20.8%

of our patients. The indication for gastric lavage was asked in 30.1% of cases. This method exposes to a number of complications: Inhalation, hypoxia, heart rhythm disorders, laryngospasm, digestive perforation, and metabolic disorders. There are contraindications: Lack of airway protection, ingestion of strong acid, alkaline products, and patients at risk of digestive bleeding. Activated charcoal is likely to adsorb a wide variety of drugs and toxic substances and could contribute to a reduction in their bioavailability. In our series, it was used in 1.8% of cases. However, some products are not adsorbed (strong acids and bases, cyanides, alcohols and glycols, and iron and lithium). A purifying treatment at the renal or extrarenal level (e.g., peritoneal) can be considered, but in our series, no case required a purifying treatment. Antidotic treatment has been used in 9.7% of cases. The antidote is a drug that improves the vital or functional prognosis of the intoxicated person either by modifying the kinetics of the toxic substance or by reducing its effects. The indication and use of an antidote are made by accurately assessing the benefit-risk balance of its administration. The protocol changes depending on the antidote. One of the antidotes used is N-acetylcysteine in severe paracetamol poisoning in children.

Our research has some limitations. It was done retrospectively. Hence, it is possible that not all medical data have been recorded into the files of patients in emergency unit.

CONCLUSION

Drug intoxications in children can be extremely dangerous and can lead to significant mortality. These intoxications can be avoided by the simple application of active and passive prevention measures. Prevention is multifaceted and multidisciplinary, which requires structural and organizational strategies, as well as informative and educational approaches for health personnel and parents. Involving all stakeholders in prevention, as well as the multiplication of epidemiological and scientific research, is the way forward to avoid drug poisoning in children, which remains potentially serious but always underestimated.

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