EPIDEMIOLOGICAL STUDY OF DRUG INTOXICATION IN CHILDREN

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Abstract- Unintentional drug intoxication is still a major cause of morbidity and mortality in young children. In order to study the epidemiological pattern of childhood drug poisoning in Golestan province, all cases diagnosed with poisoning from 1997 to 2002 in the only pediatric hospital in province were recruited. During this period 563 cases of poisoned children were hospitalized in Taleqani hospital, of these 305 cases were due to drug poisoning. Opium was responsible for more than half of the poisoning cases, and 91% of deaths, among drug intoxicated children. Metoclopramide, benzodiazepines, tricyclic antidepressants and anticonvulsants were among the other frequent causes of poisoning. Neurological symptoms were the most prominent symptoms of poisoning and more than 80% of cases showed some neurological symptoms. Mortality rate among the cases was 3.6% and of total of 11 deaths, 10 were poisoned with opium. About 61% of cases were hospitalized between 24-48 hrs. Most of the poisoning cases in young children were unintentional and in many cases, their parents played a critical role in their intoxication. This role specially is crucial in infants and children under one year of age. Parents in Golestan province use opium widely for symptomatic treatment of routine illnesses in their young children and overdose of opium may cause severe intoxication and even death of the child.

Acta Medica Iranica, 44(1): 37-40; 2006

Key words: Drug poisoning, opium, children

INTRODUCTION

Poisoning continues to be a major and persistent cause of injury related morbidity and mortality in children and adolescents. In 1999 in United States there were about 1.5 million potentially toxic exposures in children under 19 years of age, the majority of children being under age of six (1). It is also reported that in 1998, there were about 1.08 million recorded instances of ingestion of toxic substances by children less than six years of age in the United States (2). In Victoria, Australia, with approximately 300,000 children aged less than 5 years of age, an average of 658 children are admitted to hospital each year because of ingestion of poisons, mostly pharmaceuticals (3). In 1995, the Japan poison information center received 31,510 inquiries about poisoning in children under 6 years old. The most frequently implicated products were tobacco (20%) and the peak age for ingestion of toxic substances was 1 year and younger (83.3%) (4). National poison center in Taiwan from 1985 to 1993 received a total of 5812 inquiries regarding poisoning in children less than 19 years of age. Male exposures were more prevalent than female (59% vs. 41%). Household products, benzodiazepines and pesticides were the most frequent causes of poisoning and mortality rate was reported to be 1.4% (5).

Although fortunately most of these unintentional exposures do not result in serious toxicity, the

Received: 26 July 2004, Revised: 14 Mar. 2004, Accepted: 9 May 2005

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number of serious poisoning and fatalities increase in the adolescent age group because of self-harm and/or suicide intention. Therefore, it is very important for the pediatric health care providers to be well-informed about poisoning in children. Unintentional ingestion of medicines by children has also a significant impact on the utilization of health system resources.

Several studies have indicated drug poisoning as a very important cause of childhood poisoning in Iran. Despite some differences in type of drugs and age groups in different regions, medicines, opioid derivatives and pesticides were identified as major causes of childhood intoxications (6). In this study, incidence and causes of drug intoxication in children in Gorgan, center of Golestan province, has been investigated. Golestan, a northern province in Iran, has an agricultural dominant economy and traditional use of opium is a known phenomenon in its rural areas and especially among peasants.

MATERIALS AND METHODS

Taleqani hospital is the only pediatric hospital in Gorgan. This hospital also serves as referral hospital for most of the pediatric cases in the province. For this retrospective cross sectional study, all cases diagnosed with poisoning from 1997 to 2002 in Taleqani hospital were recruited. Only cases of drug poisoning were included in the study and poisoning caused by other means such as household products, chemical and pesticide poisoned cases were excluded.

All epidemiological and clinical data of the patients' files were extracted according to a predesigned data entry form. Age, sex, clinical symptoms, cause of poisoning, treatment protocols, length of hospitalization and outcome were the major data retrieved from the files. SPSS software and Chi Square methods were used for data analysis.

RESULTS

Out of total of 563 cases of hospitalized poisoned children, 305 (54.1%) cases were due to drug poisoning. Patient's age group distribution is shown in table 1.

Table 1. Age distribution of poisoned children

Age group	Percent
< 1 Yr	41.3%
1-3 Yr	24.2%
3-6 Yr	25.3%
6-14 Yr	9.2%

According to the age group 41.3% of all cases were less than one year old and of this 60.3% of cases were less than 6 months old. Least number of cases (9.2% of all cases) belongs to age group of 6-14 years. Drug poisoned cases were almost evenly distributed between sexes with 50.2% of cases being female and 49.8% male and no significant difference was observed between sex of poisoned children.

Administration of opium for symptomatic treatment of diarrhea, cough and fever by parents were major causes of drug poisoning in children (45.6% of cases) followed by unintentional drug intoxication (43.9%). Overdose of drugs (3.6%) and adverse drug reactions (3.3%) were other causes. Only 2 cases of suicide were recorded.

Table 2 shows major causes of childhood drug poisoning. Opium was responsible for more than half of poisoning cases and 91% of deaths among drug intoxicated children. Gastrointestinal tract drugs including metoclopramide and H_2 blockers were the second frequent drug category in poisoned cases. Benzodiazepines, tricyclic antidepressants and anticonvulsants were among the other frequent causes of poisoning. Drugs such as diazepam, phenobarbital and propranolol showed the highest frequency in each drug category.

Table 3 shows major clinical symptoms in poisoned children. Sedation, myosis, respiratory tract suppression and confusion were major clinical symptoms. Neurological symptoms were the most prominent symptoms of poisoning and > 80% of cases showed some kind of neurological symptoms. Respiratory tract and GI tract symptoms were observed in 22% and 10% of cases, respectively.

Mortality rate among the cases was 3.6% and of 11 deaths, 10 were poisoned with opium. About 61% of cases were hospitalized between 24-48 hrs. For the treatment, more than 97% of cases received IV solutions, 79% gastric lavage and 67.2% received antidotes, which was naloxone in 82% of cases.

Table 2. Most frequent causes of drug intoxication in children

Drug	Percent
Opium	52.8%
GI tract medicines	10.2% (Metoclopramide* 6.2%)
Benzodiazepines	8.9% (Diazepam* 3.3%)
TCA	5.6% (Imipramine* 3.0%)
Anticonvulsants	4.3% (Phenobarbital* 2.3%)
Cardiovascular	3.0% (Propranolol* 2.0%)
Others	5.0%
Unknown	10.2%

* Most frequently used drug in this category.

Table 3. Major clinical symptoms of poisoned children. Some cases presented more than one symptom*

Clinical symptom	Percent
Sedation and drowsiness	41%
Myosis	38.4%
Respiratory distress	14.1%
Confusion	13.8%
Vomiting	8.5%
Extrapyramidal symptoms	6.6%

*Neurological symptoms were the most prominent symptoms. Respiratory tract and GI tract symptoms were observed in 22% and 10% of cases, respectively.

DISCUSSION

Opium was responsible for more than half of poisoning cases and 91% of deaths among drug intoxicated children. Gastrointestinal tract drugs were the second frequent drug category in poisoned cases. In some other reports GI tract drugs are reported to have lower rank in ranking of drug category causing poisoning in children (6-8). Opium was also the most important cause of drug intoxication in children under 4 years of age. However, other drugs, mainly benzodiazepines, were the major causes of poisoning in children over 4 years of age. This indicates role of parents and their knowledge about intoxication of younger children with opium. Similar results have been reported previously for causes of childhood poisoning in Tehran. In a study in 1995 in Loghman hospital in Tehran, it was found that medicines were the causes of 33.2% of poisonings in children under 6 years of age (6). However, in another study in 2000 in the same hospital, opium was reported to be the most important cause of poisoning in children less than 3 years of age (3). A three year (1997-2000) period of epidemiological study of poisoning in Golestan's neighboring province, Mazanderan, showed that out of 1751 reported cases, 55.5% were female and 45.5% male. Medicines were the most common causes of poisoning followed by pesticides, opium and other chemicals (9). In a study in Babool, medicines were identified as a cause of 53.2% of poisoning cases with opium as the first cause of drug intoxication (10). In New Zealand, analgesics, antipyretics and antirheumatic drugs accounted for 21% of hospitalization in poisoned children under 5 years, while organic solvents were responsible for 8% of the hospitalized cases (11). These reports show that poisoning is still a major cause of childhood mortality. Although drug intoxication could happen in any age or sex, its pattern is very much dependent on the age and sex.

Most of the poisoning cases in young children are unintentional and in many cases their parents or guardians play a critical role in their intoxication. This role specially is crucial in infants and children under one year of age and poisoning in this age is almost entirely due to the negligence of their parents or guardians. Prevention of childhood poisoning is often focused on the unintentional ingestion of medicines or non-pharmaceutical household products. Medication is often stored in drawers, cupboards, refrigerators or is left on kitchen benches or shelves, all of which enable children to gain easy access. The majority of medicines ingested by young children are used by another person in the household or administered to them by a member of their family. The introduction of child resistant packaging caused a dramatic reduction in the number of deaths of young children as a result of drug intoxication (3).

Lack of knowledge about effects and side effects of medicines is the key factor in misadministration of drugs in children. It has been previously reported that therapeutic mishaps were the major cause of medicinal poisoning in children less than 1 year of age and 59% of cases in this age group were intoxicated due to therapeutic mishaps of medicines (12). High rate of poisoning and mortality indicated easy access to hazardous substances, mostly opium in this region. Lack of accessibility to doctors or health centers and/or economic restrains could also play a major role in poisoning of young children.

Traditional use of opium as “magic bullet” for treatment of most of illnesses has perhaps lured parents into the belief that they do not need to seek any medical assistance to treat their sick children.

Results of this study show that parents in Golestan use opium widely for symptomatic treatment and relieving symptoms of common illness such as diarrhea, cough and common cold in their young children and overdose of opium can cause severe intoxication and even death of children. High mortality rate (3.6%) observed in poisoned children is in line with this finding. Therefore, it is very important to improve the knowledge of parents through mass media campaign about serious effects of improper use of medicine and misuse of opium in children.

Conflicts of Interests

We have no conflicts of interest.

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