Hospital Lethality in Acute Poisonings in the Toxicology Clinic of Emergency Medicine Institute 'Pirogov' for the period 2001-2005

Acute poisoning is a sudden and potentially life threatening damage of human health, characterised by quick dynamics and high lethality. The death rate and the lethality from acute poisonings vary between countries and depend on the complex action of various medicosocial factors. We have studied the hospital lethality from acute exogenous intoxications in the Toxicology Clinic of Emergency Medicine Institute "Pirogov", Sofia, Bulgaria for 5 years period - 2001-2005. We have monitored the lethality according to age and types of poisonings, as well as its relationship to the length of hospital stay and the complications occurred. The data from the other two Toxicology Departments in the country have also been taken into consideration in the analysis of the figures. The main reasons for the unfavourable outcome as well as the patients with the highest risk are analysed. Measures for diminishing of hospital lethality are discussed.

Introduction

Acute exogenous poisoning is a dramatic, suddenly occurring and potentially life threatening damage of human health under the influence of exogenic toxic substances. It is characterized by its sudden onset, rapid dynamics, unforeseeable course and high lethality. The death rate and the lethality from acute poisonings vary between countries and depend on the complex action of various medicosocial factors. Mortality rate is a complex statistical index that depends on the combined action of variety of medico social factors like migration, birth rate, population, natural population rate, etc. Because of this it is difficult to calculate the mortality rate, especially in toxicology. In a lot of countries poisonings mortality rate is not a separate index, but it is calculated as a complex index for all kinds of traumas, including "toxic trauma" or poisonings. Bulgaria is one of these countries. According to the Bulgarian National Statistic Institute trauma mortality rate for 2001 is 55.2 per 100 000 people and in 2005 it is 50.8 per 100 000 people [3,4,5]. It is difficult to calculate, what exactly the portion of acute poisonings in this mortality rate index is and to make conclusions about the dynamics of mortality rate from poisonings based on this index. Because of this we have studied the hospital lethality in the Toxicology Clinic of the Emergency Medicine Institute "Pirogov" for 5 years period - from 2001 to 2005. We have studied also its structure by type of poison, age and gender, as well as the impact of complications on hospital lethality and relationship between hospital lethality and hospital stay. The data have been compared with the figures obtained in the other two Toxicological Departments in the country.

Materials and methods

We have studied patients with acute poisonings, hospitalized in Children and Adult Toxicology Departments of the Toxicology Clinic between 2001 and 2005, as well as the number of cases with fatal outcome for the same period of time. The fatal cases are analyzed with regard to gender, age, type of poisoning, concomitant diseases, complications, time of first medical help, hospital stay. The methods used include: clinical observation and examination, laboratory, statistical, imaging and psychiatry methods.
Results

A total of 6576 patients with acute poisonings have been hospitalized in the Toxicology Clinic for the studied period 2001-2005, and with fatal outcome are 124 patients. The total hospital lethality for this period is 1.88%, but it varies in the years from 1.02% to 2.06% (figure 1). All 124 fatal cases have been registered in the Adult Toxicology Department. There have been no fatal outcomes in the Children Toxicology Department for the studied period, so the hospital lethality for children up to 18 years of age is 0%. At the same time the hospital lethality in the age group above 60 years of age is 16% for the same studied period.

The age structure of the fatal cases is as follows: 49 patients out of 124 (40%) are at the age above 60 and 75 patients (60%) are at the age between 18 and 60 (figure 2). If we look in each of the studied year we see that elder patients represent approximately 40% of all fatal cases for each of the years with the exception of 2004 when patients over 60 are only 26.5% of the fatal cases (figure 3). We find statistically significant distinction in the distribution of the cases with fatal outcome due to acute poisonings according to age - below and above 60 years of age (t=7.957; p=0.05).

57 patients (46%) out of these 124 are females (figure 4). We have not found any statistically significant distinction in the distribution of fatal cases according to the gender of patients.

The analysis of the types of poisons most frequently leading to death showed that the leading causes are:
- corrosives - with sodium hydroxide being the most frequently involved;
- mixtures of medicines - the most frequently detected medicinal products in fatal poisonings are benzodiazepines, barbiturates, analgetics, phenothiazines, antidepressants, verapamil and other calcium channel blockers, enalapril and other antihypertensives, dioxins, novphylline; very often these are combined with alcohol as well;
- toxic alcohols (methanol especially) and
- amanita phalloides mushrooms.

Analysis of the fatal poisonings revealed that the incidence of complications is higher in the cases with fatal outcome (36.1%) in comparison with the non fatal cases (19.2%). This is especially obvious in the group of elder patients, where we see the following subordination - the elder the patients the higher the incidence of complications, reaching 63.6% in the group above 80 years of age.

We see also high incidence of concomitant diseases (39.6%) in the fatal poisonings in comparison with the non fatal poisonings (28.8%). And again this is especially true for elder patients.

We observe a positive statistical dependency between the increase in the number of complications and the hospital lethality, especially in geriatric patients. The same is true also for the connection between concomitant diseases and hospital lethality - the more concomitant diseases the higher the hospital lethality.

Discussion

The analysis of the data and the structure of the poisonings with fatal outcome for the studied period of time we have 100% coincidence between the clinical and forensic diagnosis.
revealed that for the studied period of time hospital lethality from acute poisonings is a stable indicator with very little variations throughout the years. Very good results are achieved in the Children Toxicology Department with 0% hospital lethality for the period 2001-2005. In comparison the hospital lethality in the Children department for the period 1973-1993 was 0.30% [2]. The hospital lethality for the Adult Department has shown a tendency to decrease in comparison with previous periods (3.01% in 1994-1998), although there is still more to be desired in achieving better results, especially in the age group above 60 years of age [5]. The hospital lethality is much higher among the elder age group although it also has shown a tendency to decrease in the last few years (from 19% in 1990 to 8% in 2005) [5].

The positive dependency between concomitant diseases, complications in the acute poisoning and the hospital lethality has been proven. Keeping in mind the increase in the incidence of concomitant diseases with age we can easily explain the higher hospital lethality in the age group of elder patients. All this identifies the patients at the age above 60 as a risk group and special attention has to be paid while treating these patients in order to decrease as much as possible the complications and fatal outcomes [1,6].

The time between poisoning and rendering the first specialized toxicology help is a very important indicator for the progress and course of intoxication, and as a result of the outcome. And again this indicator is very important for elderly patients, because the tender balance of the aging organism is very quickly and easily disturbed and its restoration requires special efforts and cannot be easily reached.

We do not see any change in the structure of fatal poisonings in regard to the type of poison involved throughout the years - the most fatal toxic substances for the country remain sodium hydroxide, methanol and other toxic alcohols, mixtures of various medicinal products and amanita phalloides mushrooms. There is still a lot more to be done in order to achieve further decrease in the hospital lethality in adult patients and especially in patients above 60 years. The same is true also for diminishing the number of poisonings with the known potentially fatal poisonings by limiting the access to these substances.

The comparison between the data from the three Toxicological hospital wards - in Sofia, Varna and Plovdiv - has showed that there is no statistical significant difference in the figures for hospital lethality all over the country. In all three different toxicology departments (Sofia, Varna and Plovdiv) the hospital lethality for 2005 varies from 1.28% to 1.56% and 1.47%. The structure of hospital lethality according to age, gender and type of poison also is identical in these three departments. Based on this comparison we consider the presented figures more or less valid for the country as a whole and based on this we make conclusion on the characteristic of this index for the whole country.

The main reasons for the unfavourable outcome to our understanding are: poisonings in patients with high risk, severe poisonings with delayed onset of specialized toxicological help, poisonings in patients with concomitant diseases, developing of complications in the course of the poisoning.

Diminishing of hospital lethality together with decrease in the duration of hospital stay is one of the goals for every toxicologist. Implementing wild-spread prophylactic programs for prevention of poisonings, training of general practitioners in early diagnosis and treatment of acute poisonings, presence of qualified toxicologists and availability of easily accessed specialised toxicological clinic are one of the most important measures for decreasing the number of poisonings and hence the hospital lethality. Putting into action various standard therapeutical protocols with special attention paid to the early prophylactic measures for prevention of complications in the course of the acute intoxications are the next steps for diminishing the number of fatal cases.

Conclusions

1. Hospital lethality in the Toxicology Clinic of Emergency Medicine Institute “Pirogov” is 1.88% for the studied period 2001-2005. In the separate years of the study it varies from 1.02% to 2.06%. This index is similar for all specialized Toxicology Hospital Departments in the country and may be accepted for relevant for the whole country.

2. Hospital lethality in Children toxicology Department is 0 for the studied period. As this is the only Toxicology Department in the country specialized in the treatment of poisoned children to which all severe poisonings in children are referred to, we can consider this index for children hospital lethality as valid for the whole country.

3. The main cause for lethality in regard to the type of poison involved, remain: corrosive poisonings, methanol, poisonings, mixed medicinal poisonings, amanita phalloides mushroom poisoning.

4. Decompensation of concomitant pathology and complications of acute poisonings lay on the basis of the fatal outcome.

5. The age above 60 is the leading in the age structure of hospital lethality.

6. The combination of type of poison, age, time of first specialized toxicology help, concomitant diseases and complications of poisoning underlie the problem of "hospital lethality in acute intoxications”.

7. The knowledge of the structure of hospital lethality as well as the factors influencing it is a precondition for undertaking measures for decrease in hospital lethality from acute poisonings.

References


