LETHALITY FROM ACUTE INTOXICATIONS WITH ORGANOPHOSPHATE PESTICIDES IN VARNA REGION FOR A PERIOD OF 15 YEARS

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ABSTRACT

An analysis of the lethality in cases of acute exogenous intoxications /AEI/ with organophosphate pesticides /OP/ in Varna region for a period of 15 years -1991-2005 was done. It was established that from 207 patients with acute OP poisonings there were 40 lethal cases. The frequency of the lethal cases was 19.32%. 28 /70%/ of them were men and 12 /30%/ were women. The lethality was significantly higher in men. The proportion of lethal cases in men and women was 2.33: 1. The average age of deceased patients was 59 years. It was reported that with growing up of the age the average lethality had grown bigger too. All the lethal poisonings were by an oral ingestion. In 35 cases /87.5%/ suicidal attempts were done and in 5 cases /12.5%/ accidental household poisonings took place. The main reason about the death was a development of syndrome of multorgan insufficiency /SMOI/.

Keywords: acute intoxication, organophosphorus pesticide, lethality

INTRODUCTION

The widespread use of OP and their significant toxicity determine the high frequency of intoxications in some countries. /8,19,22,24/. During recent years in Varna region the relative share of OP/AEI has grown smaller. /3/. The hospital lethality from these intoxications varies in different studies and is in the range within 20% and 25% /1,11,12,18, 23,26/. OP are the cause of 10% to 46% of the lethal cases of all acute intoxications /10,21/. Although the highly toxic substances were replaced by less toxic OP pesticides and more contemporary methods of treatment had been introduced the acute OP poisonings continue to have a high lethal rate and represent one of the most serious problems of the nowadays clinical toxicology. /5,20/. Some omissions in the first medical aid also contribute to this fact. /4/.

In this relation we have put ourselves a task to study the lethality from AEI with OP in Varna region during the period 1991-2005 in order to establish the frequency of the lethal outcomes, to analyze the lethality according to sex, age, years, type of the pesticide, relative part of different pesticides in the death rate, and also the concrete reasons for the lethal exit.

MATERIAL AND METHODS

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RESULTS AND DISCUSSION

A retrospective study of the hospital case files and the forensic protocols of the autopsies of all 40 patients with lethal outcome previously treated at the Department of Toxicology, Naval Hospital-Varna.

207 patients with acute OP intoxications were treated at the Department of Toxicology, Naval Hospital-Varna, during the examined period. Lethal outcome was registered in 40 cases /19.32%/.

The analysis of the lethality by years showed significant variances. In 2001 there were no lethal cases, but there were only 2 patients with OP poisonings during this year. The highest death rate was registered in 1992 -33.3 %, when 21 patients with OP intoxications were treated at the Department of Toxicology.

OP poisonings were the cause of lethality in 25.24% of the total death rate from acute intoxications. In 28 lethal cases /70% the patient was a man and in 12 lethal cases /30% a woman. The death rate of male patients was significantly higher than that of female patients - 2.33: 1. These results are due to the fact that OP AEI are more frequent in men than in women /3,5/ as well as to the fact that usually suicidal attempts in men are more grave and lead to more serious poisoning. The distribution of the patients with lethal OP poisonings according to the age showed lowest death rate in the age group of young patients / younger than 24
years/ and highest in the age group of patients over 60 years. /Table 1/

Table 1. Distribution of the lethality from OP acute intoxications according to the age group

<table>
<thead>
<tr>
<th>Age group</th>
<th>Total number of treated OP intoxications</th>
<th>Lethal cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 24 years</td>
<td>25</td>
<td>1</td>
<td>4 %</td>
</tr>
<tr>
<td>25-44 years old</td>
<td>41</td>
<td>3</td>
<td>7.32 %</td>
</tr>
<tr>
<td>45-60 years old</td>
<td>72</td>
<td>15</td>
<td>20.83 %</td>
</tr>
<tr>
<td>Over 60 years</td>
<td>69</td>
<td>21</td>
<td>30.43 %</td>
</tr>
<tr>
<td>Total number</td>
<td>207</td>
<td>40</td>
<td>19.32 %</td>
</tr>
</tbody>
</table>

The average age of the deceased patients was 59 years. It makes an impression that with the growing of the age the death rate is increasing too. This fact can be explained with more severe clinical course of the intoxication and less adaptive potential of the elder patients, a result of existing serious co morbidity which weakens the resistive and reparative potential in the course of the OP poisoning and which can undoubtedly influence the clinical course and outcome of the poisoning.

Lethal outcome from OP poisoning with 5 different OP pesticides was registered. In one case the type of OP pesticide could not be established. /Table 2/. The prevailing part of the death cases was caused by Dimethoate /Bi-S8/- an OP pesticide with middle toxicity. These results are due to banishment of the highly toxic and dangerous OP pesticides as Parathion, Intrathion, etc. in Bulgaria and to the widespread use of Dimethoate in our country nowadays.

Table 2. Relative part of different OP pesticides which had led to lethal acute exogenous OP intoxication.

<table>
<thead>
<tr>
<th>OP pesticide</th>
<th>Number of the lethal cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethoate</td>
<td>33</td>
<td>82.5 %</td>
</tr>
<tr>
<td>Neocidol</td>
<td>3</td>
<td>7.5 %</td>
</tr>
<tr>
<td>Nurele D</td>
<td>1</td>
<td>2.5 %</td>
</tr>
<tr>
<td>Fenitrothion</td>
<td>1</td>
<td>2.5 %</td>
</tr>
<tr>
<td>Azodrin</td>
<td>1</td>
<td>2.5 %</td>
</tr>
<tr>
<td>Not identified</td>
<td>1</td>
<td>2.5 %</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100 %</td>
</tr>
</tbody>
</table>

In practice the syndrome of multiorgan insufficiency was the cause of death in 37 cases /92.5%. Each of the patients who had died from immediate cause of death rhythm disorder had clinical data about SMOI as well. With the introduction into use of contemporary methods and means of reanimation and intensive treatment permitting elongation of the life or survival of the critically ill the OP poisonings lead to the development of typical symptoms of multiorgan disorders and multiorgan failure which consequently can cause the death of the patients. /2,6,9,27/. The lethality of the patients with SMOI grew from 8.3% to 100% with the increasing of the number of the involved organs and systems with insufficiency. /2/. In two cases the death occurred after a peripheral type of paralysis of the respiration - development of intermediary syndrome. In one case the immediate cause of death was an acute myocardial infarction in a patient with coexisting ischemic disease of the heart, on the eighth day of the intoxication, on the background of slow restoring of the cholinesterase activity.

**CONCLUSION**

We consider that OP acute exogenous intoxications continue to be a serious test for the doctors- toxicologists as they quite often end with lethal outcome. We establish lethality of 19.32%. This relatively high death rate is due to the severe forms of intoxication - a result mainly of suicidal attempts with oral ingestion of great quantity of OP and high average age of the intoxicated. The death rate was higher in male patients than female. The proportion male to female patients was 2.33: 1. We report that with the growing of the age the lethality is increasing too. The main cause of lethal outcome was the development of a syndrome of multiorgan insufficiency.

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