CLINICAL ASPECTS

CLINICO-EPIDEMIOLOGICAL RESEARCHES ON THE USE OF THE ANTIDOTE IN ACUTE ORGANOPHOSPHATE POISONING ON PATIENTS ADMITTED IN THE MEDICAL CLINIC OF “SF. IOAN” EMERGENCY CLINIC HOSPITAL, IASI, DURING 2003-2009

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Abstract: In the present study we have analyzed the clinical evolution of the patients intoxicated with organophosphate insecticides, depending on the prescribed treatment, being a well-known fact that the reactivators of cholinesterase are administered only in the first 48-72 hours from the ingestion of the toxin, while after this period there appears a dealkylation of the complex cholinesterase – organophosphate substance (OPs), which triggers the irreversibility of the process of blocking the cholinesterase. Material and method: we have analyzed retrospectively a number of 137 patients hospitalized in the period 2003-2009. Results: all the patients were given supportive treatment and the association of Atropine, Obidoxime (Toxogonin) and plasma was administered only for 25,5% of the intoxications with OPs. There are no statistically significant differences between the evolution of the patients intoxicated with OPs treated only with Atropine and those treated with Atropine and Toxogonin.

INTRODUCTION

The International Programme on Chemical Safety defines the antidote as a therapeutic substance used in order to annul the toxic action of a xenobiotic. The antidotes must act specifically on a functional cellular complex, must have a high intrinsic activity and must not determine serious side-effects; the antidote must be effective for a long period of time and must not create toxic active compounds through metabolism. The number of substances that meets these conditions is relatively small.

Less than 5% of the intoxications have an antidote treatment (4,15). The classification of the antidotes can be carried out using several criteria, but one of the best criteria is the action mechanism. In the case of intoxications with organophosphorus insecticides (OPs), the atropine acts through competitive antagonism at the level of the receptor, the obidoxime, through a mechanism of enzymatic reactivation (1,5,16). The reactivators of cholinesterase are administered only within the first 48-72 hours from the ingestion of the toxin, while after this period there appears a dealkylation of the complex cholinesterase – organophosphorus substance, which triggers the irreversibility of the process of blocking the cholinesterase. (7,15)

MATERIAL AND METHOD

We have analyzed retrospectively a number of 137 patients hospitalized in the Clinic of Internal Medicine and Toxicology of “Sf. Ioan” Clinical Emergency Hospital, in the period 2003-2009. The following parameters have been investigated: age, sex, social background, the time of treatment in the Medical Clinic or Intensive Care Unit after the ingestion of the substance, personal pathologic antecedents, acute or chronic alcoholism, biological investigations centered on the urine toxicological screen and on the dosage of seric cholinesterase, the supportive treatment and antidote administered, complications appeared during the admission, the evolution of the patients under treatment, depending on the moment of administration of the antidote and on the period of time elapsed from the exposure to the toxin and the administration of the antidote.

RESULTS AND DISCUSSIONS

From the total number of intoxications registered in the period of investigation (2850), 7,8% (221) were patients diagnosed with insecticides, among which 62% with organophosphorous substances (OPs) (Fig. 1).

Focusing on the cases of intoxication with insecticides registered between 2003-2009, it is to be noticed that the tendency was decreasing (y = 36,71– 2,36 x), and the intoxication with OPS falls into this trend (y = 27,71–2,04 x) (Fig. 2).

The statistic analysis on sex shows the greatest
frequency for the age group 20-29 years and 40-49 years old for females (10.2%) and for the age group 30-39 years old for males (10.2%) (fig. 3).

The statistic analysis shows the greatest frequency for females (51.8%) and for the patients from rural area (59.1%). Supportive treatment was administered to all patients (100%).

All the patients with acute intoxication with OPS received atropine treatment (100%), associated in proportion of 54% with obidoxime. It is to be noticed that for 31.4% of the patients of the OPS lot plasma was administered, a treatment associated in proportion of 25.5% with atropine and obidoxime, and only in proportion of 5.9% with atropine (fig. 5).

The evolution in the Intensive Care Unit shows a great number of patients who required endotracheal intubation (30.7%), followed by cases of toxic EPA (21.9%) and small frequencies of bronchopneumonia (10.2%), rhabdomyolysis (4.4%), and urinary infections (4.4%),(fig.6)
Considering the fact that all the patients from the OPs lot received atropine as an antidote, and comparing the patient’s condition when leaving the hospital we can notice that the patients who received association of atropine and obidoxime but nevertheless died (6/74) failed to show significant differences as compared to those who only received atropine as an antidote (1/63) ($\chi^2=1.79$; GL=1; $p=0.181$) (fig. 7)

Figure no. 7. Distribution of the cases from the OPS lote depending on the administration of the antidote and the health condition upon hospital leave

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CONCLUSIONS

The number of intoxications with OPs follows a descending trend in the period under investigation. The statistic analysis shows the greatest frequency for females (51.8%) and for the patients from rural area (59.1%).

The hospitalization period ranged from 2 to 26 days. All patients received supportive treatment and the association of atropine, toxogonin and plasma was administered only for 25.5% of the OPs intoxications. There are no statistically significant differences between the evolution of OPS intoxicated patients treated only with atropine and those treated with atropine and toxogonin.

The evolution in the Intensive Care Unit shows a great number of patients who required endotracheal intubation (30.7%), followed by cases of toxic EPA (21.9%) and small frequencies of bronchopneumonia (10.2%), rabdomiolosis (4.4%), and urinary infections (4.4%).

BIBLIOGRAPHY

3. Barile A. Frank-Clinical Toxicology Principles and Mechanisms-CRC PRESS, 2004
8. Ellenhorn M.J.,Ellenhorn’s Medical Toxicology:Diagnosis and Treatment of Human Poisoning,Williams &Wilkins, 1997, editia a II a;
9. Hanna J., Danel V-Antidotes, antagonises et techniques depuration en toxicologie;
13. Robert J., Flanagan PhD., FRCP ath Alison L Jones MD FRCP(E), Antidotes, 2001, Guy’s and St Thomas’ Hospital Trust, London