



Intoxication Organophosphates in the Intensive Care Unit

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ABSTRACT:

Introduction: Organophosphates (OPS) are chemical substances derived from phosphoric acid, causing irreversible inhibition of acetylcholinesterase. It leads to muscarinic, nicotinic and neurological signs. The therapeutic approach often employed includes the use of atropine.

Materials and method: we conducted a retrospective study by recording data in University Hospital Centre (CHU) Lamine Debaghine Bab El Oued (Algeria) in ten months from juin2022 to may2023

Results: on a total of 9 patients the mean age was 30-year-old with a predominance of female patient .66.66% showed nicotinic syndrome, 55.55% had muscarinic toxidrome, and 33.33% neurologic toxidrome. The fatal rate was 11.11% and the intubation rate 55.55%

Discussion: we demonstrated a female predominance with a mortality that is consistent with the Taiwanese study and Ôzka, but diverge with the South African's study. We also demonstrated that these intoxications were in contrary more frequent in youngsters in Algeria.

Keywords: Organophosphates intoxication, intentional poisoning, intensive care unit, toxidrome, muscarinic syndrome, atropine.

Introduction:

Organophosphates (OPS) are chemical substances derived from phosphoric acid and its homologues, which induce the irreversible inhibition of acetylcholinesterase, causing accumulation of acetylcholine at cholinergic synapses. Intoxications with ops contribute to a higher mortality rate than other acute chemical poisoning (1). This accumulation leads to muscarinic, nicotinic and neurological signs (such as bronchorrhea, sialorrhoea, myosis, diarrhea, muscular fasciculation, seizures, and cyanosis), which may evolve in severe cases and increase the mortality. (2,3). The therapeutic approach often employed includes the use of atropine (4). Every year, around 3 million people are exposed to organophosphates, resulting in 200,000 deaths (5) worldwide. Moreover, a significant part of consumption of an OPS is intentional (6).

The main concern of our study is to set an epidemiologic profile for those intoxications in Algeria .

Materials and method:

We conducted a section of acute poisoning due to organophosphorus recorded in University Hospital Centre (CHU) Lamine Debaghine Bab El Oued (Algeria) in ten months from juin2022 to may2023. We noted the gender, the age of patients, the medical history, the clinical features, and the length of stay. Not only that, but we also reported the treatment received, the patients with organophosphorus intoxication that were sanctioned by intubation, and the mortality.

Results:

In our study we report 9 cases of organophosphate intoxications. OPS poisoning represented 16.9% of the cases of intoxications. All cases came from an urbanist area and were for suicidal purpose. The minimal level of instruction in our sample was high school. 66.66% were females, 33.33% males (sex-ratio =0.5). The mean age was 30-year-old, with a peak frequency at 22-year-old. 55.55% were less than 25-year-old, 11.11% were between 25–30 years old and 33.33% were more than 30-year-old. 44.44% had a medical history of psychiatric disorder such as depression and schizophrenic spectrum, 11.11% were drug addicted, and the rest had no significant medical history. For the toxidromes (fig 1). The muscarinic signs in our samples were as following 55.55% had bronchorrhea, 33.33% had hypersalivation, 33.33% had bradycardia, 22.22% had myosis, 22.22% had diaphoresis, 11.11% had a pulmonary edema, 11.11% had polypnea, and 44.44% had an oxygen saturation lower than 90%. For the nicotinic toxidromes, 11.11% presented tachycardia, 11.11% presented tremulations, 44.44% had myosis, 11.11% presented hypertension. As for the neurological signs, 33.33% manifested

seizures, 11.11% had hypothermia, 44.44% had a confusion with a GLASGOW score between 10-14, 55.55% were in coma with a Glasgow score less than 9.

As for the length of stay, 44.44% stayed for more than 5 days, 33.33% less than 48 hours and 22.22% 3-5days. During the hospitalization, 55.55% ended up intubated, 11.11% complicated with inhalation pneumopathy and 11.11% died. From the 5 intubated patient , 4 received early treatment with atropine and shown a good evolution .they were discharged .

Discussion:

Our results, highlighted a predominance of female subjects, which is unusual. These findings are diverging with a previous South Africa where most of the intentional organophosphate poisoning cases reported were men, with 53.3% (7). In A Taiwanese study, there were more female cases (1657 cases)of acute poisoning with pesticides, where most were related to organophosphate poisoning (8). We also found out that those intoxication cases were reported at a really young age, with a frequency peak at 22-year-old and a mean age of 30-year-old in contrast with a study that reported a higher mean age of 45.5 (9). The urge for intubation and mechanical ventilation in 55.55% of our OPs intoxication can be explained by the stimulation of nicotinic receptors, as it leads to obstruction of the respiratory tract and paralysis of the diaphragm (10). The signs and symptoms of the patients were typical of intoxication by OPS (11). We reported that 66.66% showed nicotinic syndrome, 55.55% had muscarinic toxidrome, and 33.33% neurologic toxidrome. In another study, 78.57% of total had at least one muscarinic symptom, (50%) had at least one nicotinic symptom and (68.57%) showed signs of central nervous system injury (12) without a significant difference. we can justify it by the small sample of our study. The average length of stay was 3–5 days, as literature reported (12).

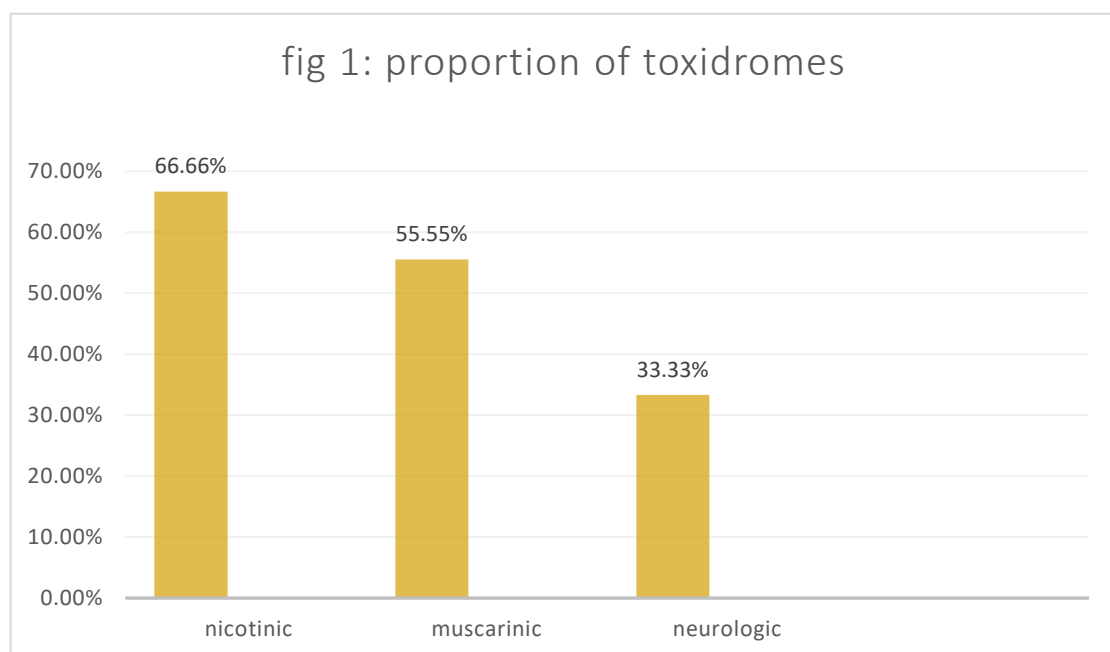
We noticed that early onset of treatment with atropine which is the referenced specific treatment (4,12) on severe intoxications had a great impact on the fatal outcomes

In this study, there was a case fatality rate of 11.11%. Which is higher than the Africans study (7). These findings are consistent with Özkay &Al, who reported a mortality rate in organophosphate poisoning is between 3-25%. (13)

Limit of the study:

The data covering only one geographical region and a single center and only in a tertiary hospital can be considered as limitations to the study. The small effective can be a selection bias.

Figures:



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