

# Pesticide intoxication

Template:Infobox - disease

- Pesticides are substances against harmful organisms
- mainly against insects (insecticides), rodents (rodenticides), molluscs (molluscicides), weeds (herbicides), fungi (fungicides) ...
- systemic pesticides - penetrate plants, protect more effectively (organophosphates)
- contact pesticides - kill organisms only in affected areas
- the most toxic are some insecticides, molluscicides and herbicides
- The most common intoxication is rodenticides - it is not so severe

## Organophosphate insecticides

### Character noxy

Organophosphates are esters of phosphoric acid, either containing sulfur (suffix -thion) and cyp450 metabolizes them to an active derivative containing oxygen (-oxone), or have equal oxygen in the molecule;

- high acute toxicity,
- the spectrum of preparations does not contain highly toxic organophosphates,
- they do not accumulate in the environment, they are low in adipose tissue, they are not significantly carcinogenic,
- representatives - fenitrothion (Sumithion), diazinon, etc.

### Professional exposure

The risk of intoxication arises during production, less so during further processing;

- in addition, they contain solvents and other additives.

### Etiopathogenesis

Irreversible acetylcholinesterase (ACHE) inhibition - ACH → ACH degrading enzyme accumulates;

- the accumulation of ACH can explain most of the symptoms of intoxication, a disorder of cholinergic transmission,
- the synthesis of the new ACHE takes 60 days,
- as a late consequence, neuropathy is due to degeneration of PNS axons.

### Toxicity

depends on the ability to inhibit ACHE, on the concentration ...

### Clinical picture

First symptoms:

- with a decrease in ACHE activity below 70% (reduction below 20% - severe poisoning),
- life-threatening poisoning - activity is immeasurable,
- depends on the speed of boarding ...
- acute - accumulating ACH affects two types of receptors (muscarinic - vegetative motor, nicotine - neuromuscular discs), then it is also a mediator in the CNS,
- muscarinic symptoms - tearing, salivation, sweating, miosis, vomiting, abdominal pain, diarrhea, bronchial hypersecretion, bronchospasm, bradycardia (as if parasympathetic),
- the preganglionic innervation of the sympathetic nervous system is also affected by ACH → in mild poisoning, the symptoms are expressed differently (the sympathetic nervous system may antagonize this),
- nicotine symptoms - fasciculations, tremor, convulsions, paralysis of the respiratory muscles,
- CNS symptoms - disorientation, headaches, convulsions, respiratory depression, coma.
- The cause of death is respiratory failure (all systems are comprehensively involved) and cardiac arrhythmias
- chronic - accumulation may occur rarely, symptoms such as acute,
- late neuropathy - not due to ACH, about 7-21 days after severe poisoning - calf cramps, numbness, paraesthesia in the legs, weakness.

### Investigation methods

- For monitoring professional exposure - erythrocyte ACHE,
- we examine neuropathy with EMG.
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## Differential diagnosis

Heavier exposures may resemble a stroke , a milder infectious disease.

## Therapy

Pharmacological antidote is atropine - blocks muscarinic symptoms (not nicotine), before administration of atropine it is necessary to correct respiratory and cardiovascular disorders (give oxygen ) - doses are controlled by mucosal humidity, in severe poisoning - biochemical antidote - oxime - ACHE reactivator (eg obidoxime) ), comprehensive care for vital functions, in case of convulsions - diazepam (in low doses).

## Carbamate insecticides

### Characteristics of noxy

Carbamic acid derivatives, directly inhibiting ACHE (without activation), representatives - pirimicarb (Pirimor®), etc., also include neostigmine (Syntostigmine®) and physostigmine (natural alkaloids, indirectly acting, parasymphomimetic , used in glaucoma ... ).

### Professional exposure

In agriculture, due to the lower toxicity they are in preparations for gardeners !; in industry they are used for the production of plastics.

### Etiopathogenesis

They enter through all gateways, they inhibit ACHE but reversibly !!!, spontaneous reactivation occurs quite quickly, they do not settle.

### Clinical picture

Acute symptoms - as with organophosphates, but they occur earlier, have a milder and shorter course, chronic poisoning - are not known (max. Dermatitis).

### Investigation methods

ACHE determination is important only after intoxication (inhalation goes too fast).

### Differential diagnosis

It can resemble an infectious disease, it is important to distinguish between organophosphate poisoning, neuropathy does not occur.

### Therapy

Atropine is enough, then symptomatically and supportively.

## Rodenticides

- The most commonly used anticoagulants - warfarin (Kumatox), brodifacoum (Volid, Talon) ...,
- they are small in granules, have a delayed effect, usually potentiated by repeated consumption of poison by rats,
- delayed toxicity does not deter rats from eating, moreover, it does not vomit rats,
- low toxicity to humans is also an important condition (they just lie on the ground, they can be ingested by children ...),
- occupational exposure - does not pose a risk.

### Etiopathogenesis

It is well absorbed from the GIT (worse through the skin), they are vit.K antagonists → they block the synthesis of coagulation factors II (prothrombin), VII, IX and X lethal doses contain up to kilograms of the product.

### Clinical picture

- Acute - most often in young children, ingestion of a few grains does not manifest itself, with a larger amount Quick is prolonged, bleeding symptoms are usually only in suicidal attempts (suicide is usually unsuccessful),
- chronic - very rare.

### Investigation methods

Monitoring of INR value.

## Therapy

Specific antidote - vitamin K ( Kanavit ) - indicated after ingestion of a large dose.

## Links

### related articles

- Intoxication by fungi

### Source

- BENEŠ, Jiří. *Study materials* [online]. © 2007. [feeling. 2010]. < <http://www.jirben.wz.cz/> >.

### Reference

Categorie:Hygiene Categorie:Occupational medicine Categorie:Toxicology Categorie:Pathobiochemistry