

INTOXICATIONS
WITH DINITROORTHOCRESOL

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The increasing use of DNOC in Voivodina contributes to the occurrence of suicidal and accidental intoxications with this compound.

It is assumed that beside other damages DNOC may affect the act of swallowing.

The only two cases of asphyxia caused by choking with a bolus of food do not allow a definite interpretation, but are presented here as a warning of the possibility of choking in DNOC intoxications after acute symptoms of poisoning already disappeared.

The established histologic changes in the CNS are a proof of pathological lesions in the suprabulbar parts of the white and gray mass. This is the anatomic ground for the development of the clinical picture of diffuse lesion of the central neuron, which was clinically verified.

The intoxication with DNOC affecting the bulbar nuclei, i. g. the act of swallowing, gives the picture of pseudobulbar damage with dysphagia as the leading symptom.

The first case of lethal intoxication with 4,6-dinitro-o-cresol (DNOC) in the territory of Voivodina was recorded in 1963 (1). Since then not a single intoxication with this poison has been recorded in the Department for Forensic Medicine in Novi Sad. The first such intoxication in Yugoslavia was reported in Belgrade in 1958 (2).

In the same period in Hungary, where the geographic and climatic conditions are very similar to those in Voivodina, eight suicidal (3) and three accidental (4) fatal cases were reported as well as severe non-fatal intoxications with 35 suicidal and 47 accidental hospitalized victims; many of these were treated in hospitals for two months (5, 6).

The following DNOC compounds are currently used in this country: Dinosan 10% emulsion concentrate; Kreozan 45% paste; Rumesan 30% paste; Rumcsan MA 5,5 emulsion concentrate; Rumesan oil 30% emulsion concentrate; Yellow oil (Žuto ulje) E5 5%; Yellow paste (Žuta pasta) 50%.

In the first half of this year four cases of lethal intoxication with DNOC – two suicidal and two accidental – were recorded in Novi Sad. In all the four cases žuto ulje (Yellow oil) E5 was used.

Accidental intoxications resulted from extreme negligence of self-protection during the spraying of fruit trees.

53 year-old farmer sprayed fruit trees with Yellow oil E5. Although he knew the toxic properties of the compound he disregarded the protective measures saying that brandy he usually uses will »neutralize« the poison. He used to blow through the atomizer holding it in the mouth. After spraying, as he came home, his hands and clothes were coloured yellow. He washed himself with soap and went to sleep. During the night he got abdominal cramps, lost consciousness, urinated and defecated in bed. In the morning he was brought to hospital unconscious.

At admission his pulse rate was 126/min, blood pressure 170/95 mm Hg. He was in coma with a picture of decerebrate rigidity. The laboratory tests were all within normal ranges. DNOC was not determined. Under therapy his condition improved and after seven-day treatment in the intensive care unit, he was transferred to the ward. His pupils responded slowly, the tendon reflexes were much increased; there was no damage of sensibility, only a slight hypertony of the muscles of hands and legs was observed. The peripheric nerves felt painful under pressure.

Ten days after the intoxication and three days after discharge from hospital the patient had a continental breakfast, moved a little around the house and lay down. Suddenly he got up, then sat down getting bluish in the face, fell on his back and died. He was transferred to our department with diagnosis: *Intoxication cum Creosano. Infarctus myocardii in obs.*

The autopsy showed livid colour of the skin of the face, damaged and neglected teeth, hands and nails coloured yellow. In the proximal part of the larynx two orange slices not enough chewed closed the beginning of the larynx and partly extended on the epiglottis. No food was found anywhere else in the respiratory system. General signs of asphyxia were also found.

Histologic examination of the brain showed diffuse perivascular encephalomalacia, dense areas of demyelination and hyaline thrombi. The ganglion cells in the reticular formation were in the state of chromatolysis and beside endothelial and microglial reaction, haemorrhages by diapedesis could be noticed. The cytotoxicity of the Purkinje's cells, pigment degeneration, vacuolisation and cariolysis were observed in the cerebellum. Most of the cells were without nuclei.

DNOC was determined after chloroform extraction with methylketon in an alkaline medium using the Fenwick-Parker's method (7, 8).

DNOC was found in the following amounts: stomach none, intestines none, lungs none, liver 0,020 mg/100 g, kidney 0,010 mg/100 g, brain 0,010 mg/100 g. No hydrochloric acid was found in the bolus.

In the second case which is very similar to the first, the bolus was a part of chicken breast and death occurred during dinner.

In our two cases of suicidal deaths aspiration of yellow coloured gastric contents was established. The amounts of the poison were determined as 50 and 140 g respectively.

The chemico-toxicological analysis in our two cases of suicidal intoxications showed the following DNOC concentrations:

stomach	13,00 mg/100 g	400,00 mg/100 g
intestines	0.75 mg/100 g	10.00 mg/100 g
liver	0.30 mg/100 g	4.72 mg/100 g
kidney	0.125 mg/100 g	2.00 mg/100 g
heart	0.30 mg/100 g	2.42 mg/100 g
brain	0.125 mg/100 g	1.20 mg/100 g

In both cases of accidental intoxications death resulted directly from choking with a bolus of food. Both victims died after the symptoms of acute poisoning had disappeared, while in suicidal intoxications death occurred in the phase of acute poisoning. Both victims of accidental intoxication were chronic alcoholics with neglected and bad teeth, aged between 50 and 60 years. Death resulted from asphyxia by choking with a bolus of food. Both boluses were almost unchewed.

The postmortem examination of the two cases of suicidal intoxications where death occurred after the intake of great amounts of DNOC showed agonal inhalation of gastric contents.

COMMENTS

The beginning of the act of swallowing is under the influence of the upper parts of the CNS; behind the palate arches it becomes independent of the brain cortex. It is known that without the stimulation of the receptors of the soft palate the act of swallowing is impossible. The soft palate besmeared with novocaine makes the swallowing impossible while such anesthesia lasts.

This complex reflex act consists of a series of processes which have a definite sequence and every process has its series of events and »rings«. The realisation of one »ring« leads to the excitation of the receptors that reflexly stimulate the next phase in the process.

It is assumed that the intoxication with DNOC may have:

- local influence on this complex reflex act
- influence on the centre of swallowing in the medulla oblongata
- some influence on the very complex relationship among different parts of the CNS, which participate in the act of swallowing.

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Sažetak

OTROVANJA DINITROORTOKREZOLOM

Autori iznose četiri slučaja otrovanja DNOC dijagnostikovanih u Zavodu za sudsku medicinu Medicinskog fakulteta u Novom Sadu. Izneta je klinika, patologija otrovanja, kao i rezultati hemijsko-toksikoloških analiza unutrašnjih organa.

Posebno je istaknuto značenje suprabulbarnih oštećenja koja uzrokuju poremećaje gutanja i vode te aspiracionu smrt u fazi kliničkog oporavka.

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