

SIGNIFICANCE OF THE TOXICO-CHEMICAL ANALYSIS FOR THE TREATMENT OF THE ETHYLENE GLYCOL POISONING

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SUMMARY :

Ethylene glycol can cause severe acute poisonings. In three patients the blood and urine concentration of ethylene glycol and its antidote ethyl alcohol is determined thanks to gas chromatographic methods. The monitoring of concentrations of ethylene glycol in blood and urine determinates the therapeutic methods.

Key words: Ethylene glycol; acute poisoning.

INTRODUCTION:

Ethylene Glycol is bivalent saturated alcohol, which absorbed in the digestive system causes severe acute poisonings. The determination of its concentration in the blood and urine contributes to the severity of intoxication. The successful treatment depends on follow-up bio monitoring of ethylene glycol and its antidote ethyl alcohol in blood and urine.

PURPOSE OF THE STUDY:

Specifying the significance of toxico-chemical analysis to treatment of the acute ethylene glycol poisonings.

MATERIALS AND METHODS :

Subject of the study are 3 patients treated in Toxicology Clinic in Varna, aged between 32-52 years. At the admittance in hospital is appointed the concentration of ethylene glycol and ethyl alcohol in blood and urine. In the next 48 hours a bio monitoring of ethylene glycol and ethyl alcohol is performed.

The identification and determination of concentration of ethylene glycol and ethyl alcohol in blood and urine are performed with own gas chromatographic methods. For that purpose is used gas

chromatograph GC 5890-series II supplied with FID and HP3396 Series II Integrator Hewlett Packard.

For evaluation the heaviness of intoxication is used contemporary data base for toxic and lethal concentration of the two alcohols (3-4).

RESULTS AND DISCUSSIONS:

PATIENT № 1 – S.D.S. , 32 years old , male – accidentally swallowed one sip ethylene glycol, without complaints.

Objectively – good general state. Clear consciousness, somatic status – without aberrations. Results from the toxico-chemical analysis: on the 12th hour after drinking up ethylene glycol in blood – 0,85 mg/ml; urine – 2,30 mg/ml. On the 18th hour – ethylene glycol is negative in blood and urine. The patient is followed up 4 days. The patient does not have symptoms of acute poisoning.

PATIENT № 2 – V.S.M., 52 years old, female – accidental drink up of 2-3 sips ethylene glycol and 50 ml whiskey, complains of nausea and vomiting.

Results from the toxico-chemical analysis: on the 8th hour ethylene glycol in blood – 0,160 mg/ml; urine – 1,425 mg/ml and ethyl alcohol in blood – 0,082 mg/ml; urine – 0,360 mg/ml. On 13th hour ethylene glycol in blood – 0,130 mg/ml; urine – 0,167 mg/ml and ethyl alcohol in blood – 0,283 mg/ml; urine – 0,153 mg/ml. On 31st hour ethylene glycol blood concentration is 0,117 mg/ml; urine concentration – negative and ethyl alcohol in blood – 0,050 mg/ml; urine – negative. After 36th hour ethylene glycol concentration in blood and urine is negative. On 26th day are registered normal renal and liver indexes.

PATIENT № 3 – J.P.K., 52 years old , male –

taken to hospital in coma- GCS – 4 points with severe metabolic acidosis.

Results from the toxico-chemical analysis: ethylene glycol blood concentration – 1.245 mg/ml; urine concentration – 3.528 mg/ml. Four hours haemodialysis is performed. Results after the haemodialysis: ethylene glycol in blood – 0,20 mg/ml; in urine – 0,57 mg/ml. On the 12th hour after the haemodialysis ethylene glycol blood concentration is 0,10 mg/ml and urine concentration is 0,10 mg/ml. The patient developed acute renal failure and 23 new haemodialysis were performed. 3 months after hospitalization the patient suffered hemorrhagic brain stroke and this caused his death.

The results from the study show that ethylene

glycol is found in blood between 8th – 31st hours. The clinical manifestation corresponded to the concentration of ethylene glycol in blood and urine. These concentrations also contribute the determination of therapeutic methods.

CONCLUSION:

1. Toxico-chemical analysis gives possibility for diagnosis of acute poisonings with ethylene glycol.

2. The monitoring of concentrations of ethylene glycol in blood and urine determinates the therapeutic methods.

In the case of patient in coma and severe metabolic acidosis performance of toxico-chemical analysis is necessary.

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