

PREVENTION OF METHANOL TOXICITY BY ETHANOL THERAPY

To the Editor: Although ethanol therapy has been used for the treatment of methyl alcohol intoxication for several years, there are few data on its effectiveness. We observed a patient who received prompt and aggressive ethanol therapy for methanol poisoning and who had no sign of metabolic acidosis or ocular toxicity, despite a high blood level of methanol.

In a suicide attempt a 36-year-old woman ingested approximately 118 ml of gasoline antifreeze (Gas-Flow) containing 95 per cent methanol. A few minutes after ingestion, her husband gave her 118 ml of 40 per cent ethanol. She was admitted to the hospital two hours later, where she received another 118 ml of 40 per cent ethanol, and a 5 per cent ethanol infusion was started at a rate of 166 mg per kilogram of body weight per hour and adjusted every six hours to maintain a blood ethanol concentration between 100 and 150 mg per deciliter. On admission she was conscious, and physical examination was normal. The arterial blood pH was 7.41, partial pressure of carbon dioxide 40 mm Hg, and the bicarbonate 25 mmol per liter. Blood urea nitrogen, creatinine, electrolytes, and results of liver-function tests were normal. The anion gap was normal at 11. The blood methanol concentration on admission was 180 mg per deciliter (measured by gas-liquid chromatography). Two hours after admission the blood ethanol concentration was 110 mg per deciliter.

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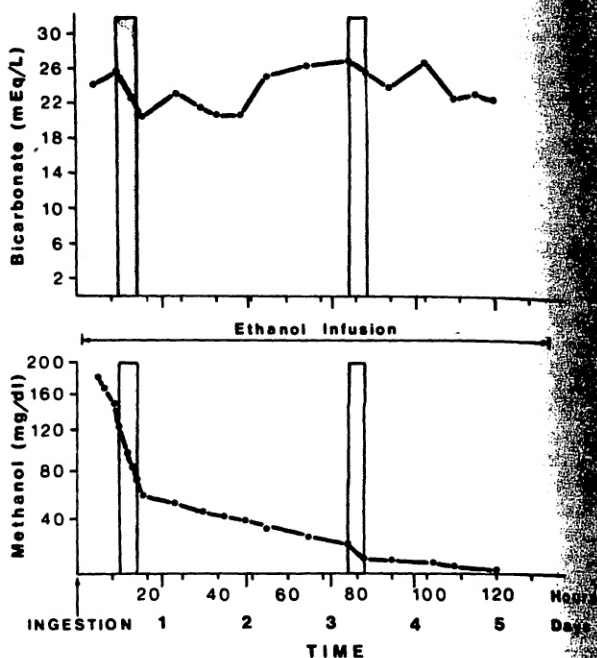


Figure 1. Serum Bicarbonate (Upper Graph) and Methanol Levels (Lower Graph) during Five Days of Treatment with Ethanol. The bars represent the hemodialyses.

Twelve hours after methanol ingestion, the patient underwent a 5-hour hemodialysis, during which the rate of ethanol infusion was doubled. The blood methanol concentration dropped from 120 to 60 mg per deciliter at the end of hemodialysis. With ethanol therapy, the blood methanol level decreased slowly and was still 26 mg per deciliter 50 hours after the first hemodialysis (Fig. 1). A second hemodialysis of four hours resulted in a drop in the methanol level to 11 mg per deciliter. Arterial blood pH and bicarbonate remained normal without administration of sodium bicarbonate (Fig. 1). Fundoscopic examination, visual fields, and acuity showed no abnormalities during the course of hospitalization or at a follow-up visit three months after discharge. This patient had no prior history of chronic alcoholism, hepatic dysfunction, or kidney insufficiency. The blood methanol half-life was calculated to be more than 30 hours.

Despite two hemodialyses, this patient was exposed to toxic concentrations of methanol for three days but had no metabolic acidosis or ocular toxicity even without administration of bicarbonate. This case demonstrates that early and aggressive ethanol treatment can completely prevent the toxic effect of methanol poisoning. It shows also that with appropriate therapy the half-life of methyl alcohol is much longer than previously reported and that some patients need much higher doses of ethanol than those recommended by McCoy et al.* for drinkers and nondrinkers. Therefore, it is necessary to stress the importance of monitoring the blood ethanol level in every patient treated for methyl alcohol poisoning.

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*McCoy HG, Cipolle RJ, Ehlers SM, Sawchuk RJ, Zaske DE. Severe methanol poisoning: application of a pharmacokinetic model for ethanol therapy and hemodialysis. *Am J Med.* 1979; 67:804-7.