



An Interesting Methanol Poisoning: Case Report

İlginç Bir Metanol Zehirlenmesi: Vaka Sunumu

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ABSTRACT

Introduction: We aim to introduce an interesting and rare case that has high potential to be encountered in our country: a methanol poisoning case.

Case Report: A 48-year-old male patient stated that he had been rubbing his legs with denatured alcohol during the last 3 days due to pain in both of his legs. The patient presented to the emergency unit on the 3rd day of his symptoms with abrupt vision loss. No organic pathology could explain the vision loss. Blood gas analysis showed high anion gap metabolic acidosis, and the methanol level was 38 mg/dL. The eye examination revealed 99% vision loss. Since the patient had vision loss and deep acidosis, hemodialysis was performed. The patient was treated with ethyl alcohol and fomepizole. Additionally, 1 mg/kg prednol for 1 month was added to the treatment, based on the advice of the ophthalmologist. On the 2nd month of treatment, the visual acuity in the right eye increased to 1 and to 0.4 in the left eye.

Conclusion: Methanol poisoning can be mortal if not treated properly. Physicians should consider methanol poisoning if a patient who can not give a good history presents with altered consciousness and a high anion gap, and proper treatment should be started accordingly.

ÖZET

Giriş: Biz bu çalışmamızda gerçekten çok ilginç ve nadir görülen fakat özellikle ülkemizde görülme potansiyeli olabilecek bir metanol zehirlenme vakasını sunmayı amaçladık. Metanol oral, inhalasyon ve dermal yolla çok az miktarda alımlarda dahi ciddi zehirlenmeye yol açabilen oldukça toksik bir alkoldür.

Olgu Sunumu: Bu vakada da 48 yaşında erkek hasta bacaklarında ağrı şikayeti nedeniyle son 3 gündür bacaklarını ispirto ile ovduğunu ifade ediyor. Üçüncü gün ani gelişen görme kaybı şikayetinin olması üzerine acil servise başvuran hastanın yapılan nörolojik muayenesi ve görüntüleme yöntemleri sonucu görme kaybını açıklayacak organik bir patoloji saptanmadı. Yapılan kan gazı tetkiklerinde yüksek anyon gapli metabolik asidoz mevcuttu ve kan metanol düzeyi 38 mg/dL olarak ölçüldü. Yapılan göz muayenesinde %99'luk görme kaybı tespit edildi. Derin asidoz ve görme şikayetlerinin olması üzerine eliminasyon amacıyla hemodiyaliz uygulandı. Ayrıca antidot olarak uygulanan etil alkol ve fomepizol tedavisi başlandı. Bunlara ek olarak göz konsültanının önerileriyle 1 mg/kg dozunda, 1 ay süreyle prednol tedavisi de eklendi. Tedavi ile 2.ayın sonunda görme keskinliği sağ göz için 1, sol göz için 0.4'e yükselmiştir.

Sonuç: Metanol zehirlenmesi uygun şekilde tedavi edilmediği zaman ölümcül olabilen bir zehirlenme türüdür. Acil hekimleri iyi anamnez alınamayan, bilinç değişikliği olan, artmış anyon açığı olan hastalarda metanol zehirlenmesi olasılığını düşünmeli ve uygun tedaviye başlamalıdır.

Keywords: Methanol, poisoning, acidosis

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Introduction

Methanol is a colorless, odorless, and bitter alcohol that is found in various solvents, paint-dissolving liquids, varnish, antifreeze, cologne, and denatured alcohol (1). Methanol is a toxic alcohol that can cause serious poisoning, even when taken in low doses orally, by inhalation or dermally (2).

Generally, cases of methanol poisoning are due to accidental or conscious oral intake. However, since the absorption of methanol through the dermal or respiratory route is high, poisoning cases may also be caused by methanol being applied dermally or through inhalation.

People rub their bodies with denatured alcohol or vacuum therapy to relieve muscle aches and for fever. During the application of these methods, methanol can be absorbed through the skin and can reach toxic levels in the blood. In this study, we aim to introduce a rare case, which has high potential to be encountered in our country: a methanol poisoning case.

Case Report

In this case, a 48-year-old male patient stated that he had been rubbing his legs with denatured alcohol during the last 3 days due to pain in both legs. The patient presented to the emergency unit on the 3rd day of his symptoms with abrupt vision loss. After a detailed neurological examination and imaging studies, no organic pathology was found to explain the vision loss. After high anion gap metabolic acidosis was found in his blood gas analysis, a more thorough history was taken, and it was discovered that the patient had been rubbing his legs with denatured alcohol for the last 3 days. The patient was thought to have methanol poisoning, and he was admitted to the toxicology intensive care unit for further investigation and treatment. A loading dose of 10 ml/kg of 10% ethyl alcohol was administered intravenously, and a maintenance dose of 1.5 mL/kg/hr was started. Additionally, after a 15-mg/kg loading dose of fomepizole, a maintenance dose of 10 mg/kg was applied every 12 hours. NaHCO₃ at a dose of 1 Eq/kg, was given to correct the deep acidosis found in the blood gas analysis. During the eye examination, the visual acuity at 1 meter was at the level of finger counting. This translated into approximately 99% vision loss. The patient, having a blood methanol level of 38 mg/kg, had hemodialysis due to acidosis and visual loss. Apart from the administration of ethyl alcohol and fomepizole, as antidotes of methanol, 1 mg/kg prednol for 1 month was added to the treatment, based on the advice of the ophthalmology consultant. On the 2nd month of treatment, the visual acuity in the right eye increased to 1 and to 0.4 in the left eye.

Discussion

Patients with methanol poisoning present to the emergency unit with various complaints. Apart from nonspecific symptoms, such as abdominal pain, nausea, and vomiting, severe symptoms, such

as central nervous system suppression, decrease in visual acuity, and total visual loss, can also be seen in these patients. High anion gap metabolic acidosis can be detected in these patients. Visual problems can be encountered in half of the patients with methanol poisoning. Visual problems can manifest as blurred vision, snowdrop appearance, narrowing of the visual field, hyperemia, paleness of the optic disc, atrophy, venous distention, pupil edema, and blindness (3).

The clinical outcome correlates more with the severity of acidosis rather than the concentration of methanol (4).

The treatment of methanol poisoning consists of decontamination, supportive treatment, and administration of antidote.

Gastric lavage should be done to patients applying within the first hour after oral intake. Gastric irrigation was not performed in this patient, since the methanol poisoning was caused by dermal absorption. Since methanol does not bind very well to activated coal, in cases of poisoning due to oral intake, administration of activated coal is not suggested.

Ethyl alcohol and fomepizole (4-methylpyrazole: specific alcohol dehydrogenase antagonist) can be used as antidotes when indicated. Fomepizole, a competitive inhibitor of alcohol dehydrogenase, inhibits the conversion of methanol to its major metabolite, formic acid. Antidote treatment is indicated in cases when the methanol plasma concentration is >20 mg/dL or if the history indicates intake of methanol in toxic doses and an osmolar gap >10 mOsm/kg H₂O and arterial blood pH <7.35 (mmol/L) (5). Even though fomepizole is more specific and has fewer side effects than ethyl alcohol, studies have not shown a superiority of fomepizole over ethyl alcohol (6). If a patient with methanol poisoning has visual problems, confusion, and deep metabolic acidosis and if the blood level of methanol is more than 30 mg/dL, hemodialysis is indicated (7, 8). In our case, since the methanol level was 38 mg/dL and, apart from the visual problems, since the patient also had high gap metabolic acidosis, treatment with ethyl alcohol and fomepizole was initiated, and one course of 4-hour hemodialysis was performed. The patient responded to the treatment and was discharged from the intensive care unit. However, the patient continued to take steroid, as suggested by the ophthalmology clinic, due to the presence of a decrease in visual acuity. On the 2nd month of steroid treatment, the visual acuity in the right eye increased to 1 and to 0.4 in the left eye.

Conclusion

Methanol poisoning can be mortal if not treated properly. Physicians of the emergency unit should consider the possibility of methanol poisoning if a patient who cannot give a good history presents with altered consciousness and a high anion gap, and proper treatment should be started accordingly.

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References

1. Burkhart KK, Kulig KW. The other alcohols. Methanol, ethylene glycol, and isopropanol. *Emerg Med Clin North Am* 1990; 8: 913-28.
2. Satar S. Alcohol poisoning. *Acilde Klinik Toksikoloji* 2009; 535-9.
3. Sanaei-Zadeh H, Zamani N, Shadnia S. Outcomes of visual disturbances after methanol poisoning. *Clin Toxicol (Phila)* 2011; 49: 102-7. [\[CrossRef\]](#)
4. Cheungpasitporn W, Jirajariyavej T, Kangwanpornsi A. Role of sodium bicarbonate in the treatment of methanol-induced acidosis. *Am J Med* 2012; 125: e15. [\[CrossRef\]](#)
5. Bestic M, Blackford M, Reed M. Fomepizole: a critical assessment of current dosing recommendations. *J Clin Pharmacol* 2009; 49: 130-7. [\[CrossRef\]](#)
6. Megarbone B, Boron SW, Trout H, Hantson P, Jaeger A, Krencker E, et al. Treatment of acute methanol poisoning with fomepizole. *Intensive Care Med* 2001; 27: 1370-8. [\[CrossRef\]](#)
7. Megarbone B, Borron SW, Baud FJ. Current recommendations for treatment of severe toxic alcohol poisonings. *Intensive Care Med* 2005; 31: 189-95. [\[CrossRef\]](#)
8. Kavalci C, Sezenler E, Kavalci G, Cevik Y, Turan M. Methanol poisoning: case report. *JAEMCR* 2011; 2: 14-6. [\[CrossRef\]](#)