

Methanol Intoxication Increasing Again with COVID-19 Pandemic: Clinical Series

COVID-19 Pandemi Salgınıyla Yeniden Artan Metanol Zehirlenmeleri: Olgu Serisi

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ABSTRACT

Methanol intoxication is very rare clinical condition encountered at emergency rooms while numbers started to increase with COVID-19 pandemic. In this clinical series we mentioned about our clinical approach to methanol intoxication patient during COVID-19 pandemic.

ÖZET

Metanol intoksikasyonu çok nadir olarak karşımıza çıkmakta iken COVID-19 pandemisiyle birlikte acil servislerde daha ciddi klinik tablolarda tekrardan görülmeye başlandı. Bu olgu serimizde de pandemi ile mücadele döneminde artan sıklıkta karşılaştığımız metanol intoksikasyonu olgularına klinik yaklaşımımızı derledik.

Keywords:

Methanol Intoxication
COVID-19 Pandemic
Emergency Service

Anahtar Kelimeler:

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INTRODUCTION

Methanol is a clear, colorless, volatile liquid used as an industrial solvent (1). It is easily procured and illegally used for alcohol production due to its cheap price. Although there are individual cases of intoxication, methanol intoxications with mass poisoning and deaths have also been encountered in the history. The most common reported ingestions are secondary to drinking windshield washer fluid as a suicide attempt but intentional ingestion when alcoholic beverages are difficult to obtain is another common reason we see in our emergency service. In our case series, we presented our approach to methanol intoxication cases in the emergency service, the incidence of which increased with the lockdown during the fight against the COVID-19

CASE REPORT

Between 19.12.2021 and 31.12.2021, there were a total of 14 applications to the emergency department resuscitation area with methanol intoxication, two of which were women. In the same period, a nationwide weekend curfew is imposed in our country due to the COVID-19 pandemic. The mean age of the patients was 24 for women and 48±2 for men. In the evaluation of the Glasgow Coma Scale (GCS), 6 patients (42.9%) were evaluated as having GCS score of 3 at the time of admission to the emergency service. 10 patients (71.4%) were intubated during emergency follow-up. Majority of the patients (11 patients) needed intensive medical care and special treatment regimens like hemodialysis and

ethanol infusion. After the first evaluation and emergency interventions, 57.1% of the patients (8 patients) were hospitalized and followed up in the intensive care unit.

Three patients requiring intensive unit care developed cardiac arrest and had cardiopulmonary resuscitation procedures applied in the emergency service. Despite intense emergency care, NaHCO₃ infusion, ethanol infusion and positive inotropic support, these 3 patients died in the emergency resuscitation area. One of the patients who hospitalized for methanol intoxication was infected with the COVID-19 virus and received favipavir and additionally low molecular weight heparin treatment. 11 patients were treated with loading dose of 8 mL/kg ethanol infusion followed by maintenance dose of 130 mg/kg/hour ethanol infusion in serum containing 5% dextrose in saline. Hemodialysis, which also plays an important role in the treatment of methanol intoxication was applied to 78.6 % of the patients (11 patients).

After ophthalmological examination of intoxicated patients, fixed dilated pupils were found in 2 patients, pinpoint pupils were found in 1 patient, and blurred vision and decreased visual acuity were found in 4 patients. 7 patients had normal ophthalmological examination.

Patients who died as a result of methanol intoxication had higher levels of MCV, PaCO₂ and blood urea compared to treated patients. In the terms of the age, average age of death was 62. The reason for older patients having higher mortality is thought to be chronic alcohol addiction leading to withdrawal symptoms, and difficult access

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Table: Distribution of Mean Laboratory Parameters of Methanol Intoxicated Patient (Treated Versus Exitus)

	Treated Patients	Exitus Patients
Age	39.82	62.67
MCV	93.12 fL	111.96 fL
HCO ₃	14.7	5.1
Anion Gap	13.6	21.9
Serum Chloride Levels	112	114
pH	7.1	6.7
PCO ₂	32 mmol/l	40.7 mmol/l
Htc	50	53
Blood Urea	19	26
Potassium	4.6	5.5

to ethanol during curfew causing higher consumption rates of methanol. General features of patients are presented at table. Only 3 patients were discharged from emergency service without need of ethanol treatment and hemodialysis.

DISCUSSION

Half life of methanol is 14-20 hours for mild poisoning and 24 to 30 hours for untreated serious poisonings. Half life of methanol can be reduced to 2.5 hours with hemodialysis treatment (2). The aim of treatment in methanol intoxication is to compete with the conversion of methanol into toxic metabolites. Ethanol is used in the treatment owing its high affinity to alcohol dehydrogenase which is responsible for the conversion of methanol to toxic metabolites (2). Ethanol treatment protocol; 100-150 mg/dl loading, 130 mg/kg/hour maintenance infusion should be continued until methanol serum levels reach zero. These treatment can sometimes last for days. Maintenance dose can be increased to 250-350 mg/kg/hour for patient undergoing hemodialysis. Hemodialysis treatment is very effective in removing methanol and toxic metabolites of methanol and can be continued until serum methanol level is zero or acidosis is over. Schwarz et al. recommends hemodialysis at serum methanol levels of 100 mg/dl and more. However, hemodialysis is also recommended regardless of methanol level in patients with severe acidosis, treatment-resistant fluid and electrolyte disturbances, ocular findings, and kidney failure (2,4). In our series, hemodialysis treatment was applied to 78.6 % of intoxicated patients.

Conflict of interest: Authors declare no conflict of interest.

Ethic: Informed consent was obtained from all patients.

Approval of final manuscript: All authors

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Regarding the complete blood count, Swartz et al. showed that the MCV value decreased in heavy methanol intoxication, but its mechanism could not be fully determined (4). At our series, especially for patients admitted to ICU and for patients died at emergency service, MCV levels were considerably increased (mean 111.96 fL). The reason for this was assumed to be high MCV due to chronic alcohol intake, suggesting that these patients were chronic alcohol consumers and they tended to consume methanol in the shortage of ethanol due to the curfew and their methanol consumption habits were not routine.

Due to the curfew during the pandemic period, it has been observed that different methods are used to provide alcohol and the pandemic has even led to more serious methanol intoxication cases.

Target organ in the methanol toxicity is the retina. It is known that consumption of high amounts of methanol is associated with reversible or irreversible blindness (5). Researches showed that, formic acid, a metabolite of methanol, inhibits cytochrome oxidase in the optic nerve and impairs transfer through axoplasm (6). As eye symptoms; pain, blurred vision, decreased visual field, photophobia, snowy landscape can be detected. The main eye symptoms in our patients were blurred vision and narrowing of visual field. Ophthalmological examination of 7 patients was normal.

Conducted researches showed that mortality in methanol poisoning is directly proportional to the severity of acidosis. In these data, mortality was 19% in patients with PCO₂ less than 20 mmol/l despite treatment, while mortality increased up to 50% in patients with PCO₂ less than 10 mmol/l (8).

For our series mean PaCO₂ level was 40.7 mmol/L for patients who died, strongly different compared to other studies and thought to be associated with increased CO₂ production as a result of methanol metabolism.

As a result of the implementation of curfews during the pandemic period, it has been observed that different methods have been used to supply alcohol. The pandemic has even led to more serious methanol poisoning. As a result, it presents with a more serious toxic clinic.

CONCLUSION

In the history, rare conditions like methanol intoxication showed an increasing trend through pandemics. Despite advanced medical technologies and medical care, methanol toxicity is still a highly mortal medical emergency. Early antidote treatment and hemodialysis are cornerstone treatment regimens applied for methanol toxicity.

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