



Acute Ethanol Intoxication Following Percutaneous Treatment of Liver Hydatid Cysts in a 13-Week Pregnant Patient

Mehmet Sargin, Mehmet Selçuk Uluer, Sadık Özmen

Konya Training and Research Hospital, Anesthesiology and Reanimation Department, Konya, Turkey

Abstract

The clinical picture of ethanol intoxication can present a broad range of signs and symptoms, from mild perception disorders to cardiac arrest and death. Although ethanol intoxication is a common condition, it is reported in literature here for the first time in a patient treated percutaneously for a hydatid cyst of the liver. The case was additionally complex given the fact that the patient was in the first trimester of pregnancy. Presented here is a case of ethanol intoxication in a 13-week pregnant woman who was treated percutaneously using 800 ml of ethanol for a hydatid cyst in the liver.

Keywords: Ethanol intoxication, percutaneous treatment of hydatid liver cysts, pregnant patient

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Corresponding Author: Mehmet Sargin, Konya Training and Research Hospital, Anesthesiology and Reanimation Department, Konya, Turkey

E-mail: mehmet21sargin@yahoo.com **Phone:** +905322662766 **Fax:** +903323236723

Introduction

Ethanol ($\text{CH}_3\text{CH}_2\text{OH}$) is a water-soluble compound that rapidly permeates cell membranes, resulting in ready equilibration between intra and extracellular concentrations [1]. Ethanol can enter the circulatory system in a variety of ways, and can spread to all parts of the body, including the cerebrospinal fluid. It does not bind to plasma proteins, and can pass into fetal circulation through the placenta, where its concentration in fetal blood can equal the concentration in the maternal blood [2].

Ethanol demonstrates its effects in many organ and tissues, primarily in the central nervous system. Symptoms are usually related to blood ethanol concentrations. In normal adults, mild to moderate intoxication presents with a slurring of speech and drowsiness, with the blood levels of 50–150 mg/dL. Moderate to severe intoxication can affect balance, sensations, perception and coordination, and usually occurs at the blood levels of 150–300 mg/dL. Unconsciousness may occur at blood levels of 300–500 mg/dL, while the patient may enter a coma with blood levels of greater than 500 g/dL [3]. Death may occur in individuals with a limited tolerance to ethanol in low concentrations (300 mg/dl), while reversible cases have also been reported in cases of very high blood ethanol concentrations (1200 mg/dl) [4-6].

This paper presents a case of ethanol intoxication in a 13-week pregnant woman who was treated percutaneously for a hydatid cyst of the liver, along with the literature review.

Case Report

A 37-year-old female patient (160 cm, 58 kg) who lost consciousness following the percutaneous treatment of a hydatid cyst of the liver was transferred to the intensive care unit. Based on her past medical history obtained from her relatives and her medical records, the patient was known to be 13 weeks pregnant with no comorbidities. Her Glasgow Coma Scale score was 8, her respiratory pattern was non-specific and her peripheral oxygen saturation was 97% while taking nasal O₂ (4lt/min). Her non-invasively measured blood pressure and heart rate were 115/69 mmHg and 83/ min, respectively. Radial artery catheterization and monitorization was carried out for invasive blood pressure monitorization and arterial blood gas analysis. The patient's arterial blood gas values were, at the time of administration to the intensive care unit, pH 7.33; pCO₂, 23.5 mmHg; pO₂, 176,5 mmHg; and HCO₃, 12.3

mmol/L, BE -12,1 mmol/L and lactate 3,67 mmol/L. It was learned from the intervention team that, due to the high number of the hydatid liver cysts, 800 ml of ethanol had been administered during the intervention for treatment. Routine laboratory tests and blood ethanol levels were ordered, from which it was found that the patient's blood ethanol level was 268.1 mg/dL, while the other laboratory results were within normal limits. An arterial blood gas analysis and a close monitorization of blood glucose were carried out (Table 1), and the patient's blood glucose levels remained stable throughout her stay in intensive care. Dextrose 5 percent in a 0.045 percent NaCl solution was used for hydration, while 100 mg of thiamin was administered. A routine follow-up of temperature measurements demonstrated no hypothermia. Her urine output was more than 100 ml/hour during her follow-up.

In addition, the cyst cavities were irrigated with sterile isotonic fluids, administered through the catheters that had been left in the cysts after a procedure to remove any remaining ethanol from the cysts. The patient started to become alert 6 hours after her admission to the intensive care unit. Her blood ethanol level at the 12th hour was measured as <10 mg/dL, and she was transferred to the general ward after 18 hours, without complications. The fetal heart rate was within normal ranges during an obstetric ultrasonography.

Table 1. Arterial blood gas analysis and blood glucose levels in intensive care

	Access to ICU	1 st hour	3 th hour	6 th hour	12 th hour	Exit from ICU
pH	7,28	7,33	7,33	7,37	7,41	7,42
pCO ₂ (mmHg)	24,1	23,5	23,2	21,2	20,0	22,4
pO ₂ (mmHg)	136,4	176,5	155,5	132,2	116,4	119,5
HCO ₃ (mmol/L)	11,2	12,3	12,0	12,3	12,6	13,5
BE (mmol/L)	-13,9	-12,1	-12,3	-11,1	-10,5	-8,9
Lactate (mmol/L)	3,90	3,67	3,33	2,61	2,17	1,81
Glucose (mg/dL)	114	113	168	120	109	120

ICU: Intensive care unit.

Discussion

Percutaneous treatment combined with albendazole treatment is the preferred alternative treatment to surgical interventions in non-complicated hydatid liver cysts [7]. Various materials such as hypertonic saline, ethanol and polidocanol can be used as a scolicidal agent [8]. Percutaneous treatment is known to have its own risks, such as bleeding, mechanical damage to other tissues, infection, allergic reaction and anaphylactic shock in the event of a leakage of cyst fluid into the intra-abdominal cavity, secondary echinococcosis due to the spreading of the disease and biliary fistula (secondary to acute cystic decompression). A review of the literature revealed no previously reported case of ethanol intoxication after the percutaneous treatment of a hydatid liver cyst.

Hepatocyte cytosolic alcohol dehydrogenase (ADH) metabolizes ethanol in an adult at a constant rate that ranges between 7–10 g/hr. ADH reduces blood ethanol levels by 18–24 mg/dL/hr by converting ethanol to acetaldehyde, NAD to NADH, changing the cytosol redox state and increasing the lactate pyruvate ratio [9].

Blood ethanol levels of between 150 and 300 mg/dL present with effects on balance, sensation and perception, while this in this study patient entered a stupor with a blood ethanol level of 268.1 mg/dL. This can be explained by the fact that the given ranges of blood ethanol levels are valid for normal adults, while the case study patient was 13-weeks pregnant, which is a condition that can cause variations in metabolism and enzymatic activities.

The effects of ethanol on consciousness may vary, while the chronic consumption of ethanol can result in the development of a high tolerance [10]. A case presented with respiratory failure, shock and cardiac arrest, with no evidence of chronic alcohol consumption and a blood ethanol concentration of 1127 mg/dL [11]; furthermore, in another case only mild confusion and abdominal pain was reported in a patient with a history of chronic alcohol consumption and with a blood ethanol concentration of 1501 mg/dL [12].

Treatment in ethanol intoxication is primarily supportive, including intravenous fluids, vasopressor agents, mechanical ventilation support and administration of glucose and thiamin. Mechanical ventilation support was not necessary in our patient, since the respiratory pattern was unchanged, in spite of the stupor, while oxygenation was adequate with nasal O₂ support.

Hypoglycemia was not encountered in this patient since a Dextrose level of 5 percent was used for the hydration of the patient, who was constantly measured for blood glucose levels.

In conclusion, although ethanol intoxication is a very common condition, this is the first report of a case of ethanol intoxication after the percutaneous treatment of a hydatid cyst of the liver. We suggest that patients who undergo percutaneous interventions for such cysts, especially in cases where a high amount of ethanol was used, as was the case in our patient, should be followed-up closely, with attention paid particularly to ethanol intoxication levels.

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