

# A 19-day neonatal case with accidental alcohol intoxication during umbilical care

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## Abstract

Acute alcohol intoxication is a condition frequently defined in childhood, especially in adolescents, and is seen as extremely rare in infants. In this study, acute alcohol intoxication developed after accidentally spilling alcohol with 96% concentration to the face of a 19-day-old neonate during umbilical care is presented because it is a rare case in the neonatal period.

**Keywords:** Acute alcohol intoxication; ethanol; neonatal; skin antisepsis

## INTRODUCTION

Acute alcohol intake is a condition that is frequently defined in childhood, especially in adolescents and is seen as extremely rare in infants. Ten cases are reporting acute alcohol intoxication in the infant age group in the literature so far, and three of these are in the neonatal period. One of these cases is intentional oral alcohol intake (child abuse), one is an accidental oral intake, and third is a percutaneous intake of alcohol (1-3).

Our case is a 19-day-old neonate with accidental alcohol intake. It is presented because acute alcohol intake is rare in this age period.

## CASE REPORT

A 19-day-old baby girl who was born 3700 grams by normal spontaneous vaginal birth as the first survivor of a 26-year-old mother's first pregnancy was brought to the Pediatric Emergency Department due to spilling of alcohol on her face. It was learned from the history that approximately 40 cc of alcohol was spilled to the facial area of the child after the accidental opening of the cover of the alcohol cap used for umbilical care of the child, then a short-term bruise occurred, and the mother washed the child after the incident and brought her to the hospital. The alcohol used for umbilical care had a 96% concentration.

Upon the initial assessment, the baby was in good condition, conscious, and active in general. Vital findings were normal for her age. In his physical examination, there were no signs of pathological physical examination

except for hyperemia in the facial area. The patient was diagnosed with acute alcohol intoxication and followed up. The patient was administered with intravenous fluid with dextrose suitable for her age. Her blood glucose was 145 mg/dL. There was no metabolic acidosis in the blood gas. Her biochemistry and complete blood count were normal. Blood alcohol (ethanol) level was 42.38 mg/dL on the first hour after intake. There was no additional problem in the follow-up of the patient, who was followed up in the emergency observation unit, and her hourly blood glucose rate was normal. The sixth-hour blood alcohol level was <5 mg/dL. At the end of the 24-hour follow-up, she was discharged from the emergency department. Accident-related training was provided to the family.

## DISCUSSION

Ethyl alcohol is found in many food and beverages, household cleaning products, some medicines (furosemide, morphine, and potassium chloride), hand disinfectants, perfumes, colognes, and mouthwashes. Alcohol intoxication may develop by accidental or intentional intake of these, absorption of alcohol-containing products from the skin, child abuse, or smelling of alcohol (2,4). Acute alcohol intoxication in the neonatal period occurs by accidental or intentional administration of alcohol to the baby and it is very rare.

Alcohol intoxication can be seen in newborns and infants with numbness, lethargy, tremor, inattentiveness, weak crying, hypotonia, hypotension, and metabolic

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abnormalities. Hypothermia, hypoglycemia, tachycardia, tachypnea, metabolic acidosis, and coma are typical symptoms of acute alcohol intake, and young children and infants are more prone to the development of these clinical symptoms, even in cases with trace amounts of ethanol intake (4,5). The reason for this is that alcohol elimination is quite slow in children under five since hepatic dehydrogenase activity is relatively immature. This situation decreases the metabolization capacity of ethanol in young children and causes rapid increases in blood alcohol levels and intoxications (6).

Calculation methods used to estimate blood alcohol levels do not provide very accurate results in children under 17 due to differences in total body water and alcohol metabolization rates. Therefore, blood alcohol levels must be checked in all infants and children exposed to alcohol intake (7). Ethanol concentration generally peaks between 30-60 minutes after intake (8). In infants and young children, toxic dose develops with the intake of 0,4 ml/kg ethanol with 100% concentration. In this dose, the peak serum ethanol level is expected to be 50 mg/dL. The toxic dose which causes deep coma with life-threatening respiratory depression develops upon the intake of 4 mL/kg ethanol with 100% concentration. Peak ethanol level of intakes with this dose is higher than 500 mg/dL in this dose (5,9,10).

Blood alcohol levels being >400 mg/dL may cause coma, seizure, hypothermia, acidosis, and death (11). Besides, infants and children are more susceptible to hypoglycemia compared to adults. Therefore, any symptoms observed after intake require immediate intervention. Even if children are asymptomatic, blood glucose must be followed up if the blood alcohol level is above 50 mg/dL (5). In our case, despite the alcohol was spilled to the facial area and was not drunk, it is thought that alcohol with a maximum of 40 cc might be ingested by the patient with an amount over 0,4 mL/kg. In our case, hourly blood glucose was followed up, and hypoglycemia was not detected throughout the follow-up.

In the literature, three cases have been reported in terms of acute alcohol intoxication in the neonatal period to the best of our knowledge. The first case was reported from Japan, a 15-day-old baby girl arriving with a metabolic acidosis chart without flushing, tachycardia, circulatory disorder, somnolence, and hypoglycemia after drinking formula diluted with sake (Japanese wine prepared from fermented rice) by accident.

In this case, the blood alcohol level in the third hour after the intake was found to be 43.0 mg/dL, and she was discharged without complications after intravenous fluid therapy (1). The second case was reported from Taiwan, child abuse of a three-day child brought to the emergency department who was given 50 mL rice wine by the father instead of formula milk, found in the bed one day after the alcohol intake with the cyanotic and non-breathing

state, and brought to the emergency department with cardiopulmonary arrest. Blood alcohol level was determined as 61.0 mg/dL. This case died despite the treatment (2). The last case is a 15-day-old baby reported from France. This is a case that developed a coma clinic and brought to the emergency department upon umbilical care with gauze impregnated with ethanol. The blood alcohol level was found to be 440 mg/dL, and the patient was discharged without complications after intravenous fluid therapy (3). Our case was a patient who developed alcohol intoxication by accidental spilling of the alcohol used for umbilical care on the child's facial area.

Alcohol use in umbilical care is quite common due to its antiseptic properties and low cost. The most frequently recommended concentration of alcohol as an antiseptic agent is a 70% solution of ethyl alcohol due to its bactericidal and fungicidal properties (12). The alcohol concentration used in our case was significantly higher than the recommended concentration. Use of alcohol in skincare, especially in premature babies, can lead to severe skin burns and deaths due to the immaturity of the skin (13). Autret et al. (3) presented a case that is the development of alcohol intoxication of a 15-day-old baby due to percutaneous absorption of alcohol after umbilical care. Although the alcohol used for skincare was spilled on the face in our case, it was thought that the intoxication mechanism was oral alcohol intake because of bruising of the child after the incident and the mother washing the baby right away.

Immature skin barrier in neonates may cause percutaneous absorption at different levels and much percutaneous absorption was reported with intoxication cases. Data are presented on the fact that alcohol is absorbed through the skin in pediatric patients, causes cutaneous hemorrhagic necrosis, and increases blood alcohol level. Alcoholic solutions frequently used in preterm neonates may cause skin burns and systemic toxicity due to percutaneous absorption (14).

Treatment consists of administration of intravenous fluid containing dextrose and the provision of respiratory support if necessary. Hemodialysis can also be used for patients with coma, acidosis, and hemodynamic instability (15). Only one of the cases in the literature died despite appropriate treatment (2), and the others were discharged without any complications (1,3). In our case, she was discharged without complications after fluid therapy.

## CONCLUSION

In conclusion, babies may be exposed to acute alcohol intoxication by percutaneous or oral intake. Therefore, in cases applying with unidentified clinical conditions must bring intoxication in mind. Families must be told that the alcohol used during skincare is not harmless, alcohol may cause intoxication upon absorption from skin, and therefore they must be careful when using alcohol.

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