

Case Report:

A Very Rare Complication of Ethanol Consumption: Non-Traumatic Unilateral Raccoon Eye



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ABSTRACT

Ethanol is a chemical that is easily absorbed in all parts of the gastrointestinal tract. This feature increases the risk of poisoning by ingesting this chemical at any amount; the signs and symptoms depend on the poisoned individual. Common symptoms of ethanol poisoning include sedation, poor coordination, vomiting, slurred speech, ataxia, respiratory depression, coma, and death. A rare manifestation of alcohol consumption is the raccoon eye. This article presents a 5-year-old girl who gradually showed a unilateral raccoon eye following ethanol consumption.

Keywords: Ethanol, Ataxia, Respiratory depression, Child

Introduction

Ethanol is a lipid-soluble compound, so it is easy to be absorbed in all parts of the gastrointestinal tract [1]. Ethanol is available as a drink, antiseptic, cleanser, etc.

Ethanol intoxication or poisoning occurs due to excess consumption. Symptoms of acute ethanol poisoning can widely range from mild sedation, poor coordination, vomiting, slurred speech, ataxia to respiratory depression, coma, and death [2]. Raccoon eye, as a hallmark of traumatic or non-traumatic conditions, is characterized by blood tracking into periorbital tissues, which in turn

leads to blue or purple discoloration around the eyes [3]. In this article, we will introduce a child who showed unilateral periorbital ecchymosis following alcohol consumption. This case is an infrequent complication of ethanol consumption: non-traumatic unilateral raccoon eye.

Case Presentation

Our case was a 5-year-old girl (17 kg) without medical history who was taken to the poisoning emergency department of Al-Zahra Hospital in Isfahan City, Iran, on May 29, 2020, after consuming about 10 mL of 90% ethanol in the last hour.

According to the patient's family, after ethanol ingestion, red spots (petechia) appeared first on the face and under the patient's left eye, and gradually periorbital ecchymosis appeared. No trace of trauma was observed anywhere on the patient's body. The patient had not vomited.

At the time of hospitalization, she had no signs of drowsiness, nausea, vomiting or slurred speech, etc. The patient just consumed a pediatric iron supplement. The patient had no history of bleeding disorders.

Her vital signs were as follows: respiratory rate 24/min, pulse rate 125/min, O₂ saturation 97%, temperature 36.7°C, and Glasgow coma scale of 15/15. Her protein/creatinine ratio was 1.5, and urine analysis revealed 1+ proteinuria with a specific gravity of 1012. In addition, a periorbital ecchymosis in the left eye and red spots in the right periorbital and frontal areas were seen (Figure 1). Visual acuity and field were normal, pupils had normal size and were symmetric and normally reactive to light, and there was no other abnormal point in physical examination.

The first Venous Blood Gas (VBG) results were pH: 7.25, PCO₂(mmHg):38, HCO₃ (mEq/L):16.7, and the second VBG after 4 hours was pH: 7.4, 32.2 PCO₂(mmHg), and HCO₃ (mEq/L): 19.7. The patient's coagulation tests (prothrombin time, partial thromboplastin time, and international normalized ratio) and CBC (Cell Blood Count) were normal.

One of the limitations of this case was the unavailability of blood ethanol and acetaldehyde level test for better evaluation of the patient. Toxic panels for opioids, amphetamines, cannabinoids, benzodiazepines, and tricyclic antidepressants were negative.



Figure 1. Unilateral periorbital ecchymosis (Raccoon eye) at presentation

The patient was admitted, and supportive care with IV fluid therapy and vital sign observation was started. Furthermore, brain CT was done, and it was normal. Due to the normality of the above tests, the bleeding time was checked, which was 3 minutes by the Duke method.

During the patient's observation, the vital signs and level of consciousness remained normal, and no complaints were observed. The patient was discharged after 12 hours of observation and general well-being.

Multiple functional abnormalities of renal tubules may be associated with ethanol-induced changes in membrane composition and lipid peroxidation. The high content of long-chain polyunsaturated fatty acids makes the kidney vulnerable to oxidative damage. Renal ultra-structural abnormalities due to ethanol exposure may be important in the genesis of some functional disturbances in the kidneys, like increased oxidative stress and endothelial dysfunction.

The appearance of transient proteinuria was expected in ethanol consumption. After ethanol consumption, its metabolites go through the kidneys and are excreted into the urine. Its content in the urine is higher than that of the blood and the liver. Multiple functional abnormalities of renal tubules may be associated with ethanol-induced changes in membrane composition and lipid peroxidation. The vulnerability of the kidney to oxidative damage has been partly attributed to its high content of long-chain polyunsaturated fatty acids, increased oxidative stress, and endothelial dysfunction.

Discussion

Periorbital ecchymosis or raccoon eye usually occurs following a trauma to the head and facial or traumatic procedures such as rhino or ear surgery [4]. However, it can also occur in various medical conditions from fragile capillaries (spontaneous rupture) to coagulopathy disorder to non-traumatic diseases, such as amyloidosis, migraine, neuroblastoma, leukemia, and multiple myeloma [1, 5, 6]. Amyloidosis associated with multiple myeloma is a key factor in the pathogenesis of the raccoon eye. In patients with multiple myeloma, infiltration of amyloid protein in capillaries plays an important role in the progression of raccoon eye [7]. Varim et al. reported a 64-year-old male patient who presented unilateral periorbital ecchymosis, diagnosed with multiple myeloma [8].

There are few studies regarding ethanol-induced ecchymosis. Alamri et al. described a case with periumbilical ecchymosis. The patient had a history of ethanol abuse and hepatitis C infection without any history of abdominal

trauma [9]. Kageler et al. reported a case of spontaneous hyphema, which was developed after consuming 10-15 oz ethanol and aspirin. The patient was a 42-year-old white woman whose initial symptoms were pain, lacrimation, photophobia, and decreased visual acuity in the left eye, which gradually became hyphema. They found that the bleeding time was prolonged. The patient was monitored for 14 days and the bleeding time and hyphema normalized after 14 days; the authors claimed that the cause of bleeding was impaired platelet function [10]. The mechanism may be coagulopathy due to thrombocytopenia or impaired platelet function [11]. In our patient, platelet dysfunction can be the cause of this complication.

Conclusion

To the best of our extensive search, this is the first report of raccoon eye following ethanol consumption. In the case of raccoon eye, the physician should suspect ethanol consumption in the patients without a history of trauma or non-traumatic diseases. The underlying pathophysiological mechanism of raccoon eye after ethanol poisoning is still unknown. Future studies should be performed to elucidate the main cause and pathophysiological mechanisms of this phenomenon. Other differential diagnoses of raccoon eye include coagulopathy and metastatic neuroblastoma with orbital involvement [12]. Other causes of raccoon eye are retinal detachment, hyphema corneal laceration, and any collection of blood in the periorbital cavity [13].

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. The participants were informed of the purpose of the research and its implementation stages. They were also assured about the confidentiality of their information and were free to leave the study whenever they wished, and if desired, the research results would be available to them.

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Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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