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Pathology

Unmasking Occult Cerebral Calcium Oxalate Crystals on Autopsy after Snake Envenomation – A Rare Case Report

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Abstract | **Case Report**

There are various documented lethal mechanisms induced by Snake bite leading to death. These are – Venom-induced consumption coagulopathy [VICC], acute renal failure, neurotoxic respiratory arrest, multiorgan necrosis and Myocardial infarction. The frequent histological autopsy findings are glomerular and tubular necrosis, pulmonary edema and hemorrhage, liver congestion, affected site of bite [skin and soft tissue] will show acute inflammation, dermal necrosis, congestion and hemorrhage. Hemorrhage will be noted in Pituitary and adrenal glands. Here, we report an extremely rare case of intracerebral calcium oxalate crystal deposition on autopsy after snake bite in a 25 year old male. No case has been reported yet with calcium oxalate crystals in brain after snake envenomation.

Keywords: Calcium oxalate, intracerebral, crystals, snake bite, autopsy.

INTRODUCTION

Deposition of calcium oxalate crystals in human tissue was first described by Lepoutre [1925] and cited by Hughes [1959]. Their deposition in Central nervous system appears exceptionally rare. [1]. Etiology related to calcium oxalate crystal deposition could be Hereditary or acquired. Primary hyperoxaluria and oxalosis is a rare and autosomal recessive disorder. Most common secondary cause is Ethylene glycol poisoning. Ethylene glycol is a toxic alcohol with physical properties of being colourless, odourless, sweet in taste and soluble with water, acetone and ethanol. It is used as a cooling liquid in radiators, textile and cosmetic industries. Its presence is also noted in several commercially available chemicals like antifreeze, brake fluid, stabilizer of sparkling agents, liquid for domestic radiators and plasticizer for glue. Ethylene glycol intoxication is often accidental or suicidal or homicidal or due to occupational exposure. Initially, ethylene glycol is metabolized into glycoaldehyde and glycolic acid, which is then converted into glyoxylic acid. Final metabolites of glyoxylate intermediate are formic acid, oxalic acid and valeric acid. The oxalic acid combines with Calcium ions leading to formation of calcium oxalate crystals which are found in urine and different organs [2].

CASE REPORT

25 year old male was brought dead in the emergency of GGSMC Faridkot with alleged history of snake bite on right foot. On examination a puncture wound measuring 0.4 cm x 0.2 cm was present over lateral side of foot, 2cm below lateral malleolus. There was no evidence of consumption of any alcohol, ethylene glycol or any toxic element. We received visceral organs including heart, part of lungs, brain, liver, spleen and kidney in the department of Pathology GGSMC Faridkot. Histopathology shows presence of calcium oxalate crystals in brain parenchyma [Fig 1 and 2]. Heart shows atherosclerosis of left coronary artery. Lungs show features of Chronic bronchitis. Spleen, kidney and liver were unremarkable. In the literature, no study was found showing a link between snake bite and formation of calcium oxalate crystals. Here, we report an extremely rare case of intracerebral calcium oxalate crystal deposition at post mortem after snake bite.

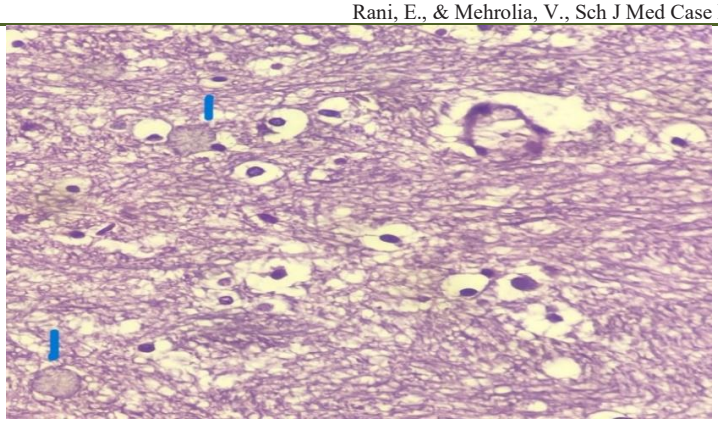

Fig. 1: H& E stained [400x] section shows calcium oxalate crystals in brain parenchyma[blue marker]

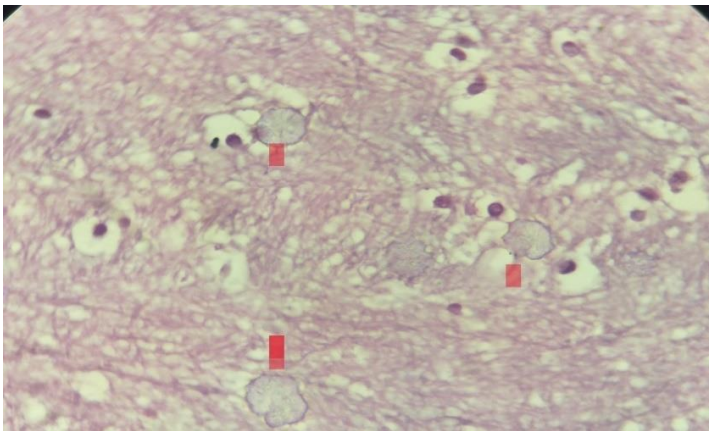

Fig. 2: H&E stained [1000x]- Calcium oxalate crystals in brain parenchyma [highlighted with red marker]

DISCUSSION

There are various documented lethal mechanisms induced by Snake bite leading to death. These are – Venom-induced consumption coagulopathy [VICC], acute renal failure, neurotoxic respiratory arrest, multiorgan necrosis and Myocardial infarction. The frequent histological autopsy findings are glomerular and tubular necrosis, pulmonary edema and hemorrhage, liver congestion, affected site of bite [skin and soft tissue] will show acute inflammation, dermal necrosis, congestion and hemorrhage. Hemorrhage will be noted in Pituitary and adrenal glands. [3] In our case brain parenchyma shows presence of calcium oxalate crystals, which is an unusual and rare finding. Reasons for calcium oxalate crystal deposition could be Hereditary or acquired. Primary or hereditary hyperoxaluria and oxalosis is an autosomal recessive disorder. Secondary cause is Ethylene glycol poisoning. Ethylene glycol is a toxic alcohol with physical properties of being colourless, odourless, sweet in taste and soluble with water, acetone and ethanol. It is used as a cooling liquid in radiators, textile and cosmetic industries. Its presence is also noted in several commercially available chemicals like antifreeze, brake fluid, stabilizer of sparkling agents, liquid for domestic radiators and plasticizer for glue. Ethylene glycol intoxication is mostly accidental and is seen in children. It could be suicidal or homicidal or due to occupational exposure. [2]

In acute poisoning with ethylene glycol, clinical symptoms are non-specific and simulate other intoxications. The toxicological examination is confirmatory, that determines the presence of ethylene glycol or its metabolites in victim's blood. [4,5]

Renal biopsy plays a major role in diagnosing the chronic intoxication or low dose ingestion of ethylene glycol. The kidney biopsy will show presence of calcium oxalate in kidney tubules. [6]

Treatment in acute intoxication includes stomach decontamination and specific antidote: ethylic alcohol or fomepizole. [7,8]

Autopsy examination will identify signs of asphyxia, stasis, cerebral edema, haemorrhagic gastric mucosa and renal failure, if death occurs within 24 hours of acute poisoning. Death may occur due to renal failure or septic complications. Presence of calcium oxalate crystals in tissues, will confirm the ethylene glycol poisoning in cases of longer survival of the victim. [9,10,11]

In our case, no documentation and evidence were present regarding ethylene glycol poisoning. We received organs in the department of pathology after autopsy with alleged history of death due to snake bite. Histopathological finding showed calcium oxalate

crystals in brain parenchyma. Considering the findings we are documenting a rare case of intracerebral calcium oxalate crystals in snake bite victim on autopsy.

CONCLUSION

Occult Cerebral Calcium Oxalate Crystals at Post- mortem after snake envenomation is an uncommon finding. It should be considered a differential diagnosis in visceral oxalosis. Histopathology is the gold standard for diagnosis.

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