

Poisoning by Wild Yam: Dioscorea - A Case Report

Saagar Singh

PG RMO 3rd Department of Forensic Medicine and Toxicology, Gandhi Medical College, Bhopal, M.P.

Received: 24-07-2022 / Revised: 29-08-2022 / Accepted: 25-09-2022

Corresponding author: Dr. Saagar Singh

Conflict of interest: Nil

Abstract

People from rural areas, who are less accessible to or are reluctant about medical services, sometimes prefer local traditional medicine practitioner for treatment of common ailments. But because they are not aware of the fact that such practitioners lack scientific knowledge, they suffer the serious consequences of such primitive treatments. These people are often served some kind of a plant root preparation and may lead to a fatal event from an overdose of such medication. One such case is reported here who after the advice of such a traditional medicine practitioner ended in a fatal event as a result of overdose of a root preparation from bitter yam. This article also describes the clinico- pathological aspects of bitter yam poisoning.

Keywords: Poisoning, bitter yam, Dioscorea, dioscorine

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Introduction

Bitter yam poisoning occurs when the yam is eaten raw, undercooked or not handled properly.^{1,2} Common ways to prepare this type of yam in our environment includes soaking it in water for several hours (usually overnight) and to dry it. Toxic components include histamines, furanoidnorditerpenes and dioscorine. The effects of histamine usually lead to allergic reactions, furanoidnorditerpenes (diosbulbins A and B) are responsible for the bitter taste of the tuber, while dioscorine effects manifest as gastrointestinal or central nervous system pathology. Individuals with bitter yam toxicity may experience a variety of symptoms ranging from allergic rashes to gastrointestinal disturbances such as vomiting and/or diarrhea. In severe cases, the central nervous system may be involved

manifesting as convulsions and/or coma. Dioscorine induces convulsions, among other central nervous system symptoms, when a piece of tuber weighing about 100 grams or more is swallowed. Unprocessed plant extract causes severe acute kidney injury with seizures and toxic encephalopathy. Mechanism of associated toxic encephalopathy has not been reported. [1,2,3,4,8]

This type of yam is said to have originated in Latin America, among other places, but has now become a common starchy delicacy in Southeast Asia and Africa. In central India, yams are prepared by finely slicing, seasoning and frying. In South India, this vegetable is a popular addition to rice dishes and curries. Purple yam, *D. alata*, is also eaten in India, where it is also called violet yam. The species can be

referred to under the regional name "taradi", which can refer to Dioscorea belophylla, Dioscorea deltoidea, and D. bulbifera. [5]

Case History & Autopsy Findings

A 65-year-old man was suspected of having stomach ailments for some past few days. According to the history provided by the relatives, he was advised by a traditional medicine practitioner to take a preparation made from the roots of some plant, but

probably the person took more than was necessary for immediate relief. Following ingestion, post dinner within 2-3 hrs, he started having burning pain in throat and stomach followed by severe vomiting and diarrhea, fell unconscious almost immediately and suffered a convulsion. The person died before any proper medical help could be provided. The person was thus brought dead to the casualty of our hospital in the early hours of the morning and shifted to the mortuary for Post mortem.



Figure 1: A Piece of tuber retrieved from clothing of person.



Figure 2: Hemorrhagic mucosa of stomach.

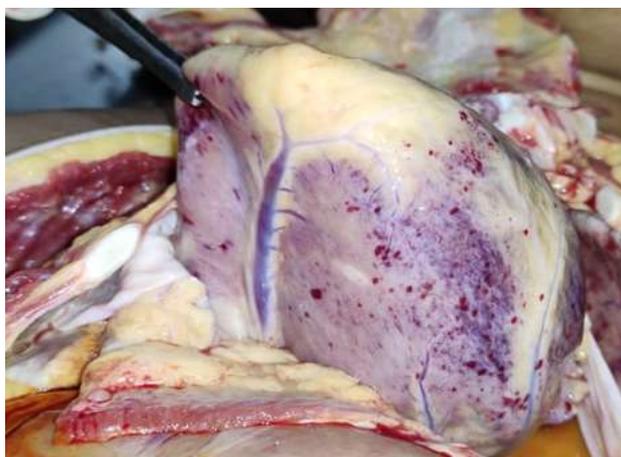


Figure 3: Epicardial surface of heart with hemorrhages

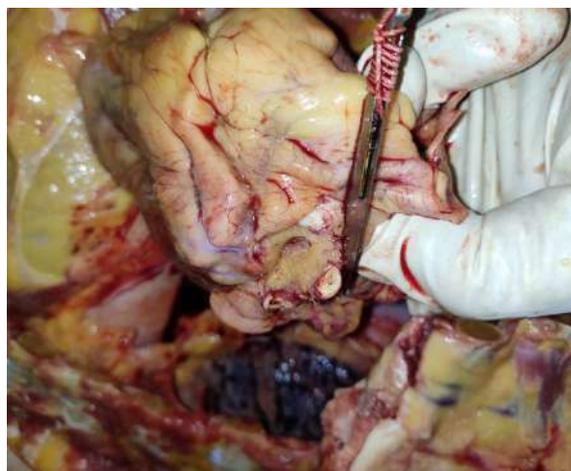


Figure 4: Atherosclerotic changes in heart.

Upon external examination the clothes, comprising of kurta (traditional shirt) and dhoti were covered in vomitus over the anterior chest aspect, neck and collar region

and the upper back. The deceased was of average built. The body was cold to touch, rigor mortis was well developed all over the body, post mortem lividity was faint purple

and was not fixed, present upon the back and posterior aspect of the body. No injuries were noted on the body. Nostrils and mouth were covered with yellowish color mucoid material. Upon proper examination of the kurta we found 3 tubers with dark brownish color rough skin and yellowish, orange color softer meat part and

light pinkish color buds. The total weight of the tubers were 212 grams which were identified by the relatives as the medicine provided by the traditional medical practitioner, were subsequently sealed signed and handed over to the police for chemical and toxicological analysis.

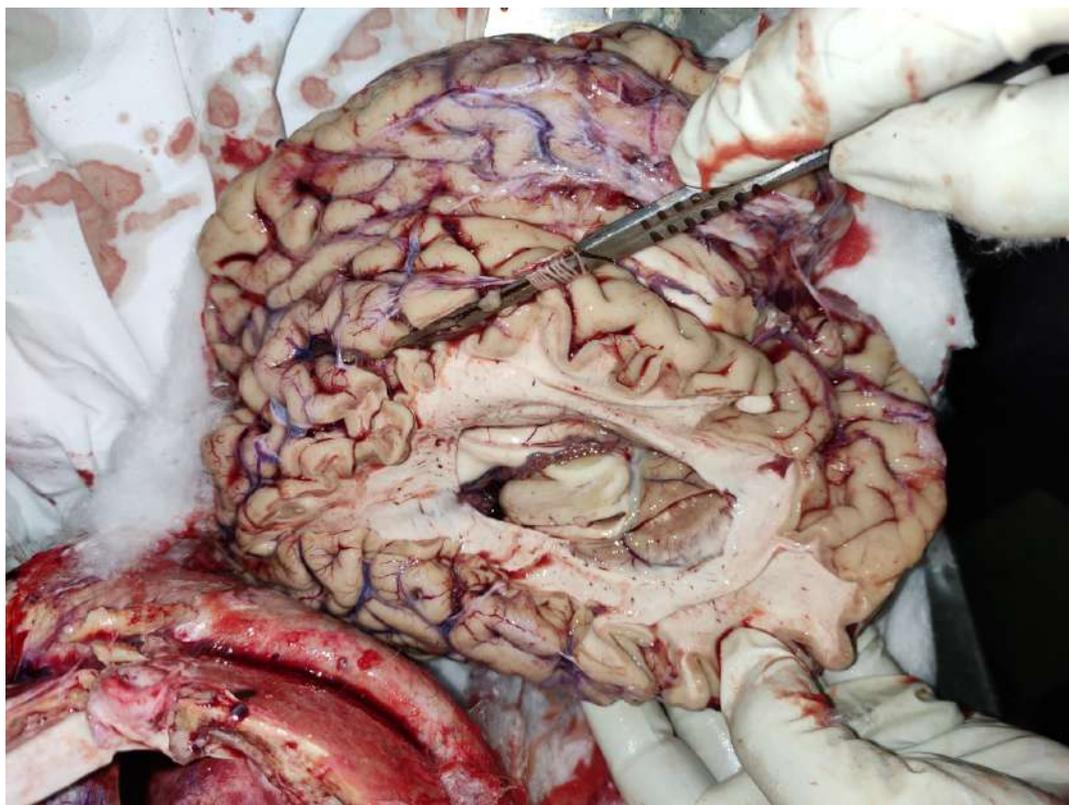


Figure 5: Congested and hemorrhagic brain parenchyma.

Internal findings include inflammation of the stomach wall with punctate hemorrhagic points over posterior wall and greater curvature, petechial hemorrhages over epicardial surface of heart, lower lobes of lungs and white matter of cerebral hemispheres. Stomach contents along with the other normal organs were sent for chemical analysis. All organs were congested and edematous. Trachea was filled with yellowish color mucoid material and tiny bits of food particles, with some pieces lying in the terminal branches of the tracheobronchial tree. Hence death was opined as asphyxia as a result of aspiration. Examination of heart revealed mild to moderate atherosclerotic deposition in the

left anterior descending artery and the left circumflex, amounting to stage two coronary blockage with no patches of old.

Discussion

Bitter yams can be unpleasant or even toxic, causing vomiting, diarrhea or even central nervous system problems if consumed in large quantities without proper processing or eaten raw. Processing usually involves soaking or boiling in water for long hours until fully cooked. Yam is particularly difficult to cook. This is due to the difficulty in separating the yam tissue cells during cooking. The heaviness is due to the hydrolysis of phytate, which leads to the deposition of a lignin-like material that

makes the cell wall stronger. Dioscorine content of bitter yam was found to decrease from an average of 168.7 mg/100 g to 124.2 mg/100 g after prolonged cooking. This 30 percent reduction in the alkaloid content of yam is supposedly the reason for its safety after prolonged cooking. [6,7]

The toxic constituents of yam species include toxic alkaloids called dioscorine. Others include histamine and saponins. Dioscorine induces convulsions, among other central nervous system symptoms, when a tuber fragment weighing about 100 g or more is consumed raw. Natives of Africa are said to have once used extracts of wild bitter yam to make poisoned arrows. Raw extract of the tuber contains dioscorine and histamine. Histamine has been reported in bitter yam as the main allergen, causes mild inflammation and itching. The unpleasant character of the tuber has been attributed to the group of furanoidnorditerpene compounds it contains. Barbiturates have been reported to have significant results in controlling dioscorine-related symptoms - although there is little information on this - while allergic symptoms are treated conservatively with antihistamines and other allergy medications. [1,2]

Conclusion

It is quite scary that the same crop that is used for a regular meal by any people can be poisonous with fatal consequences if not treated properly before consumption. Therefore, public awareness must be promoted in areas where this plant is a staple food or used for medicinal purposes. In fact, if there are, alternative tubers/other yam species, the crop could be completely avoided as a household staple. People should be informed about the possible adverse effects of non-detoxified herbs.

Additionally, herbal medicines which can induce severe side effects need to be classified as prescription drugs and to be regulated more strictly.

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