Gloriosa superba ingestion: Hair loss and acute renal failure

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ABSTRACT

Gloriosa superba is a plant that grows wild in several parts of South India. Tubers of this plant contain several alkaloids. Acute intoxication following the ingestion of *G. superba* results in gastrointestinal and haematological abnormalities, hepatic and renal insufficiency, cardiotoxicity and hair loss. We present a case with typical features of G superba toxicity.

Key words: Acute renal failure, *Gloriosa superba*, hair loss

Introduction

Gloriosa superba is a plant that grows wild in several parts of South India. The tubers of this plant have been found to contain several alkaloids. Acute intoxication associated with the ingestion of *G. superba* is indistinguishable from colchicine toxicity.

Case Report

A 38-year-old man presented with nausea, vomiting and loose stools of 2 days duration. Patient gave history of consumption of a tuber taken from the nearby forest with the intent of deliberate self-harm. Patient has consumed the tuber 6 days prior to the presentation. It was followed by nausea, vomiting, loose stools and haematochezia on 4th day. He also complained haematuria and bleeding from gums and rectum on 5th day. On 6th day he observed scalp hair fall, and easy pluckability of beard, moustache and body hair. He also complained oliguria on day 6. Patient's wife has brought the tuber. It was identified as *G. superba*. Patient revealed that he had consumed 250 g of the tuber along with water.

Patient had no history of any illness. He was apprehensive, with pulse rate of 120 bpm, blood pressure 70/40 mmHg, febrile, with congestion of conjunctivae. The pillow and bed were full of his hair. Patient himself demonstrated easy pluckability of hair. His investigations were, haemoglobin 6.0 g/dl, total leucocyte count 14,000/mm^3, differential count: polymorphs: 60, lymphocytes 30, monocytes 5, eosinophils 5%, erythrocyte sedimentation rate 40 mm after first hour, platelet counts 0.24 lakhs/mm^3, peripheral smear showed no abnormal cells and no features of haemolysis, there was thrombocytopenia, random blood glucose 120 mg/dl, serum creatinine 5.4 mg/dl, blood urea 188 mg/dl, serum sodium 127 mEq/L, serum potassium 3.9 mEq/L, serum chloride 88 mEq/L, serum bicarbonate 12.0 mmol/L, serum bilirubin 1.0 mg/dl, serum glutamic oxaloacetic transaminase 45 U/L, serum glutamic pyruvic transaminase: 65 U/L, serum alkaline phosphatase 125 U/L, serum proteins 6.9 g/dl, serum albumin 4.3 g/dl, serum creatinine kinase 65 IU/L (reference range: 40–200 IU/L), fractional excretion of sodium <1%, urine microscopy showed plenty of red blood cells and urine myoglobin was negative. Ultrasound abdomen revealed normal sized kidneys. Electrocardiogram showed T inversion in V4, V5, and V6. Chest radiograph was normal.

He was initiated on intravenous fluids, sodium bicarbonate supplementation and ionopressors. He was

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transfused with two units of whole blood. Blood pressure improved after 24 h. The bleeding manifestations subsided over next 72 h. Serum creatinine fell over next 6 days. Hair loss continued for next 10 days. He lost entire scalp hair. Patient regained scalp hair after 4 months.

Discussion

Gloriosa superba [Figure 1] is a plant of the family Colchicaceae. Common names of this plant include flame lily, climbing lily, creeping lily, glory lily, gloriosa lily, tiger claw and fire lily. Names in other languages were *kalihari* (Hindi) and Nabhi and Nagati Gadda (Telugu). *G. superba* is used in traditional medicine practised in tropical Africa and Asia (including Ayurveda). The extracts from seeds are effective in the treatment of acute gout, intestinal worms, infertility and wounds. The roots and leaves used as an antidote for snake bite. However, the tuber is poisonous and not to be consumed. It is widely cultivated in Tamil Nadu, Andhra Pradesh, Orissa in India and also in Sri Lanka and Australia. In Africa, it is cultivated in Nigeria and Zimbabwe. It is the state flower of Tamil Nadu and the national flower of Zimbabwe.[1]

There are several alkaloids in tubers of this plant. Colchicine, gloriosine, superbine and salicylic acid are the most important ones. Poisoning with *G. superba* is indistinguishable from colchicine overdose.[2]

Colchicine inhibits microtubule polymerization by binding to tubulin, one of the main constituents of microtubules. Availability of tubulin is essential to mitosis, and therefore colchicine effectively functions as a "mitotic poison" or spindle poison. This effect is greatest on cells with rapid turnovers like bone marrow and gastrointestinal epithelium provoking diarrhoea and decreasing absolute number of short-living blood cells, granulocytes and thrombocytes.[3] It is considered as second-line therapy of gout because it has a narrow therapeutic window and a high rate of side effects.[4] The main untoward effects of colchicine include nausea, vomiting, diarrhoea, and abdominal pain, bone marrow suppression and proximal myopathy, when used for prolonged periods.[4]

Figure 1: Leaves and tubers of *Gloriosa Superba*

There are three sequential and overlapping phases of colchicine poisoning. (1) 10–24 h after ingestion-gastrointestinal phase mimicking gastroenteritis; (2) 24 h to 7 days after ingestion –phase of multi-organ dysfunction. Death results from rapidly progressive multi-organ failure, involving bone marrow suppression, kidney and liver failure, acute respiratory distress syndrome, arrhythmias and cardiovascular collapse, and neuromuscular involvement. Delayed presentation, pre-existing renal or liver impairment are associated with poor prognosis. (3) Recovery typically occurs within a few weeks of ingestion, but with rebound leucocytosis and alopecia.[5,6]

Acute renal failure in our patient might be pre-renal due to hypovolemic shock. The fractional excretion of sodium and improvement with rehydration suggested this possibility. Rhabdomyolysis, multi-organ failure and possible direct toxicity on the proximal renal tubules are other mechanisms of acute renal failure.[6] Petechial haemorrhages were noticed on kidney surface on postmortem of a patient died after consumption of this tuber.[7] Disseminated bleeding is related to thrombocytopenia and hepatic dysfunction leading to a reduction of clotting factors.

The first step of treatment is timely gastrointestinal decontamination with activated charcoal. Very large, recent (<60 min) ingestions may warrant gastric lavage. Administration of granulocyte colony-stimulating factor might help in combating haematological cell deficiency. Fab fragment antibodies for colchicine poisoning has been used, it is not commercially available.[5]

The combination of alopecia and renal disease is possible in systemic lupus erythematosus, end-stage renal disease and after use of heparin, tacrolimus, antihypertensive like beta-blockers, statins like atorvastatin, and anti-cancer medications.

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