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Indian Journal of Forensic and Community Medicine

Journal homepage: <https://www.ijfcm.org/>

Case Report

Death due to kodalikkizhangu poisoning: A case report

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ARTICLE INFO

Article history:

Received 30-05-2022

Accepted 12-06-2022

Available online 22-06-2022

Keywords:

Autopsy findings

Kodalikkizhangu

Colchicine

Poisoning

ABSTRACT

Deaths due to accidental ingestion, suicidal consumption and homicide poisoning with colchicine alkaloid containing extracts have been documented and reported in innumerable literature across the world. The lowest reported lethal dose of oral colchicine are 7-26 mg. *Gloriosa superba*, regionally known as Kodalikkizhangu is a highly poisonous flowering plant, seen wide spread in south and south East Asia. Colchicine is concentrated in the seeds and tubers of the plant. Colchicine content of *Gloriosa* tuber is 0.3%. These tubers are often mistaken as yams and accidentally ingested. Ingestion of tubers of *Gloriosa* results in colchicine poisoning. Toxicity of *Gloriosa* is due to the anti-mitotic effect of its toxic principle namely colchicine and Gloriosin on the rapidly proliferating cells such as stomach and oesophagus. Cardiac manifestation of *Gloriosa* poisoning is due to the impaired cardio myocyte conduction and contractility. Deaths in these cases are due to multi-organ failure. No specific antidote is available. A 71-year-old male who was a chronic alcoholic and known hypertensive got admitted in toxicology ward, with symptoms of acute gastroenteritis, 11 hours after alleged consumption of tubers of a wild plant. 24 hours after ingestion the patient succumbed to death and post-mortem was done to establish cause of death.

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1. Case Report

A 71-year-old male residing in Thiruvallur district, Tamil Nadu who is a chronic alcoholic & known hypertensive and on irregular treatment got admitted in Toxicology ward, Rajiv Gandhi Government General Hospital (RGGGH) with Symptoms of abdominal pain, vomiting and diarrhea. He gave a history of consumption of two tubers of a wild plant 11 hours before admission. Hydration was fair; vitals were stable at the time of admission. Blood sent for lab investigations which showed Serum Creatinine- 3.3 mg/dl, Blood Urea- 82 mg/dl, Aspartate transaminase- 272 U/L, Alanine Transaminase- 174 U/L, Serum Creatine kinase- 225 U/L, HIV, HCV, HBsAg – negative, increased neutrophils. Gastric lavage was done and the old man was

given symptomatic treatment. ECG was normal. 17 hours after consumption the patient went for respiratory failure following which he was intubated. Patient later went into sudden cardiac arrest and was revived but couldn't survive for long and later succumbed. Patient declared dead due to Respiratory failure/ MODS/ plant poisoning. Time interval between tuber consumption & death – 21 hours, Body sent to RGGGH Mortuary.

1.1. Postmortem was conducted and findings noted

External findings include moderately nourished and moderately built male body with yellowish discoloration of oral mucosa. Post mortem hypostasis fixed on the back with areas of contact pallor. Cornea – hazy; pupils dilated and fixed. There were no external or internal injuries anywhere on the body.

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1.2. Internal findings of the organs were noted

Scalp, Vault, Duramater and Base of Skull: Intact; Brain: oedematous; cut section: Normal.

30ml of straw coloured fluid in both the thoracic cavities.

Heart: Normal in size; Multiple sub epicardial petechial haemorrhages on the anterior surface of the heart; cut section: All chambers contained clotted blood; Valves: Normal; Coronaries: Patent; Great vessels: Multiple raised atheromatous plaques on the origin of arch of aorta.

Lungs: Voluminous and oedematous; multiple sub pleural Petechial and ecchymotic haemorrhages on the interlobar fissure and lateral aspect of both the lungs; cut section: Congested.(Figures 1 and 2)

Larynx and Trachea: Empty and intact; Hyoid bone and other laryngeal cartilages: Intact



Fig. 1: Voluminous and oedematous lungs



Fig. 2: Cut section of lung showing Congestion



Fig. 3: Stomach: Contained 125 ml of black colour fluid with no definite smell; cut section: Patchy areas of congestion

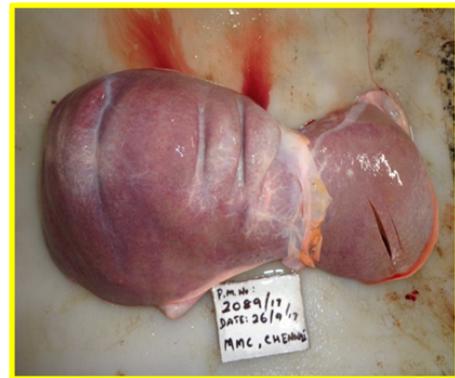


Fig. 4: Liver: Normal in size; multiple lobulations seen on the anterior aspect of right lobe; cut section: Congested



Fig. 5: Kidneys: Normal in size

Spleen: Normal in size cut section: Congested

Bladder: Intact and empty.

Ribs, Pelvis and Spinal column: Intact.

Viscera includes portion of brain and liver, one half of each kidney, 30 cm of proximal small intestine, stomach and its contents and blood were preserved and sent for chemical analysis.

Tissue bits of liver, kidney, spleen and heart were preserved for histopathological examination.



Fig. 6: Cut section of kidney showing congestion

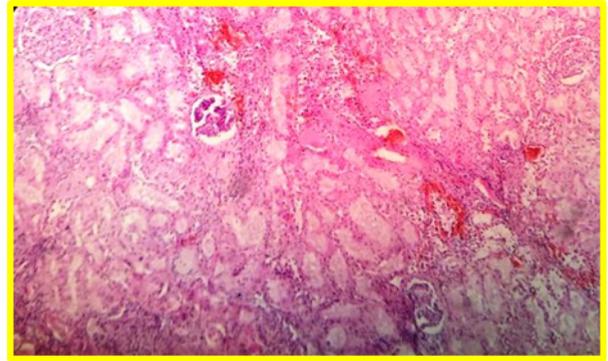


Fig. 8:

1.3. Opinion as inferred from the post-mortem report

Reserved pending the reports of chemical analysis of viscera and histopathological analysis of tissue bits.

1.4. Histopathology examination was done and inference recorded

Section studied from liver showed features of congestion, balloon degeneration of hepatocytes.(Figure 7)

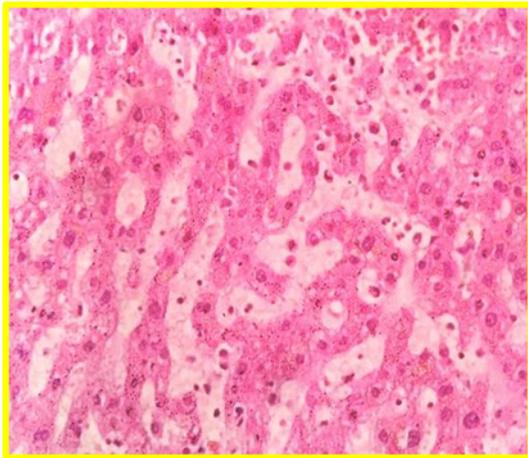


Fig. 7:

Section studied from kidney showed features of chronic pyelonephritis and hyaline arteriosclerosis of blood vessels.(Figure 8)

Section studied from spleen showed features of congestion.

Section studied from heart showed normal muscle bundles with no obvious pathology.

Stomach: showed lymphocytic infiltrates and haemorrhage.(Figure 9)

Lung: features of congestion and anthroctic pigments also seen.(Figure 10)

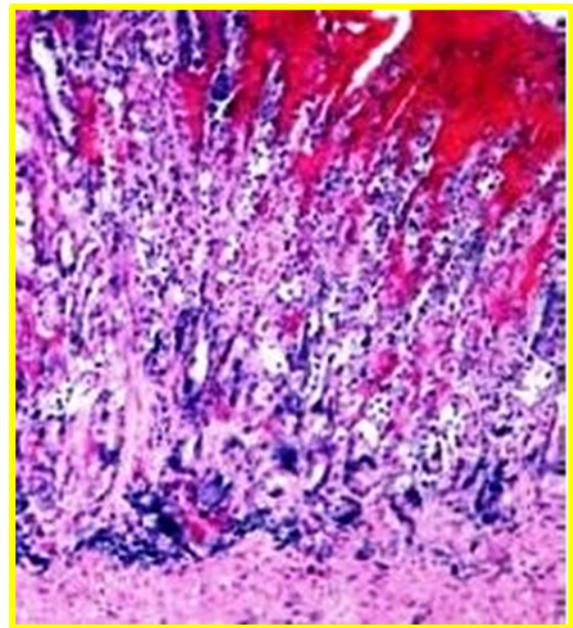


Fig. 9:

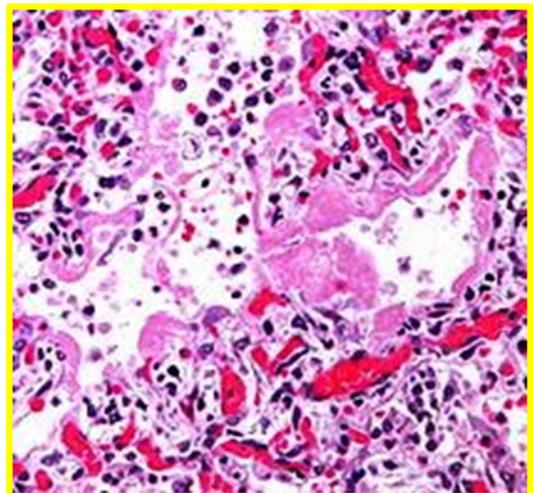


Fig. 10:

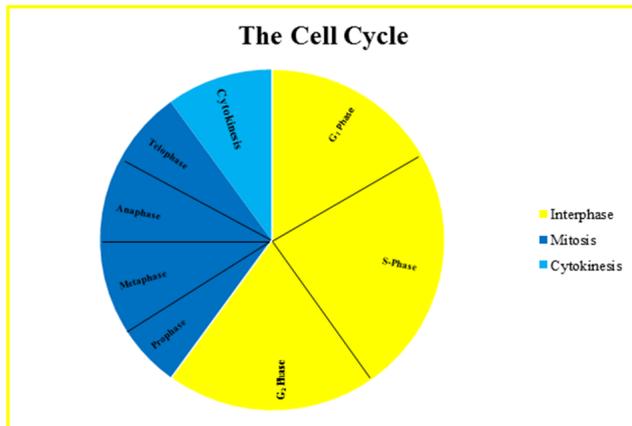


Fig. 12:

1.5. Chemical analysis report of viscera was also obtained and the inference was recorded

Stomach and its contents, intestine and its contents, liver, kidney and blood all detected the toxic principles of *Gloriosa superba*. Brain did not detect the toxic principles of *Gloriosa superba*.

Arriving at an opinion it was inferred from the above findings that the old man has died due to effects of *gloriosa superba* poisoning.(Figure 11)



Fig. 11:

2. Discussion

2.1. Mechanism of action(Figure 12)

Main toxic ingredients - Colchicine & Gloriosine. Anti-mitotic activity of Colchicine. Mitosis arrested in

metaphase. Cells with high turnover and high metabolic rate such as intestinal epithelium, hair follicle, bone marrow cells are highly susceptible. Colchicine - very narrow therapeutic index.¹ Mimics acute gastroenteritis. Mortality - Multi-organ failure.

Regional uses of *Kodalikkizhangu*:²⁻⁴ Joint pains, bruises and sprains, abdominal colic, chronic ulcers, hemorrhoids, cancer, impotence, nocturnal seminal emissions, leprosy, for inducing labor pains and abortion. Colchicine is concentrated more in seeds and tubers of *Gloriosa*. Colchicine content of tubers is roughly 0.3% .

2.2. Colchicine concentration to be measured in

Femoral blood, Bile, Urine, Gastric content, Vitreous, Liver, Heart.

2.3. Histopathology findings seen in¹

Heart, Liver, Kidneys, Lungs, Blood and Stomach.

3. Conclusion

It is important to correlate clinical signs and symptoms with autopsy findings. Differential diagnosis should include drugs and toxic substances ingestion, including arsenic, acetaminophen, lead, mushrooms, or other unknown substances. If the toxicology findings do not correlate with the clinical signs and symptoms, and the autopsy findings are nonspecific, then one must always think for unsuspected. A pharmaceutical poisoning should be considered when signs and symptoms suggest a drug or chemical and the results of toxicology screens are negative.

In patients with history of food poisoning or gastroenteritis after a plant meal, especially when tubers or wild garlic is mentioned, always consider the possibility of colchicine compounds. In case of death, autopsy, chemical analysis of viscera, gross pathology and histopathology findings will be helpful to determine cause of death. In medicolegal cases, it is very necessary to gather all circumstantial evidence surrounding a death because the exact identity of the perpetrator may be camouflaged in non- specific autopsy findings and negative viscera reports.

4. Source of Funding

None.

5. Conflict of Interest

The authors declare no conflict of interest.

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Cite this article: Narayanan S, Ramalingam S, Narendar R. Death due to kodalkkizhangu poisoning: A case report. *Indian J Forensic Community Med* 2022;9(2):86-90.

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