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Case Series

The Clinical Profile of Cerbera Odollam Poisoning and the Effect of Early Pacemaker Initiation Therapy - A Case Series

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Abstract:

Background : Cerbera odollam is a highly toxic plant found in South India, particularly Kerala. Its seeds contain cardiac glycosides, notably cerber in, which can cause life-threatening arrhythmias by inhibiting the Na^+/K^+-ATPase pump. Poisoning often presents with gastrointestinal and cardiac manifestations, and early intervention is essential.

Case series: We report three cases of Cerbera odollam poisoning presenting to atertiary care center in Kerala, between January and June 2019. The first case involved a 38-year-old male who ingested one fruit and presented with vomiting and oliguria; his ECG showed sinus bradycardia and atrioventricular (AV) block. He was successfully treated with temporary pacemaker insertion and recovered fully. The second case was a 56-year-old male who consumed one seed and developed bradyarrhythmias accompanied by hyperkalemia. Despite supportive care, pacemaker therapy was not initiated, and the patient unfortunately succumbed to the poisoning. The third case described a 42-year-old male who ingested three seeds and presented with altered consciousness and significant bradyarrhythmias, including conduction blocks. He was managed with temporary pacing and supportive treatment, leading to clinical recovery.

Conclusion: This case series emphasizes the critical role of temporary cardiac pacing in managing *Cerbera odollam* poisoning. Early diagnosis and timely intervention, particularly in the presence of conduction abnormalities, can be lifesaving.

Keywords: cerbera odollam; cardiac glycosides; poisoning; bradyarrhythmia; pacemaker, artificial; hyperkalemia

Introduction

Cerbera odollam commonly referred to as the "suicide tree," is a highly toxic member of the Apocynaceae family, closely related to both yellow oleander (Thevetia peruviana) and common oleander (Nerium oleander). The species is native to tropical coastal regions extending from East Africato South and Southeast Asia, including countries such as India, Sri Lanka, Vietnam, and Madagascar, where it predominantly thrives in marshy environments and saltwater swamps.[1,2] (Figure 1) Cerberaodollam is typically a small hardwood tree or shrub (Figure 2). It is easily recognized by its whorled branchlets, terminally crowded leaves with tapering bases, acuminate apices, and entire margins (Figure 3). The plant exudes amilkywhite latex when injured. Its green, mango-like fruit possesses a fibrous outer shell that encases a single ovoid kernel (measuring approximately 2 × 1.5 cm), consisting of two white, fleshy, cross-matching cotyledons.[3] (Figure 4).Although the seeds are highly toxic, other parts of the plant—including the leaves, bark, and latex—are reported to be non-toxic and have been used in traditional medicine, primarily as an emetic. The

plant's seeds contain a high oil content, which has traditionally been utilized for cosmetic applications, lamp oil, and insect repellents. Due to its favorable lipid profile, the seed oil is also under investigation as a potential biodiesel source. Locally known by names such as Pong-pong, Mintolla, Othalam, and Buta buta, Cerbera odollam is notoriously associated with suicidal ingestion, particularly in Kerala, South India, where it is readily available and often used in fatal self-poisoning case. The genus name Cerbera derives from Cerberus, the mythological hound guarding the underworld, symbolizing the plant's deadly nature. The seeds of C. odollam contain cerberin, a potent cardiac glycoside that exerts its toxic effects by inhibiting the Na^+/K^+-ATPase pump, leading to disruption of cardiac electrical activity and potentially fatal arrhythmias. [5,6]

A closely related species, Cerberamang has (Tangena), shares a similar toxicological profile. Poisoning typically begins with gastrointestinal symptoms such as nausea, vomiting, and abdominal discomfort, followed by cardiac conduction abnormalities, including bradycardia, atrioventricular (AV) block, and in severe cases, asystole. [7,8,9] Due to the lack of a specific antidote, clinical management is primarily supportive. In life-threatening presentations, temporary cardiac pacing has proven to be a life-saving intervention.[10] This case series highlights three patients with Cerbera odollam poisoning and the role of pacemaker therapy in survival outcomes.

Case details

Case 1:

A 38-year-old male presented to the emergency department with multiple episodes of vomiting, loose stools, and reduced urine output, suggesting possible pre-renal acute kidney injury. The patient reported ingestion of a single, fruit seed prior to symptom on set, raising suspicion of toxic glycoside exposure. He had no significant past medical history. On examination, bradycardia was noted. Electrocardiography revealed first-degree atrioventricular (AV) block, sinus bradycardia, and intermittent sinus pauses. Laboratory evaluations how ednormal serum potassium levels, ruling out hyper kalemiaasa contributing factor. Given the presence of symptomatic bradyarrhythmia with conduction disturbances, atemporary pacemaker was inserted. The patient responded well to supportive treatment and pacing, with resolution of symptoms and normalization of cardiac rhythm. He was discharged in stable condition, and follow-up revealed no persistent conduction abnormalities.

Case 2:

A56-year-old male presented with complaints of nausea and multiple episodes of vomiting following the ingestion of a single seed, suspected to contain cardiotoxic compounds. On evaluation, the patient was found to have hyperkalemia, which may have contributed to cardiac conduction abnormalities. Electro cardiogram (ECG) revealed sinus bradycardia and sinus pauses, indicating significant bradyarrhythmia. Despite medical management, no pacemaker insertion was performed. The patient's condition deteriorated rapidly, and he succumbed to the illness. The outcome highlights the potential lethality of toxic seed ingestion, particularly when complicated by electrolyte disturbances and delayed or limited cardiac support interventions.

Case 3:

A 42-year-old male presented with vomiting, altered consciousness, and chest discomfort following the ingestion of three seeds, presumed to be cardiotoxic. He had no known comorbidities. On clinical evaluation, bradycardia was noted. Electrocardiography revealed progressive conduction abnormalities, including first-degree atrioventricular (AV) block, second-degree AV block, and sinus bradycardia. Laboratory investigations showed normal serum potassium levels, excluding hyperkalemia as a contributing factor. Given the severity of the bradyarrhythmia and AV conduction blocks, a temporary pacemaker was inserted. The patient responded well to treatment, with gradual resolution of symptoms and normalization of cardiac rhythm. He was discharged in stable condition and remained a symptomatic at follow-up.

Discussion

This case series aims to describe the clinical profiles of three patients with Cerbera odollam poisoning, emphasizing the role of pacemaker therapy and its impact on clinical outcomes. The kernals of Cerbera tree contain toxin cerber in, a cardiac glycoside.[11] The cardiac toxicity of Cerbera odollam is primarily mediated through cerberin's inhibition of the Na^+/K^+-ATPase pump, which results in increased intracellular calcium and altered cardiac electrical activity.[7,8,12] This mechanism closely resembles digoxin toxicity, manifesting as sinus bradycardia, AV blocks, and sinus pauses, all observed in the present cases.

In our series, bradyarrhythmia and conduction disturbances were prominent features across all patients. The first and third cases, who received temporary pacemaker insertion, survived with normalization of cardiac rhythms and favorable clinical recovery. These findings underscore the critical role of pacing in managing symptomatic bradyarrhythmias secondary to Cerbera odollam poisoning, consistent with previous literature advocating early pacing as a key supportive therapy.[5,6] Other treatment modalities include intravenous boluses of atropine or isoprenaline.[13]

Case 2 differed notably by presenting with hyperkalemia, a known poor prognostic indicator in cardiac glycoside poisoning, which likely compounded the cardiotoxic effects and contributed to rapid clinical deterioration and mortality.[4,7] In this case, life-threatening hyperkalemia was promptly managed with IV insulin, glucose, bicarbonate, and oral potassium binders to stabilize the patient.[14]This case also highlights the potential lethality of the poison when pacing support is not provided, emphasizing the importance of aggressive electrolyte management alongside cardiac monitoring.

Interestingly, despite ingestion of a greater number of seeds in Case 3, the patient survived, suggesting that the clinical severity may not always correlate linearly with the ingested dose. Individual variability in seed toxin content, patient physiology, and timing of intervention likely influence outcomes.[1] Diagnosing Cerbera odollam poisoning can be challenging due to non specific early symptoms and lack of routine cerber in assays, especially in resource-limited settings.[10] Therefore, a high index of suspicion, combined with early ECG monitoring and electrolyte evaluation, is vital. Early initiation of supportive measures—including activated charcoal which decreases gastrointestinal absorption and enterohepatic circulation, correction of electrolyte imbalances, and cardiac pacing when indicated—may significantly improve survival.[15]

Conclusion

Cerbera odollam poisoning is a life-threatening condition characterized by severe cardiac conduction abnormalities. This case series highlights that early recognition and prompt insertion of a temporary pacemaker can be lifesaving in managing bradyarrhythmias caused by this toxin. Hyperkalemia, when present, portends a worse prognosis and necessitates urgent correction. Given the absence of a specific antidote, emphasis must be placed on supportive care and cardiac monitoring. Greater awareness and preparedness in endemic care as are essential to improve outcomes in patients exposed to this potent cardiotoxin.

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Authors' contributions:

Photo courtesy to author Nikhil Paul. All authors contributed to creating the manuscript from draft to the final text. All authors have approved the manuscript for publication and agree to be accountable for all aspects of the work.

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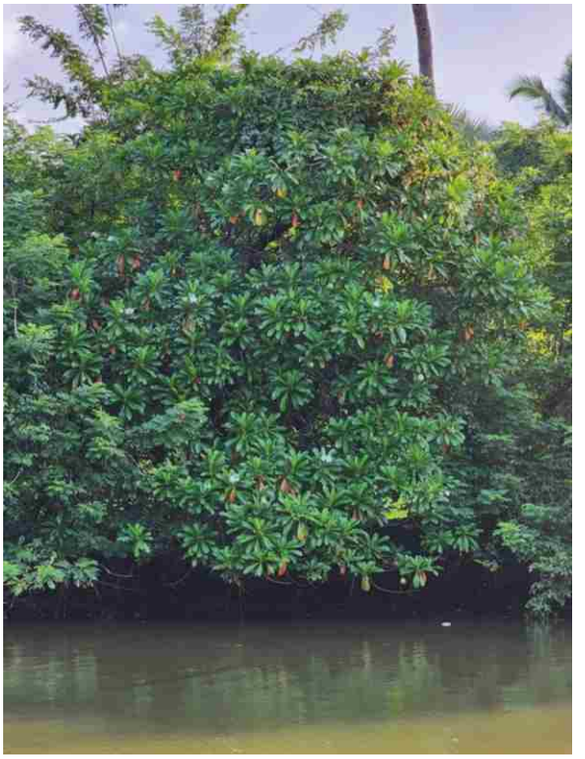

Figure 1: Cerbera Odollam tree grown in marshy areas

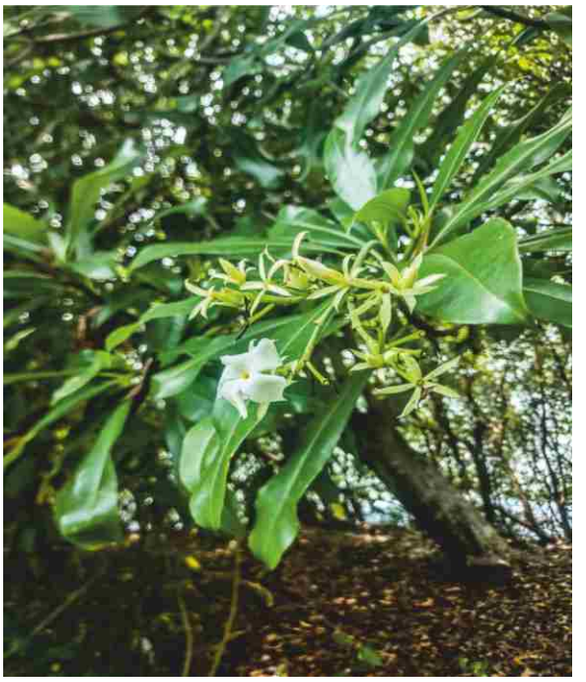

Figure 2 : In florescence and leaves of Cerbera Odollam

Figure 3 : Green, Mango-like fruit of Cerbera Odollam

Figure 4 : Cerbera Odollam fruit and seed morphology

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