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A Cross-Sectional Study on Investigations and Outcome of Cleistanthus Collinus (Vadisaku) Poisoning in A Tertiary Care Center

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ABSTRACT

Introduction:

Typically found in South India, Cleistanthus collinus (vadisaku) is a poisonous plant belonging to the Euphorbiaceae family. Intentional poisoning during suicide attempts and homicidal intent are frequent uses. Multiple organ systems are affected by the strong toxicological effects of cleistanthin A and B, the plant's poisonous chemicals. Despite its well-established toxicity, little is known about its clinical management and treatment outcome.

Objective:

To evaluate C. collinus poisoning cases' clinical presentation, test results, and treatment in order to enhance patient outcomes and diagnostic precision.

Materials and methods:

The case files of 60 patients who received treatment for C. collinus poisoning at a tertiary care facility in Andhra Pradesh between June 2022 and June 2024 were examined in this observational retrospective cross-sectional study. Demographics, presenting symptoms, and examination results were among the clinical data gathered. Treatment information (gastric lavage, usage of pantoprazole, supportive care) and laboratory tests (CBC, LFT, RFT, electrolytes, ABG) were documented. Good recovery and poor recovery (death or problems) were the two categories used to describe patient outcomes. Data were examined using means, percentages and frequencies.

Results:

Two occurrences (3.5%) were unintentional, while 58 (96.5%) of the 60 patients were suicide attempts. The majority (47%), who were young adults between the ages of 16 and 30, were slightly more likely to be female (53.3%). Abdominal disturbances (30%), acute kidney injury (18.3%), chest discomfort (13.3%), and altered sensorium (16.7%) were among the most common symptoms. Results from the lab indicated increased creatinine (28.8%), hyponatremia (45%), and hypokalemia (51.6%). Patients with ECG abnormalities made up 18.3% of the total. While receiving supportive care in the emergency room, all patients got pantoprazole and gastric lavage. Within seven days of hospitalization, nine patients passed away, resulting in a 15% mortality rate.

Conclusion:

Poisoning by C. collinus poses serious clinical problems due to its high 15% fatality rate. To improve patient outcomes, early

diagnosis, timely supportive care, and focused therapies are essential. Reducing the prevalence of intentional poisoning requires public health initiatives, such as programs for poison prevention and mental health care. It is advised that more study be done on particular antidotes to improve treatment modalities and outcome.

Keywords: *Cleistanthus collinus, Vadisaku poisoning, Toxicology, suicide, Acute kidney injury, Mortality rate*

1. INTRODUCTION

Cleistanthus collinus, sometimes called vadisaku, is a poisonous plant belonging to the Euphorbiaceae family is common poison in South India. It is frequently used to poison fish and cattle, as well as for suicide and homicidal motives. The phytoconstituents of the plant, such as cleistanthin A and B, are responsible for its toxicity and have been connected to a number of pharmacological actions, including antiviral and antitumor properties. The plant is mainly known for its toxicological effects, which include symptoms ranging from dyspnea and chest pain to central nervous system disruptions and eyesight problems, despite its possible therapeutic uses. There is no known specific antidote for C. collinus poisoning, and the fatality rate varies greatly depending on the amount and route of consumption.[1,2]

A considerable number of cases of C. collinus poisoning are reported each year, making it a prevalent form of self-harm in rural South India.[3] It is usually consumed as boiled decoctions made from different parts of the plant as all parts are considered toxic, and this is found to be the most common mode of consumption. The average age of those impacted is approximately 33.5 years, and males are more likely to be afflicted than females.[4]

Acute respiratory distress syndrome (ARDS), metabolic acidosis, arrhythmias, and hypokalemia are typical symptoms in most cases of poisoning.[5] Because there is no known cure, supportive care is still the major management approach even if gastric lavage and activated charcoal are first line treatments. According to certain studies, mortality rates can reach 50%, depending on the severity and type of treatment.[1,3] The phytoconstituents of Cleistanthus collinus have been investigated for possible pharmacological advantages, such as antioxidant and neuromuscular blocking qualities, even though the plant is well known for its poisonous effects.[1] However, the plant's function in poisoning cases overshadows its usage in traditional medicine, underscoring the need for more study into safe applications and efficient poisoning incident treatments. This study is aimed to assess the clinical presentation, laboratory investigative findings and management of cases of vadisaku poisoning, which will help us to increase the precision of their poisoning diagnosis by determining the best methods and testing. In order to improve patient safety overall, the study attempts to lower the possibility of incorrect diagnosis and inappropriate treatment. Improved diagnosis Protocols will allow for more timely and focused treatment, which could lower problems and increase patient recovery rates. Better diagnostic practices can result in less need for pointless tests and procedures and a more effective use of hospital resources. This can aid in resource allocation optimization and healthcare cost management.

2. MATERIALS AND METHODS

This research is an observational retrospective cross-sectional design. The study was conducted at a tertiary care center, specifically in emergency medicine department and ICU. The case files of 60 patients who were diagnosed with and treated for C. collinus poisoning at a tertiary care hospital in Andhra Pradesh between June 2022 and June 2024 were obtained.

The following data is collected from the case records.Clinical Data pertaining to Patient demographics: age, sex, socio-economic status, Presenting symptoms like nausea, vomiting, chest pain, abdominal pain, altered sensorium and others, Clinical examination Findings like pallor, jaundice,etc, were recorded in the case proforma. Details on the Investigative Data like the Haematological and biochemical investigations like Complete blood count, LFT, RFT, electrolytes and ABG were obtained from the case records followed by the treatment records like gastric lavage, pantoprazole use, and other supportive interventions were recorded. Duration of treatment received in the hospital is noted along with the recovery status. Outcome of the cases is categorised into good recovery and poor recovery based on the complete recovery, complications and mortality. Data were systematically organized and analysed where the Demographics, clinical presentations, and investigation findings were summarized using frequencies, and percentages and mean. The accuracy and significance of haematological and biochemical tests in diagnosing poisoning severity were evaluated. Statistical analysis of data is made after collecting and entering the data into excel sheet. The collected data is presented in numbers and percentages.

To preserve participant privacy, all medical and personal information was anonymized and safely preserved. Ethical Approval was obtained from the Institutional Ethics Committee [IEC] before the study began.

3. RESULTS

This study included 60 patients admitted to Emergency medicine department, general medicine ward and ICU with vadisaku poisoning from June 2022 to June 2024 in a tertiary care centre

out of 60 Vadisaku poisoned patients studied, 58 patients attempted suicide [96.5%] and only 2 patients consumed vadisaku accidentally [3.5%].

out of 60 patients studied most cases are reported between age group 16 to 30 years [n=28; 47%] that include teenagers and young adults, followed by the age group 31 to 45 years [n=21; 35.5%], 0 to 15 years [n=4; 6.6%], 46 to 60 years [n=3; 4.4%], 76 to 90 years [n=3; 4.4%] and 61 to 75 years [n=1; 2.2%]. In this study, age ranges from 36 months to 79 years.(Figure 1)

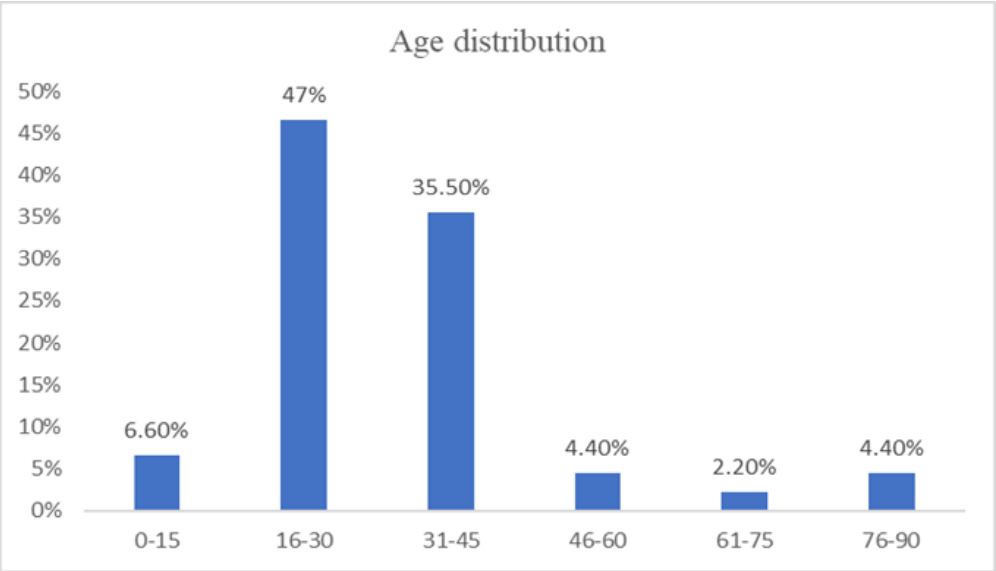

Figure 1: Age distribution of Vadisaku poisoned patients

out of 45 patients studied, more than half were females [n=32; 53.3%] and the remaining were males [n=28; 46.6%].

out of 60 patients admitted to emergency department 18 patients presented with gastro intestinal symptoms like vomiting and abdominal pain, 11 members presented with acute kidney injury, 8 members presented with chest pain,10 presented with altered sensorium 7 presented with acute respiratory distress, and remaining 6 patients had no clinical features (figure 2)

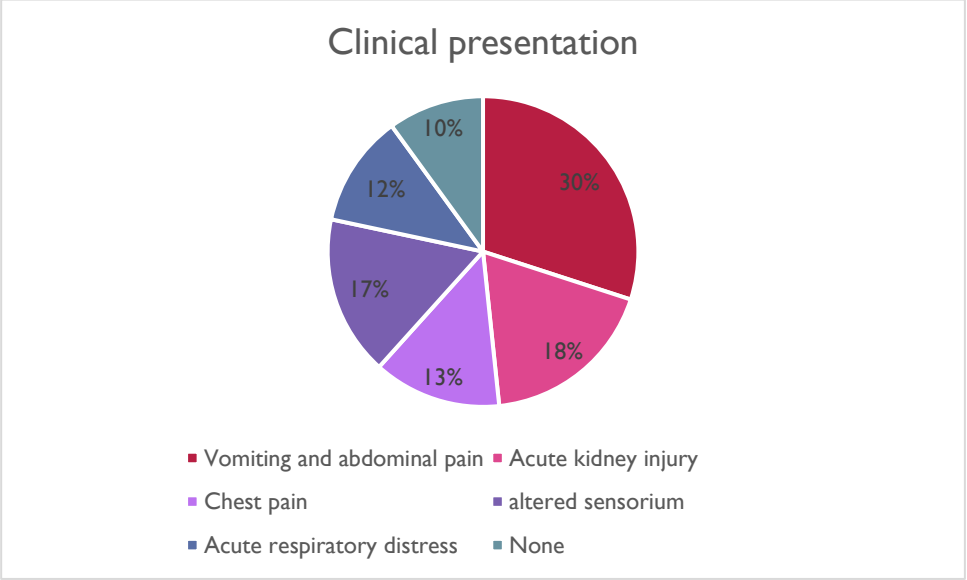

Figure 2: Clinical presentation of Vadisaku poisoned patients

CBC (Complete blood count) of 60 patients is recorded. 16 patients presented with abnormal total leukocyte count [26.6%], 40 patients presented with abnormal neutrophil count [66.6%] 32 patients presented with abnormal lymphocyte count [53.3%], 1 patient presented with abnormal eosinophil count [2.2%].(figure 3)

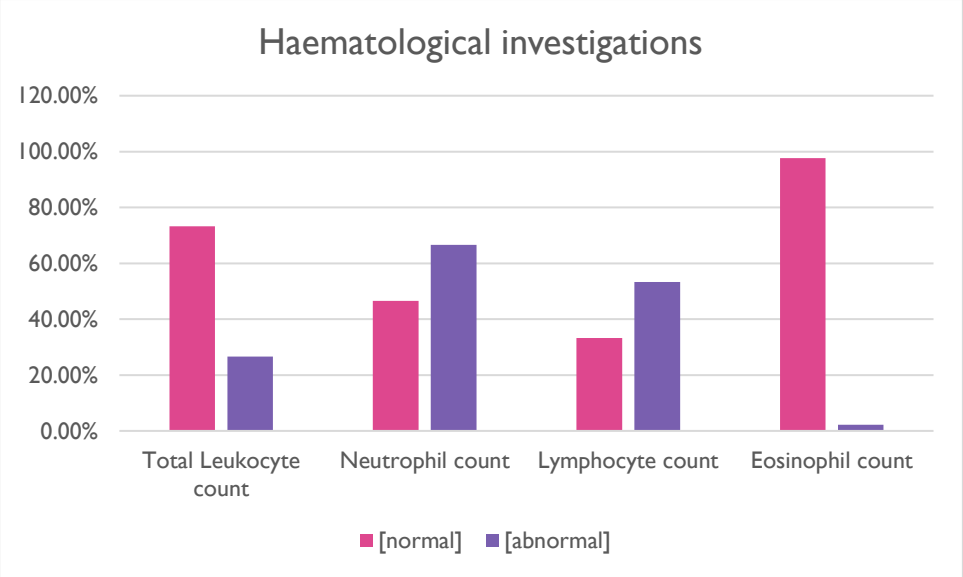

Figure 3: Haematological investigations of vadisaku poisoning cases

Renal function test results were analysed for 60 cases. out of 60, 17 had abnormal creatinine values [28.8%], 27 out of 60 patients had hyponatremia (45%) and 31 cases had hopokalemia (51.6%). Abnormalities in Na, K was seen in majority of patients followed by abnormalities in Creatinine.(figure 4)

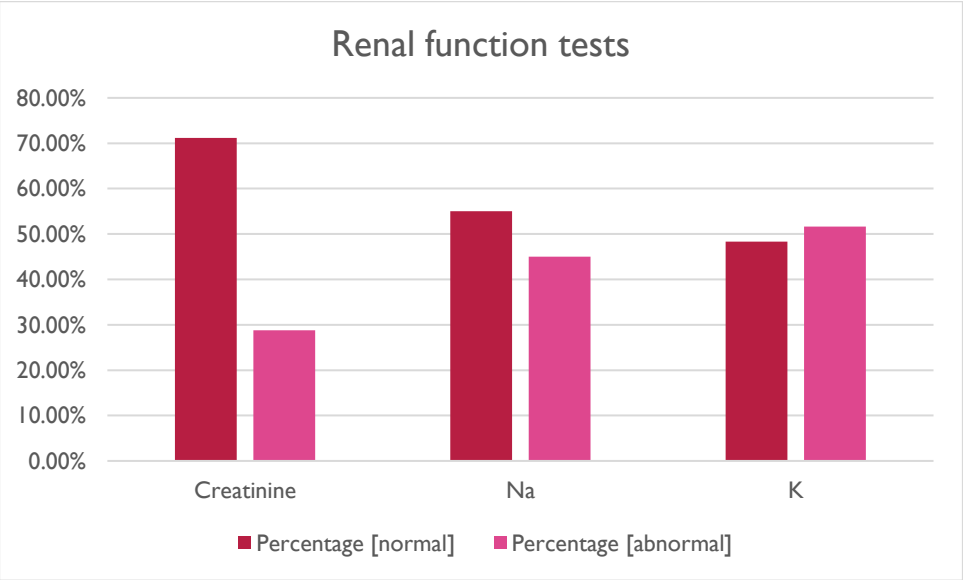

Figure 4: Renal Function Tests [RFT] of Vadisaku poisoning cases

Electrocardiogram (ECG) showed ST-T changes in 11 cases (18.33%)

Gastric lavage, Pantoprazole are the immediate interventions done in the emergency medical department in case of vadisaku poisoning. Ryle tube was administered to all the patients.Almost all the patients received symptomatic management and majority of them received electrolyte correction and few had correction of metabolic acidosis. Out of 60 cases, 9 cases died within 7 days of admission to the hospital after consumption of vadisaku poison (15%) and majority of the cases recovered.

4. DISCUSSION

In India, acute intentional self-poisoning is a major reason for intensive care unit (ICU) admissions. According to a Delhi study, acute poisoning accounted for 9.3% of all intensive care unit admissions.[6]

Through the inhibition of thymidine and uridine incorporation in DNA and RNA, respectively, cleistanthin A and B have

been found to stop the progression of the cell cycle from G1 to S phase in tissue culture lines. It induces apoptosis and breaks DNA strands at high dosages.[7]

When albino Wistar rats and Himalayan rabbits were given oral aqueous extracts of C. collinus, glutathione and adenosine triphosphatases (ATPases) were significantly reduced in a variety of tissues, including the liver, kidney, and brain. Degenerative alterations in the glomerulus, cerebral gliosis, and hepatocytes were found by histopathologic analysis.[8] Due to the plant's well-known toxicity, poisoning incidents, whether deliberate or unintentional have been documented, especially in rural regions.[5]

There is a considerable age range in which cases of Cleistanthus collinus (vadisaku) poisoning have been documented. Notably, older siblings ages 9 and 12 as well as children as young as 8 have been reported as victims.[9]

Adult patients' mean age ranges from 33.5 to 36.7 years, suggesting a higher frequency in this group.[10] This data is similar to our study findings where the majority(47%) of cases are found to be young adults aged between 16-30 years.It is thought that cleistanthin and diphyllin are among the harmful substances found in Cleistanthus collinus. Numerous organ systems are impacted by these poisons.[1]

Acute kidney injury (18.3%), chest discomfort (13.3%), and gastrointestinal disturbances such vomiting and abdominal pain (30%) were the most common symptoms that patients presented with. In a smaller group of individuals, altered sensorium and severe respiratory distress were other noteworthy characteristics. The study's clinical findings are consistent with Cleistanthus collinus's established toxicological profile, which states that toxins such cleistanthins and diphyllins mostly impact the neurological, cardiovascular, renal, and gastrointestinal systems.[3]

While acute kidney damage (AKI) and dyselectrolytemia are common side effects linked to the plant's nephrotoxic properties, gastrointestinal symptoms such as vomiting and abdominal discomfort most likely represent the initial toxic shock to the digestive system. As seen by the observed ST-T alterations in 18.33% of the patients on ECG, the presence of aberrant electrolyte values, especially potassium and sodium, is a predicted side effect of the poisoning and may help develop arrhythmias and other cardiovascular problems. The effect on cardiovascular system is similar to findings of another study[11]

Respiratory distress, observed in 11.6% of the patients, can be caused by direct toxic effects on the respiratory muscles, fluid changes, or metabolic acidosis. In order to avoid the potentially deadly progression of respiratory failure, it is imperative that these symptoms be promptly identified and managed.

The study's laboratory results provide crucial information on the systemic consequences of Vadisaku toxicity. Interestingly, 28.8% of patients had high creatinine values, indicating that a sizable fraction of the population had acute renal injury. Additionally, 48.3% of patients had electrolyte imbalances (dyselectrolytemia), with the most prevalent abnormalities being in potassium and sodium. This is in line with research showing that Cleistanthus collinus causes serious metabolic disruptions that can make treating poisoning more difficult.[12]

The hematological results showed that 26.6% of patients had an abnormal total leukocyte count (TLC), and 66.6% of cases had a noticeable neutrophil predominance. Because the chemicals in the plant have harmful effects on different organ systems, this neutrophilic reaction is probably a reflection of systemic inflammation.

In the emergency room, gastric lavage and pantoprazole are usually used to treat Vadisaku poisoning right away in order to lessen the poison's gastrointestinal symptoms. In accordance with recommended methods for managing hazardous ingestions, a Ryle tube should always be used for gastric decompression. Furthermore, the majority of patients received supportive measures like electrolyte correction, symptom management, and metabolic acidosis treatment. When no specific antidote is available, these methods are in line with the standard of treatment for poisoning patients.

Despite these measures, 15% of patients in this study died within 7 days from their poisoning, indicating a substantial mortality rate. The severity of Cleistanthus collinus poisoning and the importance of early detection and treatment are both shown in this graphic. According to earlier research, the fatality rate from Vadisaku poisoning was significant, ranging from 18% to 43%. Refractory hypotension, respiratory failure, and sudden ventricular arrhythmia were the leading causes of death. This fatality rate is in line with those findings.[11,12,13] The fact that the majority of deaths occurred within a short time frame post-admission suggests that the toxicity of the poison is swift and aggressive, necessitating urgent and intensive care.

Public health Implications

To address the increasing prevalence of Vadisaku poisoning, the results of this study highlight the critical need for focused public health interventions, especially for vulnerable groups including young adults and people with mental health issues. Intentional poisoning can be decreased with the support of suicide prevention initiatives and greater knowledge of the dangers posed by Cleistanthus collinus. Furthermore, more investigation into the creation of particular antidotes for Cleistanthus collinus poisoning may greatly enhance future patient outcomes.

5. CONCLUSION

While supportive care is still the cornerstone of management, the high mortality rate necessitates increased public health efforts, including mental health support, poison prevention, and more research into antidotal therapies. This study highlights the burden of Cleistanthus collinus (Vadisaku) poisoning in South India, especially among young adults and females. The high rate of suicide attempts and the wide range of clinical manifestations emphasize the need for early diagnosis and intervention.

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