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## ***Cleistanthus collinus* poisoning: an effective management with multidose activated charcoal**

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**Abstract**

**Background:** In south India, *Cleistanthus collinus* is toxic plant poison. That is used for suicidal purpose. Objective of this study is to compare the outcome of *Cleistanthus collinus* poisoning treated with and without multi dose activated charcoal. **Methodology:** Out of 54 patients, who consumed *Cleistanthus collinus*, 30 patients were managed with multidose activated charcoal and the other 24 were not. Various complications in both the groups were analyzed and their mortality was recorded. **Results:** Complications like hypokalemia, hypomagnesemia, ARDS, neuromuscular weakness, cardiac arrest, death etc. were reduced. Though the patients who received MDAC also had electrolyte imbalance, only 9 (30%) had hypokalemia, in contrast to 21(87.5%) non MDAC patients who had hypokalemia. Astonishingly death rate was significantly reduced among patients who received MDAC, whereas 8 patients died in non MDAC group **Conclusion:** MDAC has been found effectively reducing hypokalemia, hypomagnesemia, ARDS, neuromuscular weakness, arrhythmias and most importantly mortality in poisoned patients.

**Keywords:** *Cleistanthus collinus*/Oduvanthalai poisoning, MDAC, Multidose activated charcoal.

### **1. Introduction**

This *Cleistanthus collinus*, a toxic plant, is a commonly available poison especially in South Indian states like Tamilnadu and Pondicherry. *Cleistanthus collinus* is known by various names in different parts of India viz., Oduvanthalai/Nillipalai in Tamil, Kadiše/Vadisaku in Telugu, Oduku in Malayalam, Karlajuri in Bengali and Garari in the Hindi [1]. This plant poison is also occasionally available in Srilanka, Singapore, Malaysia and South Africa. *Cleistanthus collinus* belongs to the plant family Euphorbiaceae [4]. Almost all parts of the plant are found to be poisonous. The poisonous product present in this plant is Aryl naphthalene lignan lactones which includes cleistanthin A and B, collinusin and diphyllin [3, 4]. This plant is commonly used as suicidal, homicidal, cattle and fish poison and for procuring criminal abortion [1]. Anticancer potential has also been identified. The toxin inhibits DNA synthesis, induces DNA damage and apoptosis, reduces/inhibits thiol/thiol containing enzymes [5].



**Cleistanthus collinus leaves**

The common clinical symptoms of this poisoning includes nausea, vomiting, diarrhea, abdominal pain, cramps in the limbs, dilated pupils, hypokalemia, hypomagnesemia, cardiac toxicity, neuromuscular weakness with respiratory failure, renal failure, persistent hypotension leading to collapse/death [6].

Though the pathogenesis of *Cleistanthus collinus* poisoning is well understood, progress in therapeutic and prognostic measures were limited. Hence this study was aimed to focus on the role of Multidose activated charcoal in the management of Oduvan leaf poisoning.

**2. Materials and Methods**

This was a randomized prospective study conducted, at Vinayaka Mission Kirupananda Variyar Medical College and hospital, Salem, from 2006 to 2008. A total of 54 patients admitted to ER with alleged history of consumption of *Cleistanthus collinus* leaves were included in this study. Those who had poly herb poisoning were excluded from this study.

As soon as we received the patient in ER, the general protocol for management of poisoning were followed, which includes assessment & establishment of an adequate airway, ensurance of appropriate air exchange, circulatory support, etc. 30 patients were initially managed with gastric lavage followed by activated charcoal with the dose of 1gm / kg and continued with multi-dose activated charcoal 0.5 gm /kg every 6 hour for 48 hrs and the other 24 were not.



**Gastric lavage in ER**

Patients were managed with IV fluids, oral multi-dose activated charcoal 6 hourly for 48 hours and other standard supportive care. Patients are investigated for hypokalemia, leucocytosis, coagulopathy, metabolic acidosis; deranged liver enzymes (elevated levels of transaminases and alkaline phosphatase). Serum potassium was checked every six hours, and serum magnesium daily, and replaced accordingly.

The demographic details like age, sex, quantity of leaves consumed, time elapsed since ingestion, initial symptoms, any underlying disease, duration of stay in hospital in days, and complications like hypokalemia, hypomagnesemia, neuromuscular weakness, renal failure, persistent hypotension, arrhythmias, cardiac arrest, death were recorded. Outcome of patients with and without MDAC were analyzed.

**3. Data Analysis**

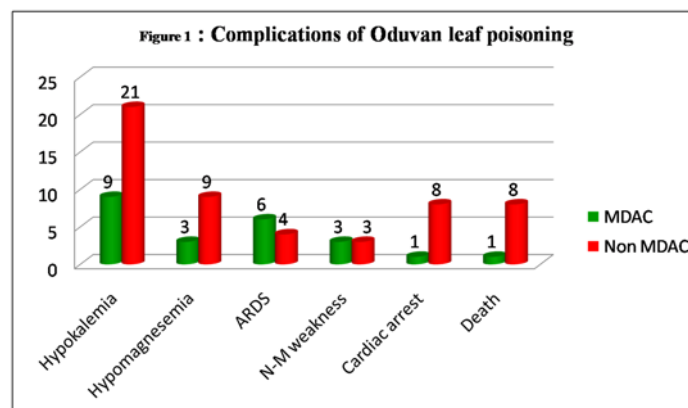
All data were compiled and statistical analysis was accomplished using statistical method for calculations provided within "SPSS" software [version 11.5].

**4. Results**

In 54 patients who consumed *Cleistanthus collinus* leaves, 29 (53.7%) were male and 25 (46.2%) were female. Majority of the patient were between 20 - 40 years and almost all these poisonings were suicidal. Out of 54 patients, only 30 (55.6%) were treated with MDAC.

30(55.6%) patients went for hypokalemia which was the expected complication in this poisoning. Though the patients who received MDAC also had electrolyte imbalance, only 9 (30%) had hypokalemia, in contrast to 21(87.5%) non MDAC patients who had hypokalemia. This is statistically significant (p value <0.005). Only 3 (10%) had hypomagnesemia in MDAC group, whereas 9 (37.5%) had the same complication in non MDAC group.

Figure 1 depicts the effective role of MDAC in *Cleistanthus collinus* poisoning by significantly reducing the complications like hypokalemia, hypomagnesemia, ARDS, neuromuscular weakness, cardiac arrest, death etc. Astonishingly death rate was significantly reduced among patients who received MDAC, whereas 8 patients died in non MDAC group, which is statistically significant (p value <0.005).



## 5. Discussion

*C. collinus* poisoning is a major problem in rural South India. Easy availability and free access to the plant are probably why people prefer this method of deliberate self-harm. A very few literature is available regarding the uncommon manifestations of poisoning with *Cleistanthus collinus*.

This study showed that majority of the poison victims were between 20 – 40 years of age. This was attributed to the fact that these patients were subjected to stress, depression, mood swings and various social factors. These results were similar to the observation made by Lalith Senarathna et al who concluded the average age of person was 25 years of age. A study performed by Andrew Dawson et al noted a male predominance, in contrast we an equal sex distribution in our study.

Hypokalemia is evident in a majority of symptomatic patients, usually at presentation or within the first 48 hours of ingestion. Kaliuresis appears to be the main mechanism underlying this abnormality, though vomiting and dehydration may have a role. Hyponatremia has also been documented. Hypomagnesemia may have an additional role in refractory hypokalemia. The role of single dose of activated charcoal as been well proved beyond any doubts in various poisoning cases. Use of multidose activated charcoal (MDAC), though not being supported majority of centers worldwide, as definitely proven beneficial and as improved the outcome of our patients.

In our study also 55.5% patients had hypokalemia, but the MDAC group to a lesser extent. Even this hypokalemia occurred in MDAC group, could be explained by the common complications of use of charcoal which includes hypokalemia, paralytic ileus, and abdominal distention with signs of intestinal obstruction. Hence the use of multidose activated charcoal dramatically reduced hypokalemia which is the most dangerous complication of this poison leading to death.

One of the major complications in most of the patients on ventilator and those who had aspirated is acute lung injury followed by acute respiration distress syndrome. Since activated charcoal caused aspiration in previous studies, we noted this in our study and found that 20% of the patient who were given MDAC had ARDS but were successfully discharged. Another significant observation made was that less than 3% who received MDAC developed paralytic ileus was seen in some patients as a result of hypokalemia and some even developed abdominal distention with signs of intestinal obstruction. Hence serum potassium should be

monitored regularly and corrected promptly through a central line.

Few researches concluded that a single dose of activated charcoal as sufficient for patients who presented with consumption of poisons. But our study proved beyond doubt that patient who presented with a low GCS and significant time delay (24 hours) also made dramatic recoveries with the use of MDAC. So in this study, multi dose activated charcoal even if given several hours after poison ingestion has the potential to interface entero- vascular circulation and entero-hepatic circulation their by increasing the rate of poison elimination.

## 6. Conclusion

Outcome of *Cleistanthus collinus* poisoning treated with multi dose charcoal was better. MDAC has been found effectively reducing hypokalemia, hypomagnesemia, ARDS, neuromuscular weakness, arrhythmias and most importantly mortality in poisoned patients.

## 7. References

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