

A clinical study of 30 cases of Acute Yellow Oleander poisoning(*Thevetia nerifolia*)

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ABSTRACT

Plant poisons are one of the common substance consumed for suicidal attempts in India, more so in the rural population because of its easy availability. There are various such medicinal plants available all over India and they produce significant toxicity with mortality and morbidity when consumed in high doses. Yellow oleander is an ornamental tree that is widely found in India, consumption of its seeds produces clinical picture that is similar to Digoxin toxicity. In this study we assessed the clinical manifestation, complication and outcome in 30 cases of yellow oleander poisoning. Study was performed at Sri Lakshmi Narayana Institute of Medical Sciences Hospital, Puducherry, between April 2011 to January 2013. 30 cases which presented with yellow oleander consumption to emergency ward were enrolled in this study. A detailed history of number of seeds consumed, time of consumption, time of presentation to hospital, any form of treatment given before presenting to hospital, detailed clinical assessment of the patient were done and routine blood investigations and a 12 lead electrocardiogram was recorded. Patients were monitored for electrolyte imbalance every 6th hourly and a continuous cardiac monitoring was done to recognise cardiac arrhythmias and ECG was recorded at the admission and every 2nd hourly for 48 hours. Out of 30 cases studied, 8 (26.3%) patients had insignificant poisoning and 22 (73.3%) patients had significant poisoning. Among those patients with significant poisoning, 6(20%) developed sinus bradycardia, 6(20%) developed I degree AV block, 4(13.3%) developed II degree AV block, 3(10%) developed Complete Heart Block, 2(6.6%) developed Atrial Fibrillation and 1(3.33%) developed Ventricular Tachycardia. There was a positive correlation between number of yellow oleander seeds consumed and serum Potassium levels with cardiotoxicity.

KEY WORDS: Yellow Oleander, Ventricular Premature Contractions(VPC), Complete Heart Block (CHB), AV (Atrio-Ventricular)

Introduction

Deaths occur due to various reasons, often preventable and curable. Suicidal deaths remain the common mode of preventable and unnatural death, which is widely prevalent both in developed and developing countries. The

modes of suicidal attempts vary geographically. Though suicidal deaths occur at all age groups, it is often the young and earning member of the family who are involved, producing emotional and economical loss to the family. The exact number of deaths and mode of suicide is grossly under reported in developing countries. In developing countries, hanging, plant poisoning, insecticide poisoning, kerosene poisoning, sedative overdose and drug abuse forms a distinct mode of suicide. Most poisonings have a clear guidelines for the effective treatment and its complications. Though the chemical nature of yellow oleander is clearly described [1], the guidelines for its management has not been defined adequately and requires a larger study.

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Yellow oleander belongs to Apocyanaceae family that is common throughout tropics [2]. The toxin of yellow oleander is similar to that of cardiac glycoside[6,8], it produces autonomic dysfunction and damage to cardiac myocytes. Poisoning often occurs as a result of consumption of its seeds. The severity of poisoning is related to the number of seeds consumed. Some studies showed that consumption of more than 5 crushed seed was associated with significant manifestation, the fatal dose being 8 to 10 seeds. Insignificant poisoning recover well with supportive measures alone, where as those with toxic doses develop cardiac dysfunction whose severity varies from trivial ventricular premature contractions and sinus bradycardia to resistant ventricular fibrillation and complete heart block.

Aims and objectives

1. To study the significant dose of poisoning.
2. To study the cardiovascular manifestation of poisoning.
3. To study the associated electrolyte disturbances.

Materials and Methods

Study was performed at Sri Lakshmi Narayana Institute of Medical Sciences Hospital, Puducherry, between May 2011 to December 2012, after obtaining a written valid consent from the patient and or attenders. All the 30 cases who presented with yellow oleander consumption to emergency ward were enrolled in the study. A detailed history of number of seeds consumed, time of consumption, time of presentation to hospital, any form of treatment given before presenting to hospital were documented. Routine blood investigations were done in all the patients with major attention on serum Potassium and serum Magnesium levels.

All patients received gastric lavage immediately at the time of presentation and gastric decontamination was achieved using activated charcoal, supportive treatment was initiated. Patients with significant cardiac abnormalities at the presentation were immediately shifted to Intensive Cardiac Care unit. Patients were monitored for electrolyte imbalance every 6th hourly and a continuous cardiac monitoring was done to recognise cardiac arrhythmias and ECG was recorded on admission and every 2nd hourly for 48hrs. Patients developing bradyarrhythmia were managed with atropine, isoprenaline, and temporary cardiac pacing in severe cases, although without trial evidence of survival benefit. Accelerating the heart rate with atropine or β -adrenergic agents theoretically increases the risk of tachyarrhythmias, and it has been claimed that atropine increases tachyarrhythmic deaths. Tachyarrhythmia has a poor prognosis and are more difficult to treat. Lidocaine is the preferred antiarrhythmic [3]. Patients presenting with multiple poison consumption and those with previous history of heart disease were excluded from the study.

Results

The IBM SPSS version 20 statistical software tool was used for the data processing. All the values were expressed as mean \pm one standard deviation unless otherwise indicated. The difference in the mean values between the patients with normal and abnormal ECG was analyzed by using the Student's t-test. Mann Whitney U test was used for non parametric testing.

A total of 30 patients presenting with acute yellow oleander poisoning were studied. A normal ECG was documented in 8 (26.3%) patients. Those patients with normal ECG had significantly smaller amount of seed consumption. Abnormal ECG was noted in 22(73.3%) patients, the number of seeds consumed and serum potassium levels was significantly higher which was statistically significant ($P < 0.001$) (Table:1-3).

Table:1

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
1	The distribution of NO_OF_SEEDS is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.000 ^a	Reject the null hypothesis.
2	The distribution of BLOOD_UREA is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.730 ^a	Retain the null hypothesis.
3	The distribution of CREATININE is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.087 ^a	Retain the null hypothesis.
4	The distribution of SODIUM is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.730 ^a	Retain the null hypothesis.
5	The distribution of POTASSIUM is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.000 ^a	Reject the null hypothesis.
6	The distribution of MAGNESIUM is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.872 ^a	Retain the null hypothesis.
7	The distribution of CALCIUM is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.872 ^a	Retain the null hypothesis.
8	The distribution of SGOT is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.420 ^a	Retain the null hypothesis.
9	The distribution of SGPT is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.507 ^a	Retain the null hypothesis.
10	The distribution of PROTHROMBIN_TIME is the same across categories of ECG.	Independent-Samples Mann-Whitney U Test	.007 ^a	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

^aExact significance is displayed for this test.

Patients with significant cardiac arrhythmia were shifted to Intensive Cardiac Care Unit and appropriately treated. The type of arrhythmias is shown in Table-2. There was no mortality.

Table: 2 ECG abnormalities noted

Normal ECG	8 (26.3%)
Sinus Bradycardia	6 (20%)
First degree AV block	6 (20%)
Second Degree AV block	4 (13.3%)
Complete Heart Block	3 (10%)
Atrial Fibrillation	2 (6.6%)
Ventricular Tachycardia	1 (3.33%)
Ventricular Premature Contractions	3 (10%)

Other biochemical parameters like Blood Urea, Serum Creatinine, Serum Sodium, Serum Magnesium, Serum Calcium, SGOT, SGPT and PT did not vary significantly among those with significant and insignificant poisoning.

Table 3: Student 't' test (two tailed)

Group Statistics					
	ECG	N	Mean	Std. Deviation	
P –two tailed					
Number of seeds consumed	Abnormal	22	5.95	1.253	<0.001
	Normal	8	1.88	.835	
Blood Urea (mg/dl)	Abnormal	22	26.9545	4.89390	.522
	Normal	8	28.2500	4.68280	
Serum Creatinine (mg/dl)	Abnormal	22	1.0500	.12630	.50
	Normal	8	.9375	.15059	
Serum Sodium (meq/L)	Abnormal	22	140.7273	2.29247	.795
	Normal	8	141.0000	3.11677	
Serum Potassium (meq/L)	Abnormal	22	5.4364	.58761	<0.001
	Normal	8	3.8125	.33568	
Serum Magnesium (mg/dl)	Abnormal	22	2.3136	.32993	.940
	Normal	8	2.3250	.45277	
Serum Calcium (mg/dl)	Abnormal	22	9.6045	.44452	.965
	Normal	8	9.6125	.42237	
SGOT (IU/L)	Abnormal	22	27.8182	5.74569	.628
	Normal	8	26.7500	3.57571	
SGPT (IU/L)	Abnormal	22	27.3636	4.62442	.707
	Normal	8	26.6250	4.98390	
Prothrombin Time (sec)	Abnormal	22	14.86	.834	.060
	Normal	8	14.25	.463	

Discussion and Conclusion

In India, yellow oleander has been used for suicide, homicide and abortion for many years. All parts of plant are poisonous, especially

seeds and leaves. Accidental consumption of yellow oleander leaves often occur in children [4]. Consumption of yellow oleander seeds and leaves are common in young individuals in developing countries, more so in rural areas[10]. Yellow oleander contains cardio-tonic steroid which contains lactone ring [5]. The myocardial effects of these compounds are attributable to increased intracellular concentrations of Ca^{2+} and Na^+ resulting from inhibition of the transmembrane Na^+/K^+ ATPase pump [6]. Yellow oleander glycoside is found to be effective in treatment of Heart Failure and Atrial Fibrillation, but due to their high gastro intestinal side effects they are not a preferred glycoside in clinical practice.

Varied severity of arrhythmia was encountered in study population. Most of the patients had Sinus Atrial Node and or Atrio Ventricular Node block, with few developing Atrial or Ventricular arrhythmia [7,8]. Greater the quantity of yellow oleander consumption more was the severity of cardiac illness.

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