



Strychnine poisoning – Case series of survivors

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INTRODUCTION

Strychnine was one of the most famous syntheses in the history by which two chemists won the noble prize (Robinson in 1947 and Woodward in 1965) in the field of organic chemistry.^[1] It is the compound which has turned from medicine to poison through ages. Though it has been discovered in 1818, it has been used to kill dogs, cats and birds in Europe during 1600's.^[1] During late 19th and early 20th centuries, it was popularly used as

ABSTRACT

Background: Strychnine is one of the oldest compound which has been used as medicine in age olden days. Later the toxic nature of the compound has been revealed and if untreated can lead to death within minutes to hours depending on the amount of consumption. Literature about the strychnine toxicity is sparsely published.

Material and methods: A case series of four members of family with strychnine poisoning who got recovered with appropriate critical care management is described in this article.

Results: All cases in our case series survived by early and timely interventions and avoidance of complications. All essential details from this cases were collected. Study of this literature showed the use of drugs varying from benzodiazepines to other sedatives and paralytics essentially to control seizures and likely complications being observed with Strychnine. Outcome has improved when compared to olden days which can be attributed to evolution of acute care medical facilities.

Conclusions: Though there is no antidote, adequate supportive care along with avoiding complications can show good prognosis as in our case series. Death occurs mainly by respiratory failure which should be taken care by early intubation and mechanical ventilation.

an athletic performance enhancer, recreational stimulant and believed to be cure for alcoholism addiction.^[2] It has been familiar with doping in Olympics (1904 and 2016).^[3,4] Strychnine is extracted from the plant *Strychnos nuxvomica* (genus – *Strychnos*, family- Loganiaceae) which is found in southern Asia (India, Sri Lanka) and Australia. At present, it is being used primarily as pesticide, particularly to kill rats. Devilishly, it was found mixed with street drugs such as LSD (Lysergic acid diethylamide), Heroin and

Cocaine. Though Strychnine poisonings are rare these days, ingestions (homicidal, suicidal and accidental) still are reported sporadically. So there is a dire need to know about varied presentations of strychnine toxicity and necessary treatment as this entity doesn't give much time between the consumption and irreversible damage to life. We hereby report case series of Strychnine (*Nux vomica*) poisoning.

CASE SERIES

This is a case series of four members who have consumed strychnine accidentally. Four members (One elderly male, two of them- husband and wife and one elderly lady who will be referred from hereafter as case 1, 2, 3 and 4 respectively) have gathered at one fine night for a supper arranged at home of elderly lady (case 4) which became the memorable event for their life-time. She (case 4) had served food made at home to the other three members and had food herself later after 20 min. After a while, case 1 started feeling agitated, nauseating and had severe muscle spasms. Within a span of 10-15 minutes, he started seizing. Case 2 and 3 also started feeling nauseous and not being normal. They were taken to the hospital in the ambulance. Meanwhile case 2 started seizing in the ambulance itself. Inj. Lorazepam 4 mg IV was given in the ambulance to both case 1 and case 2. Just after reaching the hospital case 3 also started seizing. We started preliminary treatment for all three cases, while one of us reviewed history with the elderly lady. The astounding feature about their presentation was awake seizures (conscious and aware of the things happening in the surrounding's during event). Most of the anticonvulsants were tried but seizures did not subside. To avoid complications, we had no choice left other than to sedate, paralyze and intubate them. Case 4 was about to finish the history and had seizures which got subsided with Inj. Lorazepam 4 mg IV. All of them were admitted in intensive care unit (ICU) and treated as per protocols. Treatment included mechanical ventilator (MV) support, anticonvulsants and other supportive care. History and standard treatment received by all cases are summarised below in table 1 and 2. Three cases except the case 1 got recovered within a span of 3 days and got discharged within a week. All the details regarding the four cases were tabulated. Case 1 took more time as he had acute kidney injury (AKI) due to rhabdomyolysis caused by seizures. Table 2 summarises clinical features and treatment received.

DISCUSSION

Strychnine poisoning can occur via ingestions, inhalational and intravenous routes. Now a day, Strychnine is being used in street drugs (white powder form –Heroin, Cocaine), as pesticide (to kill rats), herbal medicines in some countries like China and Cambodia.^[5,6,7] Strychnine acts by competitive inhibition of glycine receptor in the spinal cord which can lead to uncontrollable seizures and other complications causing death.^[8-15] Strychnine poisoning has varied presentation from nausea to death depending on the dose / amount of ingestion.^[15,16] At initial presentation, provisional diagnosis of toxidrome of CNS stimulation and seizures was considered. Food poisoning as differential was considered as all members had similar clinical features after consuming food cooked in same kitchen. Drug abuse, though thought as differential was unlikely in view if socio economic considerations. Organochloride poisoning was considered as differential. Strychnine was later considered in view classical awake seizures. After the recovery of the patients. we were able to find the cause by taking detailed history including the examination of food materials used. The cause was found out to be due to seeds mixed as pulses along with Tur dal (Yellow Dal). We examined the seeds and got confirmed by the forensic team. This seeds were surprisingly Strychnine seeds which were used in their back garden nursery as baits. Later all the events were correlated like symptom onset, complications, recovery with time of consumption of food, amount of consumption respectively. In the present case series of four members, they have consumed accidentally *Nux vomica* seeds which was mixed with food. All the typical features were seen including nausea, awake seizures, hyperthermia, tachycardia etc., Nevertheless, there is no antidote, adequate supportive care along with avoiding complications can show good prognosis as in our case series. Death occurs mainly due to respiratory paralysis which was taken care by early intubation and mechanical ventilation support in our cases. With consideration of peripheral mechanism of awake seizures, neuro muscular blocking agents were considered in absence of continuous bedside EEG monitoring. Initially in the age olden days' anticonvulsants used were Sodium amytal, Sodium benzoate and Sodium thiopentone. Through the years, it has changed to Benzodiazepines like Diazepam, Lorazepam, Midazolam and use of neuro muscular blocking agents like Vecuronium, Pancuronium etc., Early intubation is adopted now as a good outcome measure. Rapid cooling techniques for hyperthermia has

Table 1: Initial resuscitation and SAMPLE history of the cases

Initial presentation and interventions done		
COMPONENTS	FEATURES	INTERVENTION
A (Airway)	Frothing	Airway protection
B (Breathing)	24- 30/min, saturations > 90 on Oxygen supplement in emergency. Clear chest on auscultation.	Endotracheal (ET) Intubation, Mechanical Ventilation (MV) support, oxygen.
C (Circulation)	Tachycardia, MAP 65 to 90 mm of Hg	Nil required
D (Disability)	Case 1, 2 and 3 had awake seizures. Case 4 had muscle spasms.	Antiepileptics, benzodiazepines, Sedatives, paralytics infusion.
E (Exposure and environmental)	Hyperthermia	Cooling techniques
Sample History		
S (Signs & symptoms)	Nausea, tachycardia, hyperthermia, agitation, restlessness, awareness of symptoms, breathing difficulty	
A (Allergy)	Nil significant	
M (Medications)	Antihypertensives, antidiabetic medications	
P (Past history)	Nil such events prior	
L (Last meal)	Had food half an hour to forty five minutes back	
E (Events)	Nil significant	

Table 2: Clinical features and Treatment details

S.No	Feature	Case 1	Case 2	Case 3	Case 4
1	Onset of symptoms	First	Second	Third	Last
2	Vitals	Stable	Stable	Stable	Stable
3	Drugs used	Lorazepam, phenytoin, Midazolam, Vecuronium	Lorazepam, phenytoin, Midazolam, Vecuronium	Lorazepam, phenytoin, Midazolam, Vecuronium	Lorazepam, Midazolam, Vecuronium.
4	Organ supports	MV support / Renal support	MV support	MV support	MV support
5	MV duration	7 days	3 days	3 days	0 days (extubated in few hours)
6	Complications	AKI / Respiratory failure	Respiratory failure	Respiratory failure	None
7	Cause of complication	Rhabdomyolysis (total CPK 23000 IU/L) / more muscle mass / more food intake	Seizures	Seizures	None
8	ICU LOS	10	6	6	4

also added some value for recovery in most of the cases. Good hydration and improvement in renal replacement therapies has led to avoid the AKI and its associated complications. All these improvements in care has shown improvement in mortality and morbidity of this toxic ingestion as in our case series in which everyone survived. To our surprise we noticed Nux Vomica seeds being sold on online shopping sites.

CONCLUSION

Point which has to be kept in mind and get cognizance about Strychnine are its varied presentations and awake seizures. High index of suspicion and early appropriate

acute care has reduced mortality and morbidity observed with strychnine poisoning either consumed as drugs or nux vomica plant products.

Pearls to Remember

- Consider Strychnine when history of illicit drug abuse is noted.
- Consider in any case with awake seizures, seizures not subsiding with barbiturates and benzodiazepines.
- Symptomatic treatment and avoiding complications with critical care during first 24 – 72 hrs can recover most of the cases of strychnine.

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