

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Rhabdomyolysis and Strychnine Poisoning: A Case Report.

Yajnesh Kidiyoor¹, Sipra Rai¹, Shankar M Bakkannavar^{2*}, Vinod C Nayak³,
Ranjit Immanuel James⁴, and Kavitha Saravu⁵.

¹Assistant Professor, ⁵Professor, Department of General Medicine, ²Associate Professor, ³Professor, ⁴Tutor, Department of Forensic Medicine & Toxicology, Kasturba Medical College, Manipal, Manipal University, Karnataka, India.

ABSTRACT

Strychnine, brucine and loganin are the active principles of Strychnine nux vomica which are responsible for the toxic manifestations. Strychnine poisoning though rare but it is not an uncommon occurrence. Nowadays the poisoning is most commonly due to adulteration with narcotics. In our case of unintentional poisoning, an adult female of 36 years old, had consumed bracts of nux vomica tree (made decoction and drank it) due to the false belief that it will cure her skin lesions. But she developed tonic clonic seizures, rhabdomyolysis and was treated conservatively. Eventually she survived.

Keywords: Poisoning, rhabdomyolysis, strychnine, seizures.

**Corresponding author*

INTRODUCTION

Strychnine is an alkaloid which is obtained from seeds of tree *Strychnos nux vomica*. It is first used as a rodenticide in Germany in early 16th century. It is still used as adulterant in street drugs such as amphetamines, cocaine, heroin [1]. *Strychnos nux-vomica* L. is a highly toxic herbal preparation; it is an important ingredient of many traditional Chinese medicines [2]. This alkaloid exerts an excitatory effect on the central nervous system by inhibiting the glycine uptake at synapses, specifically in the ventral horns of the spinal cord; it would explain the need of minimal peripheral sensory stimulation to trigger diffuse muscle contractions [3]. It results in increased neuronal activity and excitability, leading to increased muscular activity [3].

Hereby we present a case of 36 year old female who consumed the decoction prepared out of the bracts of the *Strychnos* tree and got poisoned and subsequently survived.

Case history

A 36 years old female had skin disease. As the skin diseases need some time to be cured, she was thinking that it was not getting cured in spite of treatment. Meanwhile she was told that the extract of the bracts of *Strychnos* plant will cure her disease. She believed it and consumed the extract of stalk twice and didn't feel anything odd. But when she consumed the extract of the bract, developed tonic clonic seizures with clenching of the teeth. These symptoms were followed by rigidity and weakness. The rigidity occurred either spontaneously or after a stimulus. She was taken to local hospital where she was treated symptomatically and was referred to our hospital for further management.

On admission the patient was having rigidity which is severe in lower limbs. The higher mental functions and cranial nerves were intact. The vitals were stable but she developed acute kidney injury (AKI) secondary to rhabdomyolysis. She got admitted in ICU and was managed conservatively with effective measures to prevent further damage to the kidneys and to prevent from complications occurring therein. The dermatology consultation was taken for her skin problem revealing it to be *Taenia* infection and was treated for the same. She gradually recovered.

DISCUSSION

Strychnine is an alkaloid obtained from the seeds of *Strychnos* plants. These plants are from the family Loganiaceae, very common in South India, the botanical name is *Strychnos nux vomica*, commonly called as dog buttons. The seeds are most toxic part of the tree. The seeds are grayish brown, disc shaped, hard, flat, little convex on one side and concave on the other side [4]. The presence of a shiny hard pericarp with radiating silky fibres differentiates it from other seeds [5].

There are three active principles of which strychnine and brucine are alkaloids whereas loganin is a glycoside. The bark, wood and leaves contain only brucine. It dissolves very sparingly in water or ether but dissolves well in alcohol (90%) and benzene and readily in chloroform[5]. Strychnine has been used as a rodenticide and to kill stray dogs (hence the name Dog buttons) though it is of no therapeutic value [6]. Strychnine displays little protein binding and is rapidly redistributed from the blood to the tissues. Its volume of distribution is 13 L/kg [7-9]. Elimination follows first-order kinetics with an elimination half-life is approximately 10 to 16 hours [10-12].

Strychnine prevents the uptake of glycine at inhibitory synapses, especially in the ventral horns (anterior horn cells) of the spinal cord. It results in the competitive antagonism of the inhibitory neurotransmitter at the post-synaptic spinal cord motor neuron. There is a net excitatory effect, and minimal sensory stimulation can set off powerful muscle contractions [4]. The usual symptom is feeling of apprehension, muscle twitching, spasms followed by overwhelming convulsions [4]. The differentiating feature is in between spasms and convulsions there will be complete relaxation of the muscles. The patient will have clear sensorium in between the episodes of convulsions⁴. Other clinical features are Risus sardonicus, opisthotonus, emprosthotonus, pleurosthotonus, trismus (lock jaw) [4.5.13].

The differentials to this poisoning are tetanus, rabies, meningitis, hysteria etc [4]. The seeds are non poisonous if they are consumed as it is because of the presence of the pericarp. The differentiating feature from tetanus will be absence of trauma and fever prior to the onset of symptoms [13]. The usual fatal dose is 30 – 50 gms of strychnine or 1-3 gms of *Strychnos* seeds [4]. Fatal period is approximately 30 minutes – 2 days [13]. Death is usually due to respiratory muscle paralysis. In severe cases the patient is kept in a dark and silent room to avoid stimulus to cause the symptoms to occur [5].

In our case the patient due to her ignorance consumed the decoction prepared out of the bracts of *Strychnos* tree as a treatment for her skin lesions. She developed rhabdomyolysis on the first day itself but her urine myoglobin was negative. She was managed with antibiotics, anti-convulsants, drugs for her skin lesions after consulting a dermatologist and other supportive measures to make sure she survives. The toxicological analysis of the samples revealed the presence of strychnine. The renal function tests which were deranged initially gradually improved during the course of treatment thus she recovered from her illness. Though we all know the *Strychnos* seeds and fruits are poisonous. This sort of poisoning due to consumption of decoction from tree bracts is a rare phenomena.

REFERENCES

- [1] Wood DM, Webster E, Martinez D, Dargan PI, Jones AL. Survival after deliberate strychnine self-poisoning, with toxicokinetic data. *Critical care*, Licensee BioMed Central Ltd. 2002; 6(5): 456-459.
- [2] Qian Gao, Jun-jun Wang, Feng-mei Han, Yong Chen. Effect of strychnine hydrochloride on liver cytochrome P450 mRNA expression and mono oxygenase activities in rat. *Acta Pharmaceutica Sinica B*. 2011; 1(2): 121-128.
- [3] Burn DJ, Tomson CRV, Seviour J, Dale G. Strychnine poisoning as an unusual cause of convulsions. *Postgraduate Medical Journal*. 1989;65: 463-464.
- [4] Pillay VV. *Modern Medical Toxicology*. 4th ed. New Delhi: Jaypee Brothers Medical Publishers; 2013.
- [5] Vij K. *Textbook of Forensic Medicine & Toxicology*. 5th ed. New Delhi: Elsevier, India; 2011.
- [6] Lambert JR, Byrick, RJ, Hammeke MD, Management of strychnine poisoning. *CMA Journal*. 1981; 124: 1268-1270.
- [7] Sgaragli GP, Mannaioni PF. Pharmacokinetic observations on a case of massive strychnine poisoning. *Clin Toxicol* 1973; 6:533.
- [8] Heiser JM, Daya MR, Magnussen AR, Norton RL, Spyker DA, Allen DW, Krasselt W. Massive strychnine intoxication: serial blood levels in a fatal case. *J Toxicol Clin Toxicol* 1992; 30(2):269 - 283.
- [9] Smith BA. *J Emerg Med* 1990; 8:321.
- [10] Palatnick W, Meatherall R, Sitar D, Tenenbein M. Toxicokinetics of acute strychnine poisoning. *J Toxicol Clin Toxicol* 1997; 35:617.
- [11] Case records of the Massachusetts General Hospital. Weekly clinicopathological exercises. Case 12-2001. A 16-year-old boy with an altered mental status and muscle rigidity. *N Engl J Med* 2001; 344:1232.
- [12] Edmunds M, Sheehan TM, Van't Hoff W. Strychnine poisoning: clinical and toxicological observations on a non-fatal case. *J Toxicol Clin Toxicol* 1986; 24:245.
- [13] Nandy Apurba. *Nandy's handbook of Forensic Medicine & Toxicology*. Kolkata: New Central Book Agency;2013.