

Case Report

Homicidal acute arsenic poisoning: A report of two cases

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Abstract

Arsenic has been considered as an ideal homicidal poison from centuries back till date and placed in the top list of lethal poisons used with criminal purpose. We report two cases of acute arsenic poisoning, who succumbed to death after being admitted to hospital for consuming toxic temple food offering. Initially it was believed that some toxic substances might have got mixed with religious offerings which led to food poisoning among devotees. Later it was unearthed by investigating officer that it was due to web of rivalry illicit relationship. The autopsy findings of red velvety gastric mucosa, petechial haemorrhages over visceral organs along with the distinctive clinical profile of the deceased lead to a strong doubt of arsenic poisoning which were further confirmed by chemical analysis report and the circumstantial evidence of consumption of prasadam laced with arsenic poison.

Keywords: Prasadam, illicit relationship, Homicidal poisoning, Arsenic, Red velvety gastric mucosa.

Introduction

Arsenic had been used as homicidal poison since many decades. It was a poison of choice because in both acute and chronic administrations, the signs and symptoms mimic like natural disease processes and fail to arouse suspicion of foul play. Inorganic arsenicals exist in trivalent and pentavalent states. The acute toxicity of an inorganic arsenic compound depends largely on its solubility, and on whether the compound is ingested in a dissolved or undissolved form.¹

Trivalent arsenicals are more toxic than the pentavalent forms.²

Arsenic trioxide is a trivalent arsenical, commonly known as white arsenic (sugar like appearance) and has been called "king of poisons". It has been used

beneficially as homicidal agent for being colourless, tasteless and odourless, small lethal dose (even a pinch weighing 20 gms will kill 8-10 persons), easy availability, cheap price, easy administration with food or drink, gradual onset of signs and symptoms (resemble those of cholera) and certainty of action.³ The signs and symptoms of acute arsenic poisoning may appear in:

- (a) fulminant form,
- (b) gastro enteric type (common form) or
- (c) subacute narcotic form.⁴

It is absorbed through all portals of entry including oral, inhalational and cutaneous routes. After absorption it is redistributed to the liver, lungs, intestinal wall, and spleen, where it binds to the sulfhydryl groups of tissue proteins that account for its cytotoxicity by interfering with cellular respiration. More than 90% of an ingested dose of dissolved arsenic trioxide is absorbed in the gastrointestinal tract.^{5,6} About 180 mg of arsenious oxide is the average fatal dose. The smallest amount known to have caused death is 125 mg. Recovery has taken place after much larger doses, varying from 4 g to 60 g, but these are exceptional cases.⁷ The pathanatomic findings in case of arsenic poisoning may vary depending upon the survival period of the patient. These may range from slight mucosal hyperemia to profound multiorgan damage.

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The present cases justified all the circumstances, typical of homicidal arsenic poisoning that was further confirmed by the autopsy, histopathological and circumstantial investigations.

Case Presentation

The present case report relates to 27 years old female and 55 years old female who had consumed prasadam on an evening, offered at temple and got admitted to hospital with h/o food poisoning. There was no significant medical history; the patient was apparently normal one day back. The 27 years old female succumbed to death approximately after 12 hours of admission and latter at 24 hours of admission.

Mrs. X, target for poisoned prasadam in her statement to the police, claimed that the “poisoned prasadam” had been kept for her and her family, but ended up being distributed to others. As many as 12 members of two families were hospitalised following the consumption of food offered in the temple; two women died subsequently. It was third attempt which got failed in killing the target and ended up in death of two innocent persons.

Case 1: The 27 years young female presented to Emergency department of R.L.Jalappa hospital with 10 to 12 episodes of vomiting, non projectile, non blood or non-bile tinged, contained food particles and 5 to 7 episodes of loose stools, non foul smelling, non blood tinged or mucoid changes and diffuse abdominal tenderness.

The patient attenders give h/o similar complaints in other family members who consumed temple offering and were admitted at local hospital.

Clinical findings revealed tachycardia, low blood pressure and altered sensorium. The gastric lavage was done which revealed only small amount of brownish-red fluid material. The ECG revealed ventricular tachycardia with prolonged QT interval and ST segment depression. The patient was treated on all best possible grounds with inotropes, defibrillation and mechanical ventilation, but was not revived and declared dead.

Case 2: The 55 years elderly female was initially admitted at local hospital and later referred to Emergency department of R.L.Jalappa hospital for tertiary care as patient was having profound hypotension. The patient after consuming temple offering developed 30 to 40 episodes of vomiting, non projectile, non blood or non-bile tinged, contained food particles and tender abdomen.

Clinical findings revealed tachycardia, low blood pressure and altered sensorium. The patient

was responding to simple oral commands and was shifted to ICU in the view of treating shock. The ECG revealed ventricular tachycardia with prolonged QT interval and ST segment depression. The patient was treated on all best possible grounds with inotropes, defibrillation and mechanical ventilation, but was not revived and declared dead.

The dead bodies were brought for autopsy to the department of Forensic Medicine SDUMC, Kolar, under section 120(B), 302,307 & 328 of the Indian Penal Code with the complainants being the husband of the deceased in case 1, daughter of deceased in case 2 and the accused being Miss Z and her allies.

The chief autopsy findings, histopathological findings and chemical analysis reports of both cases are described in table no.1.

The circumstantial evidence including the police interrogation revealed confession of the Miss. Z and her allies regarding the criminal administration of arsenic in temple offering.

Figure 1: Gastric mucosa showing red-velvety appearance in case 1.



Figure 2: Gastric mucosa showing red-velvety appearance in case 2.



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Table 1: Showing chief autopsy findings, histopathological reports and chemical analysis results in case 1 and 2.

Sl. No.	Observations	Case 1	Case 2
1	Period of survival	6 hours	12 hours
2	Autopsy features	<p>External: The rigor mortis was appreciated over the muscles of face and neck. Post mortem lividity was purplish-red and not fixed. Conjunctival congestion was present bilaterally.</p> <p>Internal: All the viscera were markedly congested.</p> <p>Stomach: The stomach was containing about 200 ml of reddish-brown fluid material. The gastric mucosa was haemorrhagic patchily and showed generalized congestion that was more marked along the gastric rugae. The mucosa was pulpy and oedematous on touch and red velvety in appearance (Figure 1).</p>	<p>External: The rigor mortis was well developed all over the body. Post mortem lividity was purplish-red and fixed. Conjunctival congestion was present bilaterally. Blood stained mucoid secretions were present around mouth and nostrils.</p> <p>Internal: All the viscera were markedly congested.</p> <p>Stomach: The stomach was containing about 160 ml of reddish-brown fluid material. The gastric mucosa was haemorrhagic patchily and showed generalized congestion that was more marked along the gastric rugae. The mucosa was pulpy and oedematous on touch and red velvety in appearance (Figure 2).</p>
3	Histopathological report	Features suggestive of pulmonary edema	Features suggestive of pulmonary edema
4	Chemical analysis report	Stomach contents, liver, kidneys and blood samples showed the presence of 'Arsenic ions'.	Stomach contents, liver, kidneys and blood samples showed the presence of 'Arsenic ions'.

Discussion

Sudden onset of gastro enteric symptoms and clinical features in present cases suggestive of acute arsenic poisoning. Symptoms of acute intoxication usually occur within 30 minutes of ingestion but may be delayed if arsenic is taken with the food.⁴ Abnormal stomach findings like mucosa with red velvety streaks appearance, multiple sub mucosal haemorrhagic patches (figure-01 & 02) present in both cases were strongly suggestive of acute arsenic poisoning. Though solubility is the chief hindrance in its use but the same is greatly enhanced if hot solutions such as tea, coffee, cocoa, porridge or gruel are used⁸. In the present case, poison was laced with temple prasadam-khesari bath.

Mass homicidal poisoning in which persons have been affected has sometimes occurred from arsenic having been administered by an individual in

some article of food. Arsenic is used occasionally for suicidal purposes, but owing to severe pain caused by its injection, suicide victims resort to this poison much less than opium. Accidental cases of poisoning by arsenic sometimes occur from its admixture with drink or articles of food, or from its improper medicinal use. Multiple accidental cases may also occur from drinking water from streams containing arsenical mineral deposits.⁷

Acute arsenic poisoning leads to usually pronounced gastrointestinal symptoms due to dilatation of splanchnic vessels resulting in submucosal vesicle formation. The patient develops nausea, vomiting, diarrhea (which may be bloody), and abdominal pain. A garlicky breath odor may be detectable. Gastrointestinal involvement can cause fluid loss and hypotension. Subsequently, a protein-losing enteropathy may develop. Arsenic also

induces increased hepatocytic mitotic activity, which is likely to be related to the mitogenic properties of arsenic⁹. Electrocardiographic findings may include QRS complex broadening, QT prolongation, ST-segment depression, T-wave flattening, and multifocal ventricular tachycardia.

Anatomic changes from fatal inorganic arsenic poisoning by oral intake are hemorrhages and ulcers of the gastrointestinal tract, hepatocellular necrosis, renal tubular necrosis, pulmonary edema and emphysema, and sub endocardial hemorrhages with interstitial myocarditis. The shorter the survival interval, the less prominent the anatomic changes and vice versa. In hyperacute poisonings anatomic changes will be essentially negative or restricted to gastric mucosal hyperemia¹⁰. In the present case, the autopsy and histopathological findings agreed well with the survival interval.

Conclusion

Clinical features mentioned in death summary, histopathological findings, chemical analysis reports and autopsy findings confirm that victims died due to acute arsenic poisoning. The popularity of arsenic has declined in the recent times because of available advanced diagnostic investigations and most cases of arsenic poisoning reported today are accidental and chronic toxicity cases. Homicidal arsenic poisonings are still reported from time to time, the present cases as one of such presentation. Temple prasadam tragedies are becoming common in state of Karnataka (as this is second such incident in past one year), it is the need of hour to impose strict guidelines, under the Muzrai department to take safety measures, including installation of CCTVs in temple kitchens. Other measures include prohibiting entry of unauthorized persons into kitchens and ensuring food is fit for consumption.

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