J Indian Acad Forensic Med. 2021 Jan-Mar; 43(2): 194-195
doi:10.5958/0974-0848.2021.00049.X

CASE REPORT

Hue of aspiration reflected the nature of poison and cause of death: A case report of copper sulphate ingestion

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Abstract

Most of the times, the cause of death in suspected poisoning cases is given only after receipt of chemical analysis report. In inquest papers it is usually mentioned as unknown poisoning as the suspected cause of death. Here we are presenting a case brought dead in casualty of PGIMS, Rohtak with a history of consumption of some unknown poisonous substance at home. During post-mortem examination bluish coloured granular semi-liquid aspirated material was observed in the esophagus and trachea reaching up to the bronchioles which indicated not only the immediate cause of death as aspiration of gastric contents, but, also the nature of poison i.e. Copper Sulphate which is believed to be a rare poison nowadays. The detail of this case with photographs has been discussed.

Keywords

Copper sulphate; Poisoning; Aspiration

Introduction

A 30-year-old male with alleged history of ingestion of some poisonous substance at home was brought dead to casualty of Pt BD Sharma, PGIMS, Rohtak, Haryana, India. During autopsy it was observed that the body had bluish green froth around the mouth and nostrils (Figure 1). Larynx and trachea had a bluish substance adherent to its mucosa which was observed to be reaching beyond secondary bronchioles. The esophagus was full of bluish granular substance (Figure 2). Stomach contained 500 ml of semi-solid bluish material and all internal organs were congested (Figure 3). Bluish tinge was noticed on the surface of brain. Cause of death was ascertained as aspiration of gastric contents.

Discussion

Copper sulphate forms bright blue crystals containing five molecules of water [$CuSO_4 . 5H_2O$]. It is used chiefly for agricultural purposes as a pesticide and in leather industry and also in making home-made glue. Burning of copper sulphate in houses and shops (as a good luck charm and for religious activities) is a common practice among Buddhists and Hindus. It was also used as a precipitator in heavy metal poisoning and was used to treat gastric and topical exposure to phosphorous. [1, 2] Copper content of the body is 150gms. The safe daily intake of dietary copper is 2 to 3 mg while the actual requirement is only 0.8mg/day.[3,4] Copper Sulphate ingestion (accidental or deliberate) is a rare form of poisoning usually limited to the Indian subcontinent.[2] Its incidence is reported to be 34% and 65% of the total poisoning cases in two studies from Agra and New Delhi in 1960's. However, there was a decline to 3.85 and 3.33% between 1977-1982 and 1982-1987 respectively. [1] A recent survey shows the incidence to be only 1% of the total poisoning cases.[5] The immediate symptoms following ingestion of Copper Sulphate universally are gastrointestinal in the form of nausea, vomiting and cramping abdominal pain. Vomiting usually occurs within 15 minutes of ingestion and vomitus is characteristically greenish-blue.[1] Superficial or deep ulcerations of gastric and intestinal mucosa are also reported.[6] Copper Sulphate poisoning with symptoms of delusion have also been reported.[7] Suicide by intravenously injecting a solution of Copper Sulphate, used as an antifouling agent in paints has also been reported. Zhukov and Novoselov (1983) reported a case of fatal poisoning with blue vitriol, wherein a 39 years old lady introduced blue vitriol into the uterine cavity in an attempt to interrupt a two-month pregnancy.[5]

A significant correlation was found between the levels of whole blood copper and the severity of manifestations.[3] No correlation was found between plasma copper concentrations and prognosis in a previous study by Wahal et al. The overall mortality rates vary from 14-18.8%.[1] Lethal dose of ingested copper sulphate is between 10-20g.[2] Decreasing the absorption by immediate dilution with water or milk is advisable. In Copper Sulphate poisoning vomiting is likely to occur spontaneously and hence patient may require antiemetic therapy.

If corrosive esophageal or gastric damage is suspected upper GI endoscopy should be carried out, ideally within 12-24h in order to gauge the severity of injury.

Patients with symptomatic methemoglobinemia should be

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Article History
Received: 1st July, 2020; Accepted: 1st April, 2021

treated with methylene blue. Oxygen should be administered while preparing for methylene blue therapy. Hypotensive episodes should be treated with fluids, dopamine and noradrenaline. There is little clinical experience pertaining to the use of chelators for acute Copper Sulphate intoxication- British anti Lewisite (BAL), D-penicillamine, 2, 3-dimercapto-1-propane sulfonate, Na+ (DMPS) and Ethylene diamine tetra acetate (EDTA) have been used. [1] Colour changes associated with commonly encountered poisons have been listed under Table 1.

Table 1: Colours/Common Names of different Poisons

Name of the poison	Colours/Common Names
Copper sulphate	Blue vitriol (large blue crystals)
Ferrous sulphate	Green vitriol (bluish green crystals)
Aluminium phosphide	Greyish green tablets
Copper acetoarsenite	Parish green
Copper subacetate	Bluish green masses or powder
Copper arsenite	Sceele's green
Copper carbonate (native)	Mountain green

Figure 1: Bluish froth observed around mouth and nostrils

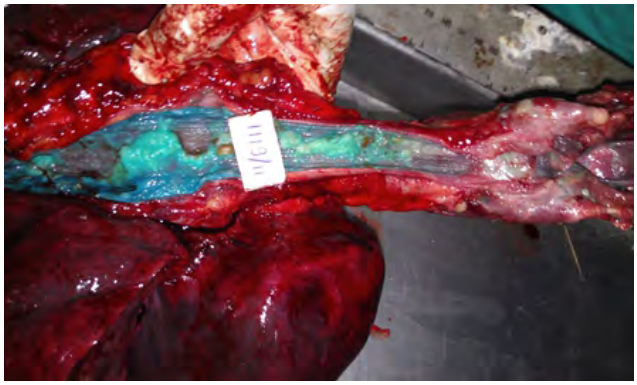

Figure 2: Bluish granular material present along the esophagus

Figure 3: Congestion of internal organs

Conclusion

Copper sulphate poisoning, which is mostly suicidal, is associated with high mortality in severe cases due to methemoglobinemia, hepatotoxicity and renal failure. In cases with severe poisoning cardiovascular collapse, hypotension and tachycardia can occur early within a few hours of poisoning and may be responsible for early fatalities. Copper sulphate is emetic but deaths due to aspiration are not reported. This case highlights the need to spread information, education and communication material amongst masses regarding preliminary steps to be taken in all poisoning cases like putting the patient in left lateral position to prevent aspiration, which could save many lives.

Ethical clearance: A prior approval was obtained from the Institutional Ethics Committee

Conflict of interest: None to declare

Source of funding: None to declare

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