

Successfully Treated Accidental Thallium Poisoning

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Abstract

Thallium (Tl) once commonly used as a rodenticide, has been banned due to its toxicity, but unfortunately, is still available in India. In this case report we investigated two female patients from the same family, 68 years and 45 years of age, who were hospitalised for abdominal pain, pins-and-needles sensations in lower limbs and alopecia for 10 days. The diagnosis of thallium toxicity was confirmed based on high blood and urine thallium levels. Patients were cured with Prussian blue and haemodialysis.

Introduction

Thallium is a heavy metal which is odourless, tasteless, and water soluble; making it one of the ideal homicidal substances. Thallium toxicity is rarely reported due to a global ban on use of thallium; however, it is still reported in India due to its illegal use. It can be absorbed into the body by any route, i.e., ingestion, inhalation, and skin contact¹. Clinical manifestations vary with dose and duration of exposure. Majority of patients present with alopecia, skin rashes and neurological manifestations such as quickly progressive and severely painful peripheral neuropathy, mental confusion and lethargy. Combination of these signs and symptoms is known as the thallium triad.

Case report

Two female patients belonging to the same family, residents of Aligarh, Uttar Pradesh, aged 45 years (patient 1) and 68 years (patient 2), presented with complaints of abdominal pain with nausea and vomiting for 10 days, pins-and-needles prick sensations and burning in both feet for 7 days and acute loss of hair from scalp for 5 days. They gave history of recent travel to their hometown 5 days prior to onset of symptoms, where they consumed wheat flour which was contaminated with unknown tablet used to keep rodents away. There was no history of fever, diarrhoea, rash, visual abnormality, oral ulceration, any medication intake, altered sensorium, abnormal behaviour, palpitation, bleeding, or breathlessness. On examination, patients were vitally stable, there was alopecia throughout the scalp and madarosis. Nervous system examination was suggestive of diminished ankle reflex and impaired vibration sense in both lower limbs below the knee joint. The other general examination was normal and systemic examination was also normal. Haemogram revealed a Hb of 12.5 g/dl, TLC of 6,000 cells/mm³ and platelet count of 2.5 lakh cells/mm³

for patient 1 and Hb of 10.1 g/dl, TLC of 6,100 cells/mm³ and platelet count of 2.2 lakh cells/mm³. Kidney and liver function tests were normal. Urine examination was normal; ANA was negative; vitamin B12 levels, folate levels, thyroid function test were normal; radiological investigations were normal. Considering the temporal and geographical association of clinical manifestations, a high suspicion of heavy metal toxicity was kept and thallium levels on day 2 of admission were found to be high in both serum and urine in both patients (patient 1 serum Tl: 335 µg/l, and urine Tl - 2,422 µg/l; patient 2 serum Tl: 136 µg/l, and urine



Fig. 1: 45-year-old female with non-scarring alopecia.

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Fig. 2: 68-year-old female with non-scarring alopecia.

Tl - 2,320 µg/l). Patients were managed with i.v. fluids, gastric lavage, activated charcoal, forced alkaline diuresis with furosemide, i.v. potassium chloride, and Prussian blue. Haemodialysis was initiated. A total of 6 cycles of haemodialysis were given until serum Tl reached <0.1 µg/l. Patients were discharged and followed up. Both patients showed good recovery and alopecia reversed over the next 3 months.

Discussion

Thallium is a bluish-white metal that turns grey on exposure to air. It is used in the glass and dye industry, depilatory creams, fireworks, metal alloys, insecticides, and rodenticides in the form of thallium sulphate, as a

radioisotope (Tl-201) in cardiac perfusion scan². It is commonly used in Chinese herbal products. Thallium sulphate was used for the treatment of diseases and conditions including syphilis, gonorrhoea, gout, and dysentery in the past. The fatal dose of thallium is 1gm (>8 mg/kg), serum levels of more than 15 mg/l are immediately fatal to health and the fatal period is usually 24 - 36 hours. Death can result in less than 48 hours if a large dose is taken. Cause of death is generally respiratory failure due to motor neuropathy, renal or hepatic failure. Thallium has three toxokinetic phases, i.e., intravascular distribution phase for first 4 hours, central nervous system distribution from 4 to 48 hours and elimination phase after 24 hours (renal and fecal excretion)³.

Early manifestations (24 hrs) include acute abdominal pain and vomiting, headache, paraesthesia, confusion, hallucination, retrobulbar neuritis, ophthalmoplegia, tachycardia; and rarely hepatic, renal and bone marrow failure. Intermediate symptoms (24 hrs to 2 weeks) include quickly progressive severely painful peripheral neuropathy, mental confusion and lethargy and cardiac dysrhythmias. Late manifestations include Mee's lines, acneform rash, peripheral neuropathy, choreoathetosis, tremors, ophthalmoplegia, keratitis, cataract, and cardiomyopathy. Once thallium gets absorbed, only haemodialysis can remove it from the body⁴.

References

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