Erosion of nails following thallium poisoning: a case report

This case report describes a patient with thallium poisoning caused by repeated exposure to low doses of thallium. Alopecia and nail changes were the most prominent features of this case. There was dystrophy of nails in the form of whitish lunular stripes. This is the first report of complete erosion of proximal parts of nails following thallium poisoning. This case is the first report of thallium poisoning from India occurring from repeated low dose exposure.

Thallium is a toxic heavy metal, which was accidentally discovered by Sir William Crookes in 1861 by burning the dust from a sulphuric acid industrial plant. It is silvery white in colour in its pure state, and is more toxic than lead and as toxic as arsenic. It is well absorbed by any route, mainly excreted by the kidneys. Poisoning by thallium is mainly from the following symptoms: headache (92.3%), abdominal pain (61.5%), falling out of scalp hairs (84.6%), feeling of extreme lethargy prevailed. After a further five days, falling out of scalp hairs was noticed. It was only on the 15th day of consumption that wheat was suspected to be the causative factor, and only then was its consumption discontinued.

Blood, hair, and urine samples collected on the 21st day were analysed for thallium content using cyclic voltametry. Thallium levels in blood and hair samples were 0.1206 ppm and 0.0459 ppm respectively. In the urine sample, the level of thallium was 0.0459 ppm. These levels of thallium were higher than the recommended normal levels which are 2 ppb, respectively.

Thallium poisoning was suspected in this patient from the presence of symptoms and signs suggestive of thallium poisoning. Subsequently, the finding of significant levels of thallium in blood, urine, and hair samples confirmed it to be
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Main messages

- Clinicians should be aware that acute nail changes, including erosion, may occur as a useful sign in cases of thallium poisoning.

Policy implications

- Use of thallium compounds as rodenticides should be discontinued wherever possible.

A case of thallium poisoning. Although the subject was an agricultural worker by occupation, no occupational exposure to any agricultural chemical was possible as there had been no agricultural activity for the past six months due to drought in the area. Although we could not collect wheat samples for analysis in order to confirm the presence of thallium, wheat intake was suspected as the only probable cause of poisoning on the basis of circumstantial evidence obtained from epidemiological investigation. The only common factor in the three affected families was consumption of same wheat. They were all consuming wheat from the same bag, at which time they started suffering from symptoms of thallium poisoning.

As thallium compounds are frequently used as rodenticides for storage of wheat, poisoning of the subject by thallium compounds from the contaminated wheat was very likely. There was probably a repeated low dose exposure from daily intake of contaminated wheat. No acute life threatening condition had occurred. On the contrary, a subacute course was observed in this case of poisoning. This case presented with the usual features of thallium poisoning already described in the literature. The only striking difference was the features of the fingernails. Effects of thallium poisoning on nails has been reported in the form of dystrophy shown by the appearance of white lunular stripes (Mee’s stripes). However, in this case the nail changes started with whitish spots in the proximal part of the nails and ultimately ended with complete erosion of the proximal parts of the nails over a period of three weeks. However, this may have occurred as a severe form of Beau’s line. Microbiological examination of samples taken from the nails did not show any evidence of infection. The woman was neither on chemotherapy nor did she have any history of chemotherapy. Results of the biochemical analysis showed affects on the liver in the form of increased alkaline phosphatase. Another significant finding in this case was lowering of serum calcium. Exposure to thallium chloride has caused fall in concentration of trace elements including copper, zinc, iron, and calcium in plants. In this case, we have found similar results with serum calcium in a human subject.

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