

# Lead poisoning secondary to unprescribed ayurvedic medicine intake

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## DESCRIPTION

Lead, an ubiquitous toxicant emitted from environmental and industrial sources, causes multiple adverse effects following acute or chronic exposure. Sometimes the sources of heavy metal exposure are unanticipated. We report a case of acute lead poisoning presenting with adverse haematological manifestations following ingestion of ayurvedic medicine.

A 30-year-old wrestler presented with complaints of pain in the epigastrium, episodic vomiting, constipation and easy fatigability following consumption of unsupervised ayurvedic medicines (figure 1) for a duration of one month. On clinical examination the patient had pallor with mild hepatomegaly. He did not have features of lead encephalopathy, neuropsychiatric/cognitive effects, peripheral neuropathy or lead nephropathy. His evaluation revealed microcytic hypochromic anaemia (haemoglobin 96 g/L, total leukocyte count  $6.92 \times 10^9/L$  and platelets  $214 \times 10^9/L$ ), with reticulocyte count of 0.06% and no evidence of basophilic stippling or haemolysis on peripheral blood smear. Bone marrow (figure 2A) showed cellular marrow with increased iron stores (Perls' stain: grade 4), with no ring sideroblasts (figure 2B,C) and dyspoietic megakaryocytes (figure 2D). Radiological evaluation revealed mild hepatomegaly. Due to history of prolonged ayurvedic medicine usage, he was subjected to heavy metal screening, which revealed elevated blood lead level (BLL 83.6  $\mu\text{g}/\text{dL}$ ), with normal blood/urine levels of arsenic, mercury, cadmium and chromium. Skeletal survey did not reveal dense metaphyseal lines. He was managed with intravenous calcium disodium EDTA at  $1\text{g}/\text{m}^2$  for 5 days, to which he responded with a reduction in BLL and clinical improvement.

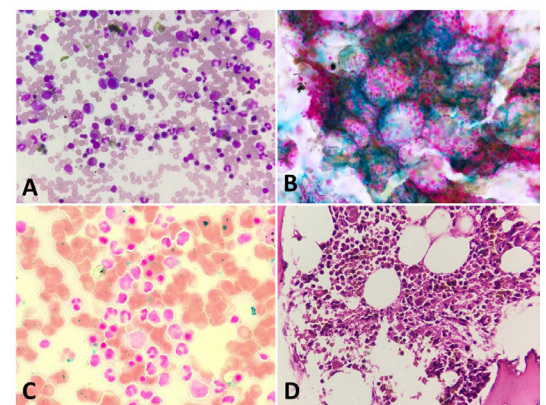
In the index case, due to short exposure to ayurvedic medication, the patient lacked the classic features of basophilic stippling and ring sideroblasts, which are often the earliest manifestations of lead poisoning.<sup>1</sup> The onset of symptoms is relatively fast for subacute lead poisoning but probably commensurate with the degree of lead ingested. Ideally, estimating the lead level in ayurvedic medications would have implicated a cause-effect relation; however, this could not be done due to lack of mass spectrometry. Chelation therapy quenches lead from different body sites and expels it through urine, as seen in our patient. Therapy should be initiated when BLL is  $>80\text{ }\mu\text{g}/\text{dL}$  in asymptomatic and  $>50\text{ }\mu\text{g}/\text{dL}$  in symptomatic adults.

Although over 95% of lead exposures are occupational, ayurvedic medicines are recognised as a source of lead poisoning and are responsible for 2% of non-occupational exposures.<sup>2</sup> Ayurvedic



**Figure 1** All the ayurvedic medications the patient was consuming to aid in bodybuilding.

medicines incorporate heavy metals (eg, mercury, lead and zinc) as ashes ('bhasmas'), a practice known as 'Rasa Shastra', and these are claimed to be safe and therapeutic if properly prepared and administered.<sup>3</sup> A comprehensive analysis of 193 ayurvedic preparations revealed heavy metals in around 20%, with lead and mercury 100–10 000 times greater than acceptable levels.<sup>4</sup> Lead intoxication associated with ayurvedic medicines is increasingly reported due to lack of government regulations on the efficacy and safety and ready off-the-shelf availability as herbal remedies in food stores or through the internet.<sup>5</sup>



**Figure 2** (A) Bone marrow aspirate with erythroid and myeloid precursors (May-Grunwald-Giemsa stain, 400 $\times$ ). (B) Bone marrow aspirate with increased iron stores, grade 4 (Perls' stain, 400 $\times$ ). (C) Bone marrow aspirate shows erythroid precursors, no ring sideroblasts (Perls' stain, 400 $\times$ ). (D) Bone marrow biopsy with dyspoietic hypolobated megakaryocytes (H&E stain, 400 $\times$ ).



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## Images in...

## Patient's perspective

I was unaware of the adverse effects of these medicines. In an enthusiasm to prepare well for the upcoming sports events and do better, I resorted to these drugs. I should have taken the consult of an expert in Ayurvedic medicines before using it. In the long run, my enthusiasm cost me heavily as I missed the opportunity to participate in the sports event.

## Learning points

- ▶ Unprescribed consumption of ayurvedic medicines can lead to severe adverse effects.
- ▶ Individuals on ayurvedic medications who present to the hospital with atypical symptoms should be evaluated for heavy metal overdose.
- ▶ Self-medication based on internet advice to help in bodybuilding, as in our case, can cause severe organ toxicity.

The patient in this case has taken unsupervised ayurvedic medicines for bodybuilding, leading to lead poisoning. This case illustrates the impact of ayurvedic medicines, supplements and other non-prescription medicines on patients' health.

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## REFERENCES

- 1 Valentine WN, Paglia DE, Fink K, *et al*. Lead poisoning: association with hemolytic anemia, basophilic stippling, erythrocyte pyrimidine 5'-nucleotidase deficiency, and intraerythrocytic accumulation of pyrimidines. *J Clin Invest* 1976;58:926–32.
- 2 Centers for disease control and prevention adult blood lead epidemiology and surveillance—2008–2009. *MMWR* 2011;60:841–5.
- 3 Savrikar SS, Ravishankar B. Introduction to 'Rasashastra' the Iatrochemistry of Ayurveda. *Afr J Tradit Complement Altern Med* 2011;8:66–82.
- 4 Saper RB, Phillips RS, Sehgal A, *et al*. Lead, mercury, and arsenic in US- and Indian-manufactured Ayurvedic medicines sold via the Internet. *JAMA* 2008;300:915–23.
- 5 Gunturu KS, Nagarajan P, McPhedran P, *et al*. Ayurvedic herbal medicine and lead poisoning. *J Hematol Oncol* 2011;4:51.

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