



Ayurvedic medicine: patients in peril from plumbism

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Abstract

Heavy metals are commonly incorporated into Ayurvedic preparations as ashes or 'bhasmas'. A widely disseminated belief within Ayurvedic medicine is that these heavy metals can be valuable therapeutic components. Western toxicology refutes this contention. We report eight cases of lead poisoning occurring in or near the Auckland region of New Zealand. In all cases, poisoning was attributable to consumption of Ayurvedic 'herbal medicines'. Whole blood lead levels ranged from 1.5 to 6.9 micromol/L. Six patients had symptomatic lead poisoning, requiring treatment with chelation therapy. A high index of suspicion is required to detect lead poisoning, which should be suspected in people taking Ayurvedic remedies, especially if they have associated anaemia or abdominal symptoms.

There is a common belief among the public that use of 'herbal medicine' is harmless while some medical professionals seem to regard use of such 'medicines' as a fad, like bottled water. Such assumptions are far from the truth. Various 'herbal medicines' present some risk, as is shown by the contamination of preparations with digitalis,¹ and introduction of agents such as corticosteroids,² ephedrine, testosterone, and heavy metals.³

We wish to alert the medical community to a substantial threat to wellbeing posed by a particular form of herbal remedy, namely Ayurvedic medicine. A recent analysis⁴ demonstrated the presence of substantial amounts of heavy metals, predominantly lead, in 20% of Ayurvedic preparations purchased in the Boston area in the United States. We report eight New Zealand cases of poisoning due to similar preparations.

Methods and case descriptions

We examined hospital clinical records, laboratory records, and records of the Auckland Regional Public Health Service for cases of lead poisoning associated with ingestion of Ayurvedic 'herbal' remedies. All clinical cases known to the authors were included. We report lead content of samples of Ayurvedic remedies, where these were obtainable, based on analysis by an accredited laboratory (Environmental Laboratory Services Ltd, Lower Hutt, arranged by ESR, Environmental Science and Research Ltd), unless otherwise specified.

We identified seven cases of lead poisoning associated with the ingestion of Ayurvedic 'herbal' remedies occurring within the Auckland region of New Zealand between May 1999 and May 2005. We include a further case from the adjacent Waikato region (Case 7). The cases are reported in chronological order.

Case 1—A 28-year-old Indian woman presented to Auckland Hospital with epigastric pain and vomiting. She had been taking a mixture of brown Ayurvedic powders and black tablets from India to aid her fertility. She had a normocytic anaemia (Hb 87 g/L) and stippled cells were noted on the film. Liver enzymes were slightly elevated and

faecal occult blood was negative. Her whole blood lead concentration was 4.5 $\mu\text{mol/L}$ (notifiable level $>0.72 \mu\text{mol/L}$), necessitating chelation therapy.

One of the unidentified brown powder preparations, taken at a dose of one teaspoon per day, contained 20% lead by weight (200,000 parts per million, ppm) and another 13% (130,000 ppm). The tablets contained lead at much lower levels (20–70 ppm).

Case 2—A physician at Auckland Hospital notified the Public Health Unit of a case of lead poisoning in a 38-year-old Indian man who had been taking tablets and using creamy snuff imported from India as a toothpaste. The patient's whole blood lead level was 6.9 $\mu\text{mol/L}$, an indication for urgent treatment.

The patient received ethylenediaminetetraacetic acid (EDTA) and dimercaprol. Liver enzymes were slightly elevated. As the patient was reluctant to take part in any further investigations, no other sources of lead exposure were identified. Lead content of the tablets (7.8 mg per tablet or 4800 ppm) probably accounted for the poisoning, as lead levels in the *Ipcos Creamy Snuff* and *Dentobac Creamy Snuff* were low (both <100 ppm)

Case 3—A 48-year-old Indian woman presented to her general practitioner with concerns about her lead levels following the admission to Auckland Hospital of a friend taking the same Ayurvedic herbal medicine (a brown tablet) as her. The lead content of each of these tablets was 7.8 mg. She was taking four tablets daily, and had done so for 3 months. Her whole blood lead level had been 2.2 $\mu\text{mol/L}$, requiring no treatment. There were no other sources of lead exposure.

Case 4—A 66-year-old female family friend of Case 3 presented to her general practitioner with concerns about having a raised lead level. She had been taking unidentified Ayurvedic herbal medicines given to her by the friend and had a blood lead level of 1.5 $\mu\text{mol/L}$, with no treatment indicated. There were no other sources of lead exposure.

Case 5—A 30-year-old Indian man who had lived in New Zealand for 2 years presented to Auckland Hospital with a 5-day history of right upper quadrant colicky abdominal pain, without any associated diarrhoea or vomiting. Examination revealed mild right upper quadrant tenderness, no organomegaly, and no signs of neuropathy or encephalopathy. Blood count showed a normocytic anaemia (Hb 107 g/L) with basophilic stippling. Liver function tests were abnormal with negative hepatitis serology. The whole blood lead level was 3.8 $\mu\text{mol/L}$ and urine lead 1.2 $\mu\text{mol}/24 \text{ h}$ (normal: $<0.25 \mu\text{mol}/24 \text{ h}$).

He had a past history of infertility and azoospermia and had been taking two to three Ayurvedic fertility pills for a month preceding his symptoms. No occupational or other source of lead could be identified. He underwent chelation therapy and required repeated courses of EDTA infusions. No tablets were available for analysis.

Case 6—A 51-year-old Indian man presented to Auckland Hospital with a 2-week history of colicky abdominal pain associated with diarrhoea. There was a background history of type 2 diabetes for which he had been taking metformin and Ayurvedic *Jambrulin* tablets. He had a normocytic anaemia (Hb 100 g/L) and stippled cells were seen on the film. The whole blood lead level was 6.7 $\mu\text{mol/L}$ and urine lead was 16.5 $\mu\text{mol}/\text{day}$. Blood cadmium, urine mercury, and arsenic were all normal. He was

treated with oral dimercaptosuccinic acid (DMSA) chelation therapy resulting in a stable reduction of levels to 1.5 µmol/L. Analysis of his Ayurvedic tablets showed that each contained approximately 10 mg of lead (16,000 ppm, unaccredited laboratory). The recommended dose on the bottle was four tablets daily.

Case 7—A 31-year-old Indian woman who had lived in New Zealand for 10 years presented several times to her general practitioner with complaints of fatigue, nausea, weight loss, abdominal pains, and diarrhoea. She was referred for an upper gastrointestinal (GI) endoscopy, which was normal. Several months later she again presented with abdominal pain and diarrhoea. A positive faecal occult blood test led to a lower GI endoscopy, which was normal.

Three months later, she again presented to the Emergency Department with abdominal pain associated with colic, nausea, vomiting, and no bowel movement for 6 days. On examination, she had abdominal distension with tenderness and guarding in right iliac fossa. She had been taking paroxetine, paracetamol/dextropropoxyphene, and tramadol, as well as Ayurvedic medicinal powders. There was no exposure to heavy metals apart from Ayurvedic medicines.

She was anaemic (Hb 105 g/L) and the blood film showed basophilic stippling, Cabot rings, nucleated red blood cells, occasional red cell fragments, and target cells. She was hyponatraemic (Na 113 mmol/L) and had elevated liver enzymes.

An abdominal X-ray suggested small bowel obstruction with no bowel gas beyond the sigmoid colon. Computerised tomography of the abdomen showed dilated large and small bowel to the level of the distal sigmoid. Possible diagnoses considered were atypical sigmoid volvulus and stricture, and laparotomy was planned but held off as her pain improved.

The patient's pain settled after sigmoidoscopy, and no mechanical obstruction was found. The whole blood lead level was 3.5 µmol/L. The abnormal sodium and liver function tests improved spontaneously and she subsequently underwent EDTA chelation therapy.

Case 8—A 53-year-old woman pharmacist of Indian origin presented with lower leg oedema for 2 months, followed by a 3-week history of mainly left-sided abdominal pain of a constant character, accompanied by nausea. She had also been feeling very tired but attributed this to stress. Examination revealed pallor, and a definite lead line on the gums. No motor weakness or other neurological deficits were present.

She had been taking six black *Chandraprabhavati* ('Chandrapradhavate') tablets per day for several months. These had been prescribed for her in India. A normocytic anaemia (Hb 72 g/L) was present and basophilic stippling was noted. The whole blood lead was 5.3 µmol/L. She was treated with a blood transfusion and oral DMSA chelation therapy. The *Chandraprabhavati* tablets each contained 11 mg of lead (12,400 ppm).

Discussion

By way of the Internet, there is universal public exposure to the Ayurvedic contention that, administered correctly, 'bhasmas' (carefully extracted ashes) containing lead or mercury have beneficial therapeutic effects. Indeed, recent webpages still assert the safety of such bhasmas.^{5,6} This belief is irreconcilable with Western toxicology. From

the point of view of Western science, even minuscule quantities of lead have potential for harm, including irreversible brain damage, and are of absolutely no therapeutic benefit.⁷

Substantial scientific literature documents these harmful effects in adults and in particular, in the developing human. Severe congenital lead poisoning has been reported in an infant born to a woman who had taken Ayurvedic preparations during pregnancy.⁸

All medical practitioners should be aware of lead poisoning caused by Ayurvedic preparations, now a common cause of lead poisoning in the Auckland region. A single case has recently been reported from Christchurch, New Zealand.⁹ Use of complementary medicines is common and reports of celebrities taking Ayurvedic remedies may increase their use.¹⁰ Symptomatic lead poisoning may be difficult to identify without a high index of suspicion. Medical histories for all age groups should now include a specific enquiry about the use of complementary, herbal, or traditional medicines.

The lead content of Ayurvedic medications used by the patients described is clearly such that consumption of even small quantities would result in intake exceeding the 'provisional tolerable *weekly* intake' (PTWI) of the Joint FAO/WHO Expert Committee on Food Additives, set in 1999 at 25 micrograms/kg body weight.¹¹ For example, consumption by a 70 kg adult of a *single* tablet containing 8 mg of lead exceeds the PTWI by a factor of over four! Moreover, in view of the consumption of Ayurvedic medication with therapeutic intent, as well as the toxicity described, it is debatable whether such remedies should be regarded solely as 'food additives'.

The cases we report are likely to be just the tip of the iceberg—individuals who have taken Ayurvedic preparations and present with abdominal pain, anaemia, or other features of lead poisoning should have appropriate determination of blood lead levels to exclude such poisoning. This is especially important because symptomatic lead poisoning can be effectively treated, with a substantial scientific rationale for such treatment.¹² Where possible, samples of the Ayurvedic remedy should be obtained, and the name and origin clearly documented (This was not possible in several of the cases reported here.)

Lead poisoning is a notifiable disease and the local public health unit should be notified immediately so that a thorough investigation of potential risk factors can be undertaken and preparations can be sent to an accredited laboratory for confirmation of the presence of lead or other contaminants. Ayurvedic or other herbal preparations may not be the sole sources of exposure to lead and other sources, such as storage containers, lead paint dust, and occupational exposures must also be investigated.

Many authorities would not treat asymptomatic lead poisoning with a whole blood lead level under approximately 2.5 micromol/L, but where there are any concerns, the case should be discussed with a toxicologist or physician with experience in the management of lead poisoning. Therapy should be tailored to the individual patient, but in many cases (such as Case 6 and Case 8 here) oral therapy with dimercaptosuccinic acid (DMSA) is an efficacious, cost-effective, and convenient option.

Discontinuation of Ayurvedic preparations is advised in all cases of suspected lead poisoning until the absence of lead in those preparations can be demonstrated. In one of the cases reported, the patient was not advised to discontinue her Ayurvedic medication following discharge from hospital, and poisoning did not cease until the public health officer investigated the raised lead level and advised her as follows:

Lead poisoning is often deceptive, and poisoning following the consumption of Ayurvedic preparations may go undetected for some time. We recommend extreme caution in the use of preparations of unknown quality or origin especially in children, pregnant women, women of child-bearing age, and those with chronic diseases such as diabetes.

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