Clinical Vignettes

Buyers Beware: Lead Poisoning due to Ayurvedic Medicine

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A 29-year-old man, who recently emigrated from India, presented with a 2-week history of abdominal pain, as well as nausea, constipation, and fatigue. He underwent removal of a parathyroid adenoma 6 weeks prior to admission and received a locally made Indian traditional medicine (Ayurveda) for pain control; however, this information was not initially available. He was instructed to take approximately 15 g/day. Initial evaluation revealed a normocytic anemia, but other workup including imaging and endoscopy was unrevealing. Given his recent use of Ayurvedic medicines, we tested for lead poisoning and found a blood lead level of 72 mcg/dl. We sent his medicine for analysis and found it had a high lead concentration of 36,000 mcg/g, which is over 25,000 times the maximum daily dose. He improved with cessation of the medicine and treatment with succimer. Lead poisoning can present with a variety of nonspecific signs and symptoms, including abdominal pain and anemia. Avurvedic medicines, as well as traditional medicines from other cultures, may be a source of lead or other heavy metals. It is essential for physicians to be aware of adverse effects of Ayurvedic medicines as they are easily available and increasing in popularity.

KEY WORDS: dietary supplements; lead; India; medicine; Ayurvedic; Phytotherapy; plant extracts/chemistry.
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CASE PRESENTATION

A 29-year-old man who had emigrated from India 1 month prior presented with a 2- week history of abdominal pain. The pain was located in the epigastric region and described as severe and burning. It did not radiate, and he reported no exacerbating or relieving factors. He also had significant nausea and vomiting; he had been unable to eat for 2 days.

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Received November 9, 2011 Revised February 6, 2012 Accepted March 7, 2012 Published online April 3, 2012 He also complained of severe constipation and fatigue; review of systems was otherwise unremarkable (Fig. 1).

He had a history of hyperparathyroidism and possibly non-alcoholic fatty liver disease. He underwent removal of a parathyroid adenoma 6 weeks prior to admission while still in India. At that time he used a locally made Indian traditional medicine for pain control; he took 1 teaspoon with each meal (approximately 15 g/day). He denied alcohol, tobacco, or illicit drug use. He reported no family history of gastrointestinal disease.

One week prior, he had been admitted to another facility for 3 days. He was noted to have a normocytic anemia (hemoglobin 9 g/dl) and a creatinine of 0.8 mg/dl (GFR estimate 114 ml/min/1.73 m²). Ferritin, transferrin, haptoglobin, and lactose dehydrogenase (LDH) were all within normal limits. Peripheral blood smear was reported as unremarkable. Serum electrolytes, liver function tests, viral hepatitis serologies, amylase, lipase, and urinalysis were all unremarkable. Other evaluations for abdominal pain were unrevealing, including ultrasound and computed tomography (CT) of the abdomen and esophagogastroduodenoscopy (EGD).

At the time of presentation to our institution, he had normal vital signs. He was in mild distress due to abdominal pain. His abdomen was mildly tender in the epigastric region, but he had no guarding or rebound tenderness. He had no organomegaly or masses, and bowel sounds were normal. Rectal examination was normal and negative for occult blood. Physical examination was otherwise unremarkable.

Many common causes of abdominal pain and anemia had been ruled out with laboratory testing, imaging, and endoscopy. Considering that the patient had started taking a new medicine of unknown purity or composition prior to the onset of his symptoms, we explored this further. Our patient carefully explained that the Indian traditional medicine was a type of Ayurvedic medicine, given to him for pain control; with this additional information, we evaluated for lead poisoning.

The blood lead level was 72 mcg/dl (normal, <25 mcg/ dl). Since the source of the exposure was suspected to be the Ayurvedic medicine, we submitted the medicine for analysis; the lead concentration in the supplement was 36,000 mcg/g (NMS Labs; Willow Grove, PA). Of note, the insurance company did not authorize lead testing in the herbal supplement as such testing was not a "covered



Figure 1. Timeline of patient's presentation (weeks).

benefit;" the team caring for him covered the expense. The National Science Foundation International Standards state that supplements should not contain lead in amounts greater than 20 mcg/day.¹ Estimating his daily dose at 15 g, he was ingesting 540,000 mcg/day (540 mg/day), which is over 25,000 times the maximum daily dose. This confirmed the diagnosis of lead poisoning secondary to Ayurvedic medicine.

We discontinued the Ayurvedic medicine and initiated chelation therapy with succimer (700 mg oral three times daily for 5 days, followed by 700 mg oral twice daily for 14 days). On day 3 of treatment, his pain improved and he was discharged home. At a 2-week follow-up he was pain-free, and his hemoglobin had increased to 12 g/dl, while his lead level was 25 mcg/dl. One year after the initial admission, he is completely asymptomatic with a lead level of 7 mcg/dl and a creatinine of 1.2 mg/dl (GFR estimate 71 ml/min/1.73 m²). Lead intoxication is known to cause renal failure.

DISCUSSION

Lead is toxic to multiple organ systems and can have a variety of presentations. Abdominal pain and anemia as our patient had are common findings. Fatigue, irritability, myalgias, arthralgias, renal failure, and neurologic deficits may also be seen. The diagnosis is made with a blood lead level. Basophilic stippling of erythrocytes may be seen on peripheral blood smear, but this is not always present. Treatment consists of removal of the source of exposure. Chelation with dimercaptosuccinic acid (succimer) or ethylenediaminetetraacetic acid (EDTA) is indicated for more severe cases as in our patient.^{2–4}

The number of adults with elevated blood lead levels (>25 mcg/dl) has decreased over the past decade, with an incidence of 6 per 100,000 in 2009. Over 95 % of lead exposures are occupational, especially in industries such as battery manufacturing, metal mining, and painting. Traditional medicines from many cultures are recognized as a source of lead poisoning, as they are responsible for 2 % of non-occupational exposures.⁵

Ayurveda is a form of Indian traditional medicine used by 80 % of the country's population, and its popularity is

increasing in the US. According to a 2007 survey, 214,000 Americans used an Ayurvedic medicine in the past year, which was a 39 % increase from 2002.⁶ Various types of Ayurvedic medicines are available, but one of importance for this topic is Rasa Shastra, which is the practice of adding metals and minerals to herbal medicines.⁷ Two recent studies examined the content of Ayurvedic medicines available in Boston-area stores and from Internet retailers. Nearly 20 % of the products tested contained lead, and the majority of them exceeded the maximum tolerable daily intake. Other toxic metals, including arsenic and mercury, were also present in many products.^{8,9} Our patient's medicines in these studies; he was quite surprised about the source of the lead poisoning.

Establishing the diagnosis of lead poisoning can be difficult as it has a variety of presentations that may overlap with other conditions. It is an uncommon cause of abdominal pain, but it should be considered in patients with typical symptoms in addition to a source of exposure. Many patients undergo diagnostic procedures that could be avoided, such as our patient who had an EGD before he presented to our facility. One study revealed that 15 % of patients with lead poisoning underwent unnecessary endoscopy or bone marrow biopsy prior to diagnosis.^{10,11}

CONCLUSION

Clinicians may not be aware of the association of Ayurvedic medicines with lead poisoning, and often patients do not admit to their physicians that they take these medicines. Our patient did not reveal he was taking this medicine until he was asked specifically about traditional medicines and supplements; we found no prior records documenting the use of supplements. This case illustrates the importance of asking patients about traditional medicines, supplements, and other non-prescription medicines because they can have serious effects on patients' health. Health departments or insurance carriers should allow testing substances suspected of lead poisoning; the source of exposure has potential public health implications.

KEY POINTS

- Lead is toxic to multiple organ systems and can have a variety of presentations including abdominal pain, anemia, fatigue, irritability, myalgias, arthralgias, renal failure, and neurologic deficits. Basophilic stippling of erythrocytes may be seen on peripheral blood smears, but this is not always present.¹²
- Ayurveda is a form of Indian traditional medicine used by 80 % of the country's population, and its popularity is increasing in the US.

- Rasa Shastra is the practice of adding metals—such as lead, arsenic, and mercury—to herbal medicines.
- Physicians need to be aware that Ayurvedics, as well as traditional medicines from other cultures, may be a source of heavy metal toxicity. Patients may be reluctant to disclose they are taking these medicines.

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