

## An Unlikely Cause of Anemia and Abdominal Pain

Tatiana Levit MD, Jacob Ablin MD, Amir Agbaria MD, Jennifer Veinberg MD, Yoav Goor MD and Ori Elkayam MD

Department of Internal Medicine F, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel  
Affiliated to Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

**Key words:** anemia, abdominal colic, lead poisoning, herbal medicine, Ganoderma, mycelium

*IMAJ 2007;9:408–409*

Lead has been used by mankind for the last 6000 years. Although the vast majority of cases of lead poisoning have been associated with occupational exposure [1], lead poisoning can also result from the use of traditional or folk remedies [2]. We describe a patient who developed typical features of lead intoxication following the chronic use of a herbal medicine.

### Patient Description

A 35 year old otherwise healthy female was admitted to the hospital due to severe abdominal colic, recurrent vomiting and profound weakness during the preceding 2–3 months. She was a foreign resident of Nepalese origin who appeared pale and very thin on physical examination. The relevant physical findings were a bluish pigmentation at the gum-tooth line [Figure] and diffuse abdominal tenderness without peritoneal signs or organomegaly.

Laboratory tests disclosed normocytic, normochromic anemia with a hemoglobin level of 8.9 g/L, increased bilirubin (3.1 mg/dl, mostly indirect) and mildly elevated alanine aminotransferase. During her hospitalization the abdominal pain worsened and was accompanied by arthralgia and myalgia. There was a further decrease in the hemoglobin level (to 6.9 g/L). An abdominal computerized tomography scan and gastroscopy were performed and were both normal. Her vitamin B12, folic acid, rheumatoid and antinuclear factor levels were within normal range. At this time, a thick blood smear that was sent for evaluation in order to rule out malaria revealed basophilic stippling. This finding was further confirmed by a thin blood smear. Her blood lead level was tested

and found to be 65 µg/dl (normal ≤ 30 µg/dl). The diagnosis of lead intoxication was established and the patient was treated with an oral chelating agent (DMSA) that brought about prompt amelioration of the clinical symptoms and normalization of lead levels after a few weeks (35 µg/dl, 2 weeks after the end of treatment).

The patient was questioned in the search for a likely source of lead poisoning and it emerged that she had been using two herbal medications from Malaysia (Ganoderma and mycelium) for the past few months. Analysis of these products for heavy metals revealed that they included lead and mercury, both exceeding the acceptable levels for human ingestion.

### Comment

The characteristic features of lead toxicity, such as anemia, colic, neuropathy, nephropathy, sterility and coma, were noted in ancient times by both Hippocrates and Nikander [3]. Lead is a poison that may affect virtually every system in the body [3]. Children are more likely to be affected by lead exposure because of the frequency of hand-to-mouth activity, but the metal is equally toxic to adults. Lead deleteriously affects erythropoiesis, kidney function and the central nervous system. Lead intervenes with hemesynthesis, resulting in microcytic anemia and basophilic stippling of erythrocytes related to clustering of ribosomes. The wide spectrum of symptoms due to central nervous system involvement includes headache, poor attention, arthralgia, myalgia, irritability, neuropathy, and encephalopathy in severe cases. Lead intoxication has been associated with poor cognitive development in children. Renal toxicity involves inhibition in the proximal

tubular lining cells and renal insufficiency (partial Fanconi syndrome) [3].

The two principal routes for lead intoxication are inhalation and swallowing. Six categories of products account for most cases of lead exposure worldwide: gasoline additives, food-can soldering, lead-based paints, ceramic glazes, drinking-water pipe systems, and folk remedies [3]. An earlier report from Israel in the 1980s described many cases of lead poisoning in a rural population near the city of Nablus due to contamination of homemade flour by lead fillings used to secure the housing of the driveshaft to the millstone [4]. Folk remedies are another important source of lead intoxication. Ayurveda is a traditional form of medicine practiced in India and other South Asian countries. Ayurvedic medications can contain herbs, minerals, metals, or animal products and are made in both standardized and non-standardized formulations. Between 2000 and 2003, a total of 12 cases of lead poisoning among adults in five states of the United States associated with Ayurvedic medications or remedies was reported to the U.S. Centers for Disease Control [1]. In Arab communities, traditional remedies for abdominal colic and early passage of the meconium after birth, known as “bint adh Dhabab,” a teething powder used in Saudi Arabia, called “saott,” and a widely used eye cosmetic, kohl, are common sources of lead poisoning [3]. Interestingly, mushrooms belonging to the Ganoderma species have been proposed as possible biomonitors for heavy metal deposition [4]. These data along with the increased concentration of lead found in the medication suggest a possible origin of intoxication.

Our patient’s typical findings of lead



Bluish pigmentation at the gum-tooth line raising the suspicion of lead intoxication.

intoxication were due to chronic ingestion of herbal medicines. Although the frequency of lead intoxication has waned, it is still encountered worldwide. The diagnosis of lead poisoning is easy once it is suspected, emphasizing the importance of maintaining a high level of suspicion.

**Acknowledgment.** Esther Eshkol is thanked for editorial assistance.

### References

- Centers for Disease Control. An adult blood level. Epidemiology and surveillance. United States 2004. *MMWR Morbidity and Mortality Weekly Report* 2002;53:578-92.
- Prpic-Majic D, Pizent A,

Jurasovic J, Pongracic J, Restek-Samarzija N. Lead poisoning associated with the use of ayurvedic metal-mineral tonics. *J Toxicol Clin Toxicol* 1996;34:417-23.

- Papanikolaou NC, Hatzidaki EG, Belivanis S, Tzanakakis GN, Tsatsakis AM. Lead toxicity update. A brief review. *Med Sci Monit* 2005;11: RA329-36.
- Hershko C. Lead poisoning by contaminated flour: an unfinished story. *Harefuah* 2005;144:458-62 (Hebrew).

**Correspondence:** Dr. O. Elkayam, Dept. of Internal Medicine F, Tel Aviv Sourasky Medical Center, 6 Weizmann Street, Tel Aviv 64239, Israel. Phone: (972-3) 697-4437; Fax: (972-3) 697-4285 email: oribe14@netvision.net.il

## Capsule

### Different dogs to different folks

In contrast to most mammalian species, *Canis familiaris* (the domestic dog) shows extreme diversity in body size. Sutter and colleagues show that a single allele of the gene encoding insulin-like growth factor-1 (IGF-1) is shared by all small dog breeds but is nearly absent from giant dog breeds, implying that sequence variation in the *IGF-1* gene plays a causal role

in dog size. Discovery of the *IGF-1* gene was facilitated by its localization within a genomic signature, or haplotype block, which probably arose as a result of centuries of dog breeding by humans.

*Science* 2007;316:112  
Eitan Israeli

## Capsule

### Risk of delivering a low birth weight infant

Bukowski et al. investigated whether first-trimester fetal growth is associated with birth weight, duration of pregnancy, and the risk of delivering a small for gestational age infant. The participants were 976 women from the original cohort who conceived as the result of assisted reproductive technology, had a first-trimester ultrasound measurement of fetal crown-rump length, and delivered live singleton infants without evidence of chromosomal or congenital abnormalities. First-trimester growth was expressed as the difference between the observed and expected size of the fetus, expressed as equivalence to days of gestational age. For each 1 day increase in the observed size of the fetus, birth weight increased by 28.2 g (95% confidence interval 14.6-41.2). The association was substantially attenuated by

adjustment for duration of pregnancy (adjusted coefficient 17.1; 6.6 to 27.5 g). Further adjustments for maternal characteristics and complications of pregnancy did not have a significant effect. The risk of delivering a small for gestational age infant decreased with increasing size in the first trimester (odds ratio for a 1 day increase 0.87, 0.81-0.94). The association was not materially affected by adjustment for maternal characteristics or complications of pregnancy. The authors conclude that variation in birth weight may be determined, at least in part, by fetal growth in the first 12 weeks after conception through effects on timing of delivery and fetal growth velocity.

*Br Med J* 2007;334:836  
Eitan Israeli