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Case Report

# Lead Poisoning in an Infant: A Case Report

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## ABSTRACT

***Background*:** There is inadequate knowledge about acute poisoning as a common problem in children. Acute poisoning in children, , is one of the health problems, requiring immediate treatment.
***Case report:*** A two-month-old male infant with discoloration of the nails was admitted to the Emergency Pediatric Unit of Imam Reza Hospital, Mashhad, Iran in 2014. Following clinical evaluations, the blood lead level was determined to be high. The cause of neonatal condition was a traditional medicine, applied by the mother for the treatment of dermatitis in the infant. The lead concentration was high in this medicine, thus resulting in neonatal lead poisoning.
***Conclusion:*** It is obvious that medicinal drugs should be used cautiously for children, especially infants. Also, drug characteristics and the process of production should be precisely specified. In fact, without taking precautions, any medicinal drug or substance could have various adverse effects on pediatric populations.
***Keywords:*** Lead, Pediatrics, Poisoning, Toxicology

## Introduction

Acute poisoning in children, accounting for 3-6% of pediatric hospital admissions, is one of the health problems, requiring immediate treatment. Most cases of pediatric poisoning are accidental [1, 2], while some are attributed to the inaccurate use of unknown medications or substances. Herein, we present a case of accidental lead poisoning in a two-month-old male infant, induced by the use of a traditional medicine.

## Case report

A two-month-old male infant was admitted to the emergency pediatric unit of the hospital for clinical evaluations. The color of the patient's nails had started to change to gray one month prior to admission. The infant's weight was 5800 g and he was fed through exclusive breastfeeding.

The infant had a history of atopic dermatitis. The mother used an atypical traditional medicine, which was applied on the skull and face on a daily basis over several days; however, the exact duration of use was not determined. According to the mother, the infant had mild constipation and irritability. All medical examinations, except for the nail color, were reported to be normal (Figure 1); also, an orange substance was observed on the scalp (Figure 2).

The laboratory findings were as follows: complete blood cell count (CBC)= normal, urea and creatinine level= normal; iron level= 100 U/A (normal); Ca level= 10.9; Na and K level= normal; serum glutamic-oxaloacetic transaminase (SGOT)=

**Figure 1.** *Normal nail color*

**Figure 2.** Orange substance on the scalp

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51u/l; serum glutamic-pyruvic transaminase (SGPT) = 47u/l; and blood lead level= 45.7 µg/dl. After further assessments, the lead concentration in the orange substance was reported at 250,000 ppm. Lead poisoning due to the use of traditional medicine was confirmed. Ten days after the discontinuation of drug use, the blood lead level was measured at 25 µg/dl

## Discussion

In this case report, the first presentations were discoloration of the nails and high lead level. The father worked in a plastic production factory; therefore, his occupation was suspected as an etiological factor. Also, the traditional medicine used on the infant's skin was speculated to be involved. After evaluations, the lead concentration in the applied medicine was found to be high; consequently, the drug was considered responsible for lead poisoning.

The traditional medicine applied by the mother is generally known as 'Sondor' or 'Soranj', composed of Pb3O4 (non-organic lead) (Figure 3). This substance is used as a traditional medicine for some skin diseases in different areas of Iran. However, given its nature, it can induce lead poisoning in humans and lead to irreversible outcomes.

In general, lead can be found in metallic, inorganic, and organic forms. Inorganic and metallic lead is absorbed by the gastrointestinal system in nearly 10-15% of adults and 30-40% of children. It should be noted that metallic lead is absorbed less readily than most lead compounds.

The overall absorption of inhaled lead is on average 30-40%. Both minute ventilation and lead concentration in air can determine air-borne lead exposure in children with a relatively greater volume of inhaled air per unit of body size. These children are proportionally at a greater risk in a given degree of atmospheric lead pollution due to higher metabolic rates. It has been estimated that children have a 2.7-fold higher risk of lead deposition in lungs, compared to adults.

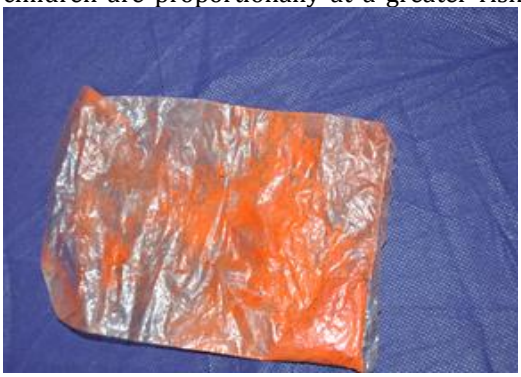

**Figure 3.** Sondor' or 'Soranj',

According to the literature, cutaneous absorption of inorganic lead is low. In a previous study, average absorption through intact skin was estimated at 0.06%. Organic lead, such as alkyl lead, is lipid soluble with unique pharmacokinetic profiles which are less characterized, compared to inorganic lead. Animal and human studies on acute ingestion and lead gasoline sniffing have demonstrated triethyl lead chloride (TEL) absorption through ingestion, inhalation, intact skin exposure, and subsequent distribution in lipophilic tissues, including the brain.

TEL is metabolized to triethyl lead, which is believed to be a major toxic compound. Alkyl lead may slowly release inorganic lead with kinetics as noted above. In the present case, absorption might have occurred via inhalation or cutaneous exposure. Overall, no organism is dependent on lead (a toxic substance) for its function. Lead exposure may have various sources, such as paint chips, dust, soil, refining or remodeling activities, batteries, plastic production, lead-based gasoline, and ceramic glaze.

Lead poisoning has many clinical effects, such as impaired hearing, fine motor activities, behavioral changes (including bad temper), abdominal pain, and constipation; severe poisoning may also induce encephalopathy. In infants, lead can induce adverse effect on neurotransmitters and synaptic function, which is necessary for nerve pruning during early childhood, i.e., period of brain development [3-6].

The Center for Disease Control (CDC) estimates that nearly 450,000 children (aged 1-5 years) have blood lead levels above 5 µg/dl [3]. Lead poisoning may also induce anemia, gum discoloration, and renal dysfunction. In addition, liver damage has been reported in the literature as a side-effect [7] such as the patent of this case, resulting in the discoloration of the nails [8].

In the present case, the initial blood lead level was high. Therefore, chelation therapy (dimercaprol, and EDTA-Na2Ca, or succimer) was considered as the method of choice according to the literature; however, the parents discharged the infant with self-consent. Fortunately, after 10 days, the patient referred to the hospital, and his blood lead level was measured at 25 µg/dL.

## Conclusion

It is apparent that medicinal drugs should be applied cautiously in children, especially infants. Also, drug constituents and process of production should be precisely determined. In fact, without taking precautions, any drug or substance could have adverse effects on the pediatric population. Further studies are highly recommended in this area.

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