



# Lead poisoning in a 16-year-old girl

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## Lead poisoning in a 16-year-old girl: a case report and a review of the literature (*CARE compliant*)

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### Abstract

**Background:** Lead is a toxic element of the environment which leads to major complications once it enters the blood stream, affecting multiple organs and systems of the body.

**Methods:** We present the case of a 16-year-old girl, diagnosed with lead poisoning after occupational exposure due to the fact that the girl was actively involved in the family's pottery business.

History revealed that the girl participated in the process of pottery, her father was also diagnosed with lead poisoning 2 years before. The patient's personal history underlined that approximately 1 year ago she presented with severe abdominal pain, being diagnosed with acute appendicitis and she underwent appendectomy, but the pain persisted, thus due to family history of lead poisoning, the suspicion of saturnine colic rose, and she was diagnosed with lead poisoning. The main symptoms and signs were severe abdominal pain, vomiting, and arterial hypertension. The clinical evolution was favorable under symptomatic treatment and chelation therapy.

**Results:** Lead toxicity is a life-threatening condition because of its severe acute and chronic complications. In children, there is no safe blood lead level, prevention methods are, therefore, very important in order to avoid toxic multiorganic effects of this metal.

**Conclusion:** Even though the diagnosis of lead poisoning remains difficult in children, it must also be taken into consideration by the clinician facing a child with gastrointestinal or neurological involvement.

**Abbreviations:** ALAT = alanine-aminotransferase, ASAT = aspartate-aminotransferase, ATSDR = Agency for Toxic Substances and Disease Registry, CDC = control disease center, DBi = direct bilirubin, DMSA = dimercaptosuccinic acid, EDTA = ethylene diamine tetra-acetic acid, GGT = gamma-glutamyl-transferase, Hb = hemoglobin, Htc = hematocrit, K = potassium, MCV = medium cellular volume, Na = sodium.

**Keywords:** abdominal pain, child, lead poisoning, pottery

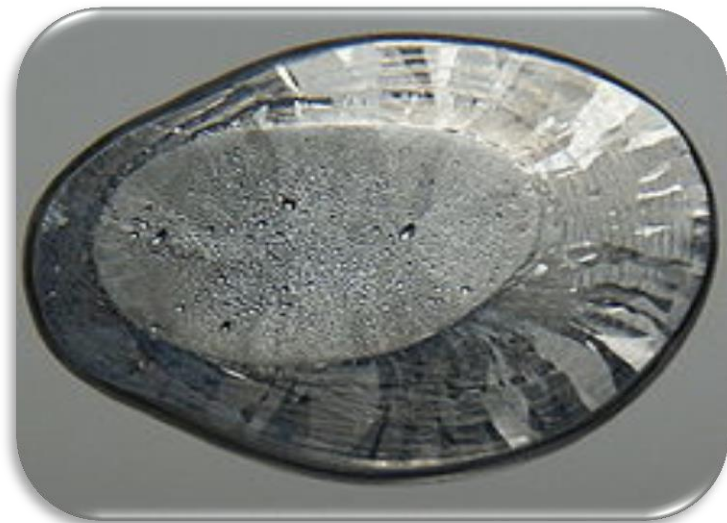
# Intended Learning Outcomes



- **Introduction**
- **Case Report :**
  - **Presenting Concerns**
  - **Clinical Findings**
  - **Diagnostic focus and assessment**
  - **Therapeutic focus and assessment**
  - **Follow-up and out-come**
- **Discussion**
- **Conclusion**
- **Reference**

# Introduction

**Lead is a bluish-grey metal that owns anti-radiation properties. Lead poisoning in children is an important health problem, accounting for 0.6% of the global burden of the disease according to the WHO.**



- Even though lead is everywhere, the industrialized areas carry a higher risk for lead exposure:  
ingestion, inhalation, prenatal exposure, dermal exposure and pathogenicity.
- It binds to the **sulfhydryl group** of proteins leading to toxicity for multiple enzyme systems.
- Lead blood level less than **50  $\mu\text{g}/\text{dl}$** .
- If a patient is found with high blood lead level, is found to be toxic.



# Case report

- We present a case report of lead poisoning in a 16-year-old girl.



# 1. Presenting concerns

## Symptoms:

✓ Severe abdominal pain



✓ Loss of appetite



✓ Nausea



✓ Vomiting



## Family history :

- The girl comes from a family of potters, her father being diagnosed with lead poisoning 2 years before.

## Case history :

- She was misdiagnosed with acute appendicitis and she underwent appendectomy.
- Then, she was diagnosed with lead poisoning depends on the family history, blood and urine lead level.





## Received Treatment :

- Only symptomatic treatment.
- chelation therapy with EDTA, with a dose of **2 tablets** daily associated with calcium supplements.



## 2. Clinical findings

### - *By physical examination:*

- ✓ Ailing face (poor health)
- ✓ Jaundice of the sclera
- ✓ Blue pigmentation of the nails
- ✓ Painful abdomen at palpation, and reduction in weight.



# 3. Diagnostic focus and assessment

## The laboratory test :

- ✓ Hypochromic anemia.
- ✓ Increased level of liver transaminases (ALAT & ASAT).
- ✓ Conjugated hyperbilirubinemia.
- ✓ Hyponatremia.
- ✓ Hypopotassemia.



➤ **Blood pressure**

$$\frac{\text{Systolic}}{\text{Diastolic}} = \frac{156 \text{ mmHg}}{96 \text{ mmHg}}$$

➤ **lead level**

The blood lead level was **66.28 $\mu\text{g}/\text{dL}$**

The urinary one was **419.7 $\mu\text{g}/\text{L}$**  (normal  $<50\mu\text{g}/\text{L}$ ) .



## Abdominal ultrasound

Disappearance of the delimitation between the cortical and medullar parts in both kidneys.

## consultation from an occupational healthcare specialist

, who recommended the continuation of chelation therapy with EDTA, increasing the dose at **4 tablets/day**.

## Neurological consultation

And the specialist established the diagnosis of behavioral disorders with depressive elements, and recommended psychotherapy.



# 4. Therapeutic focus and assessment

- 1- Intense IV hydration in order to favor lead elimination.
- 2- Diuretics, **ex: ACE Inhibitors.**
- 3- Amino acids.
- 4- Vitamins, **ex: B Complex.**
- 5- Chelation therapy.



## 5. Follow-up and outcome

- After 14 days of admission, the patient was discharged without any complaints, With recommendation for :

1- NO further exposure to lead,

2- Avoiding the contact and the working in the pottery process.

The long-term outcome of this case depends on further exposure to this heavy metal.

3- Repeat the blood lead levels after 12 and 24 months, assessing also the kidney and hepatic functions.



# Discussion

- Lead poisoning is a severe condition with potential multi-organ damage and even death.
- The 2 main ways of lead poisoning are through **ingestion** and **inhalation**.
- More common in children due to their tendency of chewing everything, while the adult is more frequent in occupationally.
- In the case presented here, lead entered the blood by **inhalation** as occupational risk in the pottery process.
- Lead represents a major risk factor for cardiovascular disease, arterial hypertension.





## Other complications:

- **Interstitial nephritis**
- **Spermatogenesis : sperm concentration, total counts and motility.**



# Lead poisoning in children :

- **Asthma.**
- **Encephalopathy.**
- **Reduced IQ.**
- **Shortened attention span.**
- **Increased antisocial behavior.**



- The pottery-making process involves ceramic glazes and decorative paints, which both contain lead. Therefore, these hand-made traditional products can represent a real danger not only for potters, but also for those using these products.



# Conclusion

- 1. Lead toxicity is a life-threatening condition because of its severe acute and chronic complications.**
- 2. In children, there is no safe blood lead level.**
- 3. A physician must always include this possibility in the differential diagnosis for cases with suggestive symptoms.**



# Reference

**Marginian, C. O. et al. (2016). Lead poisoning in a 16-year-old girl: a case report and a review of the literature (CARE compliant). *Medicine Journal*. 95:38 (e4916).**



**Thank You  
For Your Attention**

