

Acute lead poisoning: a diagnostic challenge in the emergency department

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SUMMARY

Acute abdominal pain is a common presentation to the emergency department (ED). Ruling out life-threatening causes and giving pain relief are the most important tasks in ED. We describe a 32-year-old man who presented to ED with abdominal pain and vomiting which was unrelieved by usual doses of analgesic. Extensive investigations revealed no significant abnormalities. On further probing, he admitted taking traditional medications for infertility. The toxicological panel revealed a high blood lead level, leading to a diagnosis of acute lead toxicity. Chelation therapy with D-penicillamine was initiated and the patient's abdominal pain resolved within 4 days.

BACKGROUND

Acute abdomen can be a life-threatening presentation to emergency department (ED). Early diagnosis and treatment are a priority in ED. A non-emergent but severely distressing abdominal pain is present in a few conditions. Lead poisoning is one among them. Occupational lead exposure is common. There have been case reports of lead poisoning with the use of traditional medications. Some of these medications are prepared using heavy metals. It is believed that heavy metals exert their own therapeutic effect, increase the potency of other medications and improve drug delivery to the desired site. Herbal medicines are widely used in India and can present with complications of the heavy metals used.¹ We report a case of lead poisoning after taking traditional medicine.

CASE PRESENTATION

A 32-year-old man who presented to our ED with abdominal pain and vomiting for 15 days. Abdominal pain was sudden in onset, predominantly in the epigastric and umbilical regions. The pain was severe but non-radiating. Abdominal pain was associated with multiple episodes of non-bilious, non-bloodstained vomiting. The patient also reported constipation for the last 10 days. However, there was no abdominal distention, fever or obstipation.

There was no relevant medical or surgical history. On clinical examination, the patient was conscious, oriented, but was restless and screaming with pain. His pulse was 88/min, blood pressure (BP) was 142/90 mm Hg, respiratory rate 22/min with SpO₂ of 99% at room air. Abdominal examination revealed tenderness in the epigastric and umbilical area with no guarding or rigidity. The rest of the systemic examination was unremarkable.

DIFFERENTIAL DIAGNOSIS

Based on the initial presenting reports and systemic examination, the differentials kept in mind were acute intestinal obstruction, perforation peritonitis, acute pancreatitis and acute cholecystitis. A possibility of aortic dissection was also kept due to the location of pain and higher BP at presentation, though there was no pulse deficit and differential BP recordings in the upper and lower limbs.

INVESTIGATIONS

An immediate erect chest X-ray and abdominal X-ray were done which were normal. Ultrasound of the whole abdomen was suggestive of mild hepatomegaly with fatty liver. Urgent contrast enhanced CT of the abdomen with angiography was done to rule out intestinal obstruction and aortic dissection. It revealed mild hepatomegaly. Complete blood count showed haemoglobin of 86 gm/L, and platelets of $120 \times 10^9/L$. His alanine transaminase, aspartate transaminase and alkaline phosphatase were 223 U/L, 101 U/L and 129.8 U/L. Serum amylase, lipase and renal function tests were within normal limits. ECG showed normal sinus rhythm. Peripheral smear showed normocytic normochromic anaemia. On further probing, the patient reported to have taken a whitish powder from a quack for the last 25 days for infertility. The patient took about 1 tablespoon (10 g) per day with hot milk two times per day. The quack gave the powder in free form without any label. Based on the clinical features of constipation, abdominal pain, vomiting and no change in urine colour, with a history of unlabeled drug intake, we suspected lead poisoning. We then obtained blood lead level (BLL) which was 88.2 µg/dL (normal <15 µg/dL). A diagnosis of lead poisoning was made. The exposure of lead was attributed to the medications he was consuming as the symptoms started 10 days after the start of the medications. The patient worked in a shoe factory with no occupational exposure to lead. There was no history of similar reports in the family members or neighbours. The patient did not have symptoms of joint pain, headache, myalgia, difficulty in concentrating, short-term memory deficits, irritability, confusion, seizures or encephalopathy. Clinically there was no lead line or peripheral neuropathy. Peripheral blood smear was examined again for basophilic stippling, but was not seen.

TREATMENT

We immediately advised him to stop taking the unlabeled medication. Vomiting decreased with antiemetics but abdominal pain was relieved by



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only with high dose of fentanyl and had pain relief after 2 days. We used antispasmodic (hyoscine) and non-steroidal anti-inflammatory drugs initially for pain, which did not relieve the patient's symptoms. Chelation using D-penicillamine was advised for 6 weeks.

OUTCOME AND FOLLOW-UP

The patient was discharged from the hospital after 4 days and advised to continue chelation therapy along with mebeverine and chlorthalidone combination (Librax) for abdominal pain. Librax helps to relieve stomach spasms, abdominal cramps and anxiety related to gastric disorders.² The patient had resolution of constipation in 2 weeks. BLL after 15 days was 45 µg/dL. The BLL after 6 weeks of therapy was 30 µg/dL. The patient was asymptomatic after 6 weeks of therapy. On subsequent follow-up at 12 weeks, he was completely asymptomatic with BLL of 14 µg/dL.

DISCUSSION

Acute abdomen is a very common presentation to the ED. Ruling out life-threatening causes is the most important task in the ED and it requires a quick history, physical examination and most often imaging. Our patient did not have any life-threatening event, but the severity of pain and no relief after usual doses of analgesics lead to further investigation. The presence of anaemia led us to suspect lead poisoning. A quick occupational history, environmental history and use of alternate system of medicine were asked. We got a positive history of intake of traditional medicine given to him by a quack. There have been case reports of patients with acute lead poisoning presenting with abdominal pain and anaemia.^{3,4} In the absence of any other cause of severe abdominal pain, a provisional diagnosis of lead poisoning due to the powder ingested was made in the ED, which was later confirmed after getting the BLL post-admission.

Acute lead poisoning has been mostly described in children because of better enteral and inhalational absorption and poor clearance compared with adults. Most common cause in adults are due to occupational exposure worldwide. However, in India, there have been reports of acute lead poisoning in adults more commonly due to consumption of ayurvedic medication than occupational exposure.⁵

The most common presentation is abdominal pain. The other symptoms include generalised weakness, salivation, headache, myalgia and joint pain. The renal, neurocognitive and cardiovascular effects have not been described in adult patients presenting with acute lead poisoning. Basophilic stippling is a non-specific finding and can be seen in various malignancies, haematological, rheumatological and cardiovascular diseases as well as normal individuals.⁶ Lead line, which is caused due to reaction of lead with the sulfide produced by oral bacteria forming lead sulfide which deposits at the junction of the gums and teeth, is a rare finding in acute poisoning.^{7,8}

The Centers for Disease Control and Prevention defines elevated BLL as BLL >5 µg/dL.⁹ A pilot study conducted in Jodhpur, India on 49 healthy school teachers found a mean BLL of 6.89 µg/dL with 16% having levels >10 µg/dL. The determinants of high levels were found to be usage of old metallic pipes for plumbing, water consumption without any purification

system, usage of cosmetics and ayurvedic/herbal medicines.¹⁰ For adults, BLL >100 µg/dL requires chelation, BLL 80–99 µg/dL may benefit from treatment, while for BLL 50–79 µg/dL it may be considered.¹¹ However, the final treatment of acute lead poisoning in adults is based on clinical grounds with the knowledge of BLL. The two chelating agents most commonly used for acute lead poisoning are edetate calcium disodium (CaNa₂EDTA) and dimercaptosuccinic acid (DMSA). We used D-penicillamine in our patient because of the temporary non-availability of both CaNa₂EDTA and DMSA.¹¹ The improvement takes weeks to years depending on the level of poisoning.¹²

Learning points

- ▶ Acute lead poisoning is one of the rare causes of acute abdomen.
- ▶ A proper history of off-label and non-prescription drugs should be asked to patients.
- ▶ A high index of suspicion should be kept in patients with undifferentiated abdominal pain, where examination and investigations are unremarkable.

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