

## Lead Induced Abdominal Colic in A Teenage Female

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### Abstract:

Abdominal pain is a very common symptom in gastroenterology practice but sometimes it become very tedious to find the exact etiology behind it. A through history taking and understanding of the possible medical causes is paramount in narrowing down the differential diagnosis and thus accurate treatment. We present the case of a 14 -year -old girl diagnosed with lead poisoning highlighting that rather than occupational or environmental contamination, it was consumption of ayurvedic medication which was the prime reason for her elevated blood lead levels (BLL).

**Key Words:** abdominal pain; lead poisoning; ayurvedic medications; heavy metal poisoning

### Case Report:

#### Clinical Feature, Clinical Finding and Assessment:

The girl referred for abdominal pain and constipation that she had for 4 months. The pain was intermittent and colicky, but without any aggravating or relieving factors. The pain was on occasion severe enough to warrant intra venous (IV) analgesics and she used to consume oral analgesic and occasional laxatives for her complaints. She had history of multiple hospital visits and evaluation by multiple physicians prior to her presentation. Her medical history was unremarkable except for the history of consumption of Ayurvedic supplement for the last 6 months which she was supposedly consuming as a prophylactic measure against COVID-19. None of her family members were involved in professions where they could potentially be exposed to lead. Her physical examination was unremarkable. Neurologic examination was normal, and behavior was normal too.

On investigations, her blood tests showed anemia with a hemoglobin of 11.5 gm/dl (normal 12–16) g/dL. An X-ray of abdomen revealed faeces loaded colon. Her abdominal imaging (USG abdomen) and Contrast Computed tomography (CECT-abdomen) was unremarkable. Her Urine was screened for porpho-bilinogen, which was negative. The lead concentration in the blood was high at 21.66 (normal < 5) µgm/dL. Serum IgA Tissue transglutaminase was negative. Colonoscopy revealed normal mucosa up to terminal ileum and a fecal Occult blood test was negative. Based on these clinical feature and laboratory and radiological evaluation a diagnosis of lead poisoning in this teenage girl was made.

#### Follow up and Outcome:

This patient was advised not to consume ayurvedic medications. She was followed up and her symptoms gradually subsided within a month of follow up. Her BLL a month after discontinuation of Ayurvedic medications came down to (9 mcg/dL). She was on continuous follow up and was asymptomatic thereafter.

### Discussion:

Humans have been using lead for multiple purposes since millennia, and simultaneously with this use have recognized adverse consequences of lead on the human body [1]. Today, healthcare providers and public health officials must grapple with the mounting evidence implicating lead as a potent toxin with measurable negative effects. Because lead is not biodegradable, it demonstrates remarkable environmental persistence [2]. Lead-based paint continues to be a major source of lead exposure in



young children. This is partially due to the fact that several young children live in older homes in which lead-based paint was previously used [3]. Other potential source of lead is tap water, typically secondary to the presence of lead in plumbing. Occupations such as metal welding, battery manufacturing, shipbuilding, lead smelting and refining, painting and construction work, and pipefitting and plumbing may expose adults to lead, and working parents may inadvertently bring lead home where they can expose their children second-hand [4]. Other less ubiquitous exposures including contaminated ceramic dining ware, contaminated spices and cosmetics, folk remedies (Ayurvedic and Herbal remedies), and retained leaded bullets [4]. In one recent study the blood lead levels were evaluated in consumers of ayurvedic medicines. Of the 115 participants 40% were found to have an elevated blood lead levels of 10 µg/dL or above and 9.6% had blood lead levels above 50 µg/dL [5]. As the consumption of Ayurvedic medicine in India has dramatically increased both for its believed prophylactic and therapeutic benefits for COVID-19, it may have led to surge lead levels in the population and its adverse effects in consumers especially children. Lead interacts with human physiology in two significant ways and because of the following reasons leads to adverse consequences in virtually all systems of the human body: it has a strong affinity for sulfhydryl groups and electron donor groups in general, such that lead ends up bound to and affecting a wide range of proteins. Because of its similarity to other divalent cations like calcium and zinc, it interferes with the vast array of cellular mechanisms that are regulated by and mediated by these cations [2]. Once the lead is absorbed, it distributes into two major compartments: the bone and the soft tissues. The soft tissue compartment is relatively labile compared to the more stable bone compartment. Children are at greater risk of developing manifestations of lead toxicity because more of their lead body burden is stored in metabolically active sites, rather than in relatively inert bone [2].

There is indisputable scientific evidence that blood lead levels (BLL) below 10 µg/dL are associated with adverse effects in infants and children. In response, in 2012, the Centers for Disease Control and Prevention (CDC) lowered the reference value BLL to 5 µg/dl [6, 7]. Chelating agents are recommended only if the level is above 45 µg/dl [8]. The available agents nowadays include: 2,3 dimercaptosuccinic acid (DMSA), dimercaprol, ethylene diamine tetra-acetic acid (CaNa 2 EDTA), D-penicillamine.

The exact pathogenic mechanism behind abdominal pain and constipation due to lead toxicity is largely unknown. Possible mechanisms that have been put forth as an explanation to abdominal symptoms are change in visceral smooth muscle tone through the action of lead on visceral autonomic nervous system and also causes alteration in sodium transport in small intestinal mucosa. Lead toxicity is also believed to cause lead-induced pancreatitis though very few reports of this exist worldwide [9, 10].

## Conclusion:

We present this case report of lead poisoning in a 14-year-old girl with the aim of highlighting the difficulty in diagnosing this condition, also highlighting the potential of ayurvedic

medications being a major cause of lead poisoning in India and its potential to cause neurological, hematological and gastrointestinal toxicity chiefly in children. Lead toxicity should be a suspicion especially in patients with abdominal pain and constipation with a normal abdominal examination. Even though the diagnosis represents a challenge in case of children mostly due to its rare incidence in teenagers, a physician must always include this possibility in the differential diagnosis for cases with suggestive symptoms.

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