

## Letter to the Editor



## Can E-cigarettes Be the Source of Lead Toxicity?

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## DEAR EDITOR,

To date, many health effects of e-cigarettes have been published such as acute lung injury and cancer.<sup>1,2</sup> In this letter, we would like to report a case of lead toxicity, which is most likely caused by e-cigarettes.

A 31-year-old man was referred to our hospital because of high blood lead levels (18.8 µg/dL) detected during a job application examination. Laboratory confirmation was made in the hospital. An increase in the blood lead levels of the patient was observed at two-week intervals (50.8 µg/dL and 97.3 µg/dL, respectively). During this period, he was unemployed for the last 1.5 months. He had previously worked as a waiter in various cafeterias for 1.5 years. Before that, he worked in the manufacture of accumulators for two months, over 1.5 years ago. He did not identify any hobbies or side jobs that could expose him to lead. He had never had any surgery or accidents other than appendicitis 27 years ago. He had no chronic diseases and was not taking any medications. He had two children and was divorced. He lived alone in a reinforced concrete building in the city center. The plumbing of the building was new. In terms of oral intake sources, the use of cookware containing lead was questioned.

It was learned that he had vaped e-cigarettes for two months, hoping that it would help him quit smoking. He purchased it from an online shopping website. He used to charge the battery daily and often found himself reflexively playing with it in his hand. No other new source of exposure has been identified since the last occupational lead exposure in accumulator production occurred 1.5 years ago. He was hospitalized, and chelation therapy with 40 mg/kg/day of ethylenediaminetetraacetic acid (EDTA) was administered. After treatment, the blood lead level decreased to 19.3 µg/dL. He was discharged with advice to avoid e-cigarettes.

Today, lead is identified as one of the 10 chemicals that pose a significant public health problem, and political steps are being taken to reduce exposure. Legal regulations on lead-based gasoline and leaded paint are examples of this.<sup>3</sup> However, it is a well-known fact that several consumer products may still contain lead.<sup>3</sup>

Electronic cigarettes are rapidly becoming an alternative to traditional cigarette smoking. According to chromatographic and spectroscopic measurements in the literature, similar contents such as formaldehyde, acetaldehyde, nitrosamine, toluene, lead, nickel, and cadmium were detected in the vapors of different brands.<sup>4,5</sup> Lead or other metal contents are mainly caused by the battery coil,<sup>5</sup> but can also occur through liquid contamination under poor production conditions.

Exposure to lead can occur via inhalation, ingestion, and dermal absorption routes.<sup>3</sup> If electronic cigarettes were defined as the source of exposure in our case, it can be said that lead could have been ingested into the body in all three ways.

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First, inhalation of liquid that may be contaminated with lead; second, transdermal absorption by holding the battery in the palm for a long time; and last, oral ingestion through contact with the contaminated hand to mouth.

Of course, in this evaluation, possible exposure to accumulator manufacturing over 1.5 years ago was not neglected in this patient. Because accumulator manufacturing is a well-known industry associated with lead exposure. However, the newly increasing trend in patient blood lead levels necessitated a search for a new source of exposure.

In this report, arguments are presented that e-cigarettes, which are marketed as alternatives to traditional cigarettes, may cause lead poisoning in addition to their known health effects. Comprehensive research on this topic is required.

### Ethics

**Informed Consent:** It was obtained from the patient to report the case in the medical literature.

### Footnotes

#### Authorship Contributions

Concept: M.D.A., S.Y., O.K., Design: M.D.A., S.Y., O.K., Data Collection or Processing: M.D.A., Literature Search: M.D.A., S.Y., O.K., Writing: M.D.A.

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