



Lead Poisoning in Children

Heda Dapul, MD^{a,b,*}, Danielle Laraque, MD^{b,c}

^aPediatric Critical Care Medicine, 4802 Tenth Avenue, Brooklyn, NY 11219, USA; ^bMaimonides Medical Center, Infants and Children's Hospital of Brooklyn, 4802 Tenth Avenue, Brooklyn, NY 11219, USA; ^cNew York University School of Medicine, 550 First Avenue, New York City, NY 10016, USA

Keywords

• Blood lead level • Primary prevention • Chelation • Neuro-developmental

Key points

- Lead is ubiquitous. It comes from a variety of sources and can be ingested or inhaled.
- There is no safe lead level. The presence of any amount of lead in the blood can lead to neuro-developmental deficits, and in larger amounts lead can cause multiorgan damage and even death.
- "Treatment" of lead poisoning should be geared toward primary prevention, targeting environmental hazards, particularly that of lead-based paint used in pre-1978 housing.

BACKGROUND

Lead poisoning in children is a persistent worldwide problem. According to the World Health Organization, it accounts for about 0.6% of the global burden of disease [1]. Although recent data have shown a decline in the prevalence of elevated blood lead levels (BLLs) in children in the developed world, lead remains a well-known environmental health threat.

WHAT IS LEAD?

Lead is a naturally occurring, bluish-grey metal that exists in both organic and inorganic forms. It is soft, pliable, and resistant to corrosion. It does not conduct electricity and is effective in shielding against radiation. It has been used by humans for thousands of years in a variety of ways and is still widely used today [2].

*Corresponding author. Pediatric Critical Care Medicine, Maimonides Medical Center, Infants and Children's Hospital of Brooklyn, 949 48th Street, Brooklyn, NY 11219. *E-mail address:* HDapul@maimonidesmed.org

HISTORY

The earliest record of lead mining dates back to as far 6500 BC in Turkey; decorative lead beads were found in a tomb in the ancient city of Anatolia [3]. The effects of lead *toxicity* have been documented as early as 2000 BC. Even back then, lead was readily available, inexpensive, and durable. Because of its low melting point, it is easily malleable and therefore its widespread use in civilized societies led to chronic low-level exposure that has been described by various philosophers and historians over the years. Hippocrates (460–370 BC) wrote about a man mining lead that had loss of appetite, colic, weight loss, pallor, fatigue, and irritability [4], all consistent with symptoms of lead poisoning that we see today.

During the Roman period, lead was used extensively in the building of the aqueducts. It also was used as a pigment in paint, face powders (ie, “rouge”), and mascaras. Lead sugar, or lead (II) acetate, was used to sweeten wine and preserve fruit. Because of its diverse uses and widespread availability, the Romans minimized the hazards of lead use and this was theorized to be the cause of the fall of the Roman Empire [5]. Although this belief has since been refuted, the mental instability described in many Roman rulers, the sterility of many aristocratic men, and the infertility in many aristocratic women were thought to be caused by their daily low-level exposure to the metal [4].

In the Renaissance period, alchemists used lead in their attempts to turn metals into gold, and painters used lead-based colors for their work. It also was used as a slow-acting poison by Lucrezia Borgia and Catherine De Medici in the 1400s [6]. In 1621, lead found its way to the New World, when the earliest colonists settling in Virginia began lead mining and smelting.

The Industrial Revolution saw an increase in the number of workers who exhibited symptoms of metal intoxication and prompted scientists and physicians to study these symptoms and identify a cause [7]. In the late 1800s, the first form of legislation was passed in the United Kingdom to minimize workers' exposure to harmful metals in the workplace (Factories' Prevention of Lead Poisoning Act of 1883).

In the United States, it was not until the early twentieth century that the occupational and environmental toxicity of lead was acknowledged. In 1914, a Baltimore boy died of lead poisoning from ingesting white lead paint from his crib [8]. In the 1920s, the discovery of tetraethyl lead as an antiknock, fuel-efficient gasoline additive boosted the American automotive industry. This compound was later linked to the development of mental illness and, eventually, the death of 15 factory workers in New Jersey and Ohio. In May 1925, the production and sale of leaded gasoline was suspended temporarily while the Surgeon General appointed a panel of experts to investigate the cause of these deaths. This panel was largely composed of industry representatives and in 1926, their report said that there was not enough time or sufficient evidence to prove a link between exposure to triethyl lead and the symptoms of chronic disease [6].

Throughout the world war II and postwar era, there continued to be no regulations on leaded gasoline or on lead-based paint, which were the major sources of lead exposure at the time. Deaths from acute lead poisoning continued to

Download English Version:

<https://daneshyari.com/en/article/4140281>

Download Persian Version:

<https://daneshyari.com/article/4140281>

[Daneshyari.com](https://daneshyari.com)