

Selected Topics: Toxicology



RETAINED LUMBAR BULLET: A CASE REPORT OF CHRONIC LEAD TOXICITY AND REVIEW OF THE LITERATURE

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Abstract—Background: Lead toxicity from retained bullet fragments is difficult to both predict and diagnose, but important to treat early, given the potential severity of disease. Blood lead levels > 25 µg/dL and 40 µg/dL are considered toxic in children and adults, respectively. Symptoms may range from nonspecific constitutional symptoms to seizures and coma. Chelation is the mainstay therapy for lead poisoning and levels to treat depend on patient age, blood lead levels, and the presence of symptoms. **Case Report:** We present the case of a woman with symptoms of severe lead toxicity from 20-year-old retained bullet fragments. She had been seen by multiple providers for evaluation of each symptom, but a unifying diagnosis had not been found. After identifying this complication, she was treated appropriately and more serious complications were prevented. **Why Should an Emergency Physician Be Aware of This?:** We present this case to increase awareness among emergency physicians of lead toxicity in patients with a seemingly unrelated constellation of symptoms and a history of a previous gunshot wound with retained bullet or bullet fragments. © 2016 Elsevier Inc. All rights reserved.

Keywords—chelation therapy; lead toxicity; plumbism; retained bullet

INTRODUCTION

Worldwide, occupational exposures (e.g., gasoline, soldering, lead-based paints, and ceramics) are the most common causes of lead toxicity in adults, with the

respiratory system serving as the primary pathway of lead absorption. In Asia, Latin America, and the Middle East, folk and traditional medicines are known sources of plumbism (1–9). Adults absorb about 20% of ingested lead, however, more vulnerable populations like children, pregnant women, and malnourished individuals absorb 40% to 70% of ingested lead (6–10). Lead toxicity from retained bullet fragments is an important complication of ballistic injuries. One of the earliest documented cases of plumbism from retained ballistic projectiles was in the 1860s (11). The ultimate effect of retained lead-containing ballistic foreign bodies is dependent on multiple factors. The site of impact, the degree of bullet fragmentation, the final resting place, and the physiologic state of the individual all have active roles in the final complications that ensue (12). The type of treatment an individual with plumbism from a retained bullet receives should be based on the level of lead toxicity, the projectile's location, symptoms experienced, and each individual's medical history (6,13,14).

CASE REPORT

A 43-year-old female presented to the emergency department for evaluation for a 1-month history of severe headaches, nausea, abdominal pain, and progressively worsening chronic lower back pain and right leg

paresthesias that had been intermittent for a few years but recently getting worse. She reported having been evaluated for symptoms at an out-of-state hospital several months earlier. Brain imaging, lumbar puncture, and laboratory tests were reportedly negative, but she had been subsequently informed that “some level was high.”

She initially denied any medical history, daily medication, or allergies. She lived in a newly constructed house with her two sons who were symptom-free. Social history was unremarkable. Her vital signs and physical examination were unremarkable. Her laboratory tests were notable for hemoglobin 9.9 g/dL, hematocrit 29.2% (mean cell volume 88 fL), creatinine 1.2 mg/dL, and lipase 63 U/L. The rest of her laboratory values, including liver function tests and coagulation panel, were within normal limits.

Upon further questioning, she endorsed a history of endometriosis, chronic abdominal pain, constipation, and a diagnosis of anemia 3 years earlier. The etiology of her anemia had been attributed to her history of endometriosis. She volunteered that she had a retained bullet after being shot in the back in Colombia in 1993. She had been told by an orthopedist that there was no indication for bullet retrieval. On neurologic examination, she had decreased right lower extremity sensation and bilateral hyper-reflexive patellar reflexes. She denied bladder or bowel dysfunction, leg weakness, or saddle paresthesias.

On lumbar spine plain films and lumbar computed tomography, a bullet was appreciated adjacent to the right L4/L5 facet with surrounding hyperdense debris causing narrowing of the right L5/S1 neural foraminal and spinal canal stenosis at L4/L5 (Figure 1). A blood lead level was sent and the patient was discharged.

The patient was called 2 days later to return to the emergency department because of a lead level of 70 $\mu\text{g}/\text{dL}$. She was started on oral succimer at 10 mg/kg and admitted for continued chelation therapy and bullet removal. Four days after her initial presentation, she underwent partial removal of the retained bullet fragment and posterior spinal decompression and fusion of L4 to S1 due to extensive granulation tissue formation around retained fragments. Her postoperative course was complicated by worsening anemia that improved and remained stable after a transfusion of 2 U packed red blood cells. In total, she received succimer 10 mg/kg three times a day for 5 days and a maintenance dose of succimer 10 mg/kg twice a day for an additional 2 weeks. She was discharged home with outpatient physical therapy on postoperative day 6, with a blood lead level of 18 $\mu\text{g}/\text{dL}$. The patient began having recurrent headaches 7 months after partial removal ballistic resection in addition to ongoing lower back pain. Repeat blood lead level was obtained and resulted at 50 $\mu\text{g}/\text{dL}$. She was restarted on a 2-week treatment of oral succimer in addition to British anti-



Figure 1. Left: Lateral view of lumbar x-ray study demonstrating retained bullet with surrounding granulation tissue. Right: Computer tomography scan where the bullet is appreciated right of L4/L5 facet with surrounding hyperdense debris.

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