A Shade of Supplement Toxicity

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Introduction:

The application of silver is used in many medical products given its antibacterial properties. While not FDA regulated, silver dietary supplements are also readily accessible and marketed widely for cancer, smoking remedies, AIDS, diabetes mellitus, and infections. Argyria, caused by prolonged exposure to silver salts, it a rare condition characterized by the staining of body tissue to shades of gray, black and blue. The condition is caused by silver compounds exposed to sunlight decomposes them to silver metal or silver sulfides, which are then irreversibly deposited in tissue as microscopic particles. The condition is not well studied given the lack of case reports but, like many other heavy metal exposures, can have substantial impact on numerous organ systems.

Case Description:

A 53-year-old male presented to the emergency department with the chief complaint of syncope while in a checkout line at a store. Patient stated that he felt lightheaded before the event. Bystanders reported the episode as brief with no preceding signs or symptoms. When further questioned, he confirmed that has used silver supplements for about 7 years, which he self produces combining silver rods and electric currents. Patient reported using this as an immune system boost to stop viruses. He stated that he was initially taking 150 ppm a silver 3 times a day, but recently he decreased his dose to approximately 20 ppm 3 times a day. He denied any other associated symptoms or modifying factors.

Past Medical History: Denies

Medications: Aspirin

Physical Exam: Vitals: temperature 39.1 C, respiratory rate 16, heart rate 100, BP 140/92, and SpO2 95% RA.

CONSTITUTIONAL: Well appearing.

EYES: Pupils are equally round and reactive to light. No evidence of conjunctival pallor or discoloration.

HENT: Neck is supple without mass or tenderness Mucous membranes moist. Oropharynx unremarkable. Slight abrasion above the right eye.

CARDIOVASCULAR: Tachycardic, no murmurs, rubs or clicks. Good peripheral pulses.

PULMONARY/CHEST: Lungs clear to auscultation bilaterally. No wheeze, rales, or rhonchi.

ABDOMINAL: Soft, nontender, nondistended. No rebound, rigidity or guarding. No organomegaly.

MUSCULOSKELETAL: No deformities. No pedal edema. Strength 5/5 throughout

NEURO: The patient is AAOx3. There are no focal neurologic deficits.

SKIN: Argyria most profound in sun exposed areas.

Differential Diagnosis: Medications (ie, phenothiazines, antimalarials, amiodarone, minocycline), Hemochromatosis, Polycythemia vera, Addison disease, diffuse melanosis in metastatic melanoma, Heavy metals exposure,
Central cyanosis (impaired pulmonary function, anatomic shunt, hemoglobin abnormalities, methemoglobinemia), Peripheral cyanosis (reduced cardiac output) Chrysiasis.

Pertinent Labs: Normal MI units, TSH/T4, INR/PTT/PT, acetaminophen and salicylate levels, Hgb 12.8, WBC 9.1, pH 7.49, pCO2 30, pO2 67, GFR 37, Cr 1.9, AST 48 ALT 52.
Imaging: Chest X-ray revealed left lower lobe pneumonia. Head CT no acute findings.
EKG: Sinus tachycardia. No STEMI.

Course:

Physical exam demonstrated argyria most profound in sun exposed areas. Poison control was consulted regarding suspected silver toxicity and had no recommendations. Patient was admitted for sepsis, left lower lobe pneumonia, acute kidney injury, and suspected silver toxicity, he received ceftriaxone 1 gram IV, NS 2 liters, and acetaminophen 1 gram PO. Diagnostic data included silver serum level of 131 (ref. 0.0-14), normal urine drug screen, no growth on blood or urine culture, and normal EF on echocardiogram. Urinalysis revealed 11-20 RBCs, granular casts, trace ketones, large blood, and protein 30. His Cr and GFR improved to 1.4 and 53 respectively following fluids. Patient signed out AMA following course of Ceftin inpatient.

Discussion:

Patient's fever and underlying sepsis were secondary to pneumonia identified on chest x-ray, which may have been a result of damage associated with chronic silver inhalation. His acute kidney injury was most likely associated with the silver supplement, which was exacerbated by a mild level of dehydration. While the patient was not aware of any underlying skin changes, it was quite evident on physical exam. This was caused by the chronic consumption and irreversible deposition of silver. More importantly, the patient did not initially provide any history of supplement use when asked about medications. This case highlights the need to address supplement use and further denotes the need of regulation of such substances by the FDA given their potential life threatening effects. Although extremely rare, documented silver toxicity cases cause a wide variety of toxic effects to the liver, heart, kidney, eyes, skin, respiratory, and blood cells. This case highlights a rare and unique case of silver supplement toxicity with associated argyria.

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