Generalized Argyria from Oral Ingestion of Silver Supplements: A Case Report and Discussion

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Abstract
Argyria is a rare condition of slate-gray discoloration of the skin, nails, mucosa and internal organs caused by exposure to silver-containing compounds.1 Histopathologic evaluation is extremely helpful in making the diagnosis, with silver-granule deposition seen predominantly in the basement membrane zone of the eccrine glands. Herein, we describe a case of a 79-year-old female with a history of delusions of parasitosis who presented to the dermatology clinic with gray discoloration of her face, upper extremities, and torso of six months’ duration. She was admitted to ingesting an over-the-counter colloidal silver supplement for over one year as treatment for self-diagnosed Morgellons disease. We report this case to serve as a reminder of the importance of reviewing patients’ medications and of inquiring specifically about non-prescription therapeutics, which may have detrimental effects. Additionally, physicians can caution patients with clinically diagnosed delusions of parasitosis to avoid advertised colloidal silver solution to prevent additional cases of argyria.

Introduction
Argyria is a rare cutaneous condition resulting from persistent exposure to silver compounds, leading to deposition of silver granules in the skin that can be localized or generalized. It can occur from a variety of causes, including occupational exposure, inappropriate use of silver-containing topical medications, such as silver sulfadiazine, dietary supplements, and acupuncture.1–5 Patients considering alternative therapies can be educated on the development of argyria with ingestion of silver supplements. The U.S. Environmental Protection Agency (EPA) has established a daily intake limit of 5 micrograms of silver per kilogram per day. For an individual who is 60 kg, ingestion of 300 μg of silver per day would lead to a high risk of argyria.1 Evidence suggests the concentration of silver required to cause these changes in the skin and internal organs does not lead to functional impairment.1

Diagnosis can be difficult, and evaluation must involve a thorough drug review, particularly for drug-induced pigmentary changes, as can be seen with antimalarials and minocycline. Clues to the diagnosis of argyria include the involvement of the photo-exposed skin and proximal nail bed, particularly the lunula of the fingernails. Serum silver is raised, and histopathologic examination is diagnostic, showing silver granules in the dermis, especially around eccrine ducts.1,6 We report a case of argyria in a 79-year-old female with a history of delusions of parasitosis who ingested colloidal silver solution as treatment for imagined bugs in her skin.

Case Report
A 79-year-old female presented with a six-month history of extensive blue-gray discoloration of the face, torso, and bilateral upper extremities. The patient reported daily ingestion of an over-the-counter colloidal silver solution for 12 months prior to presentation, which she discontinued upon noticing the discoloration. Based on an online advertisement, she had been using this therapy to eliminate what she believed to be bugs in her skin. Two years previously, she was seen in our dermatology clinic for recurrent, scattered, erythematous excoriations ranging from 2.5 cm to 4 cm on her cheek, forehead and left arm, as well as under her breasts (Figure 1). Histopathologic examination of a representative lesion of the left arm showed non-parasitic debris. In addition, an arthropod insect identification test was negative. During these initial visits, there was no mention of plans to use a colloidal silver supplement. The patient was provided with basic wound care treatment and counseled to avoid further scratching, and continued surveillance was recommended.

The patient’s medications included treatments for hypertension, hypothyroidism and asthma, with no recent changes. In addition, she was using topical mupirocin and anti-itch hydrogel daily. Her family history, social history, and surgical history were non-contributory.

Physical examination revealed diffuse blue-gray patches on her face, torso, and bilateral extremities with scattered white atrophic patches, more prominent in photo-exposed areas (Figure 2). She was seen by specialists in hematology-oncology and cardiology to evaluate for other possible causes of this discoloration, with a negative workup. Her history and physical examination were suspicious for a diagnosis of argyria, and two 4-mm punch biopsies were obtained from the left preauricular and left lateral forehead. Histopathologic evaluation of both areas revealed deposits of dark staining, minute granular material within the eccrine units, confirming a diagnosis of argyria (Figure 3, H&E). The patient was counseled to avoid further ingestion of the colloidal silver solution and to use sunscreen to prevent skin darkening.

Discussion
Argyria is characterized by a blue to gray staining of the skin and mucous membranes secondary to silver deposition from exposure to silver compounds. It was first described by Fuchs in 1840.1 Recently, there has been a resurgence in argyria cases due to online advertisements claiming colloidal silver to be an effective alternative treatment for various ailments, including respiratory infections, gastritis, AIDS, diabetes, and cancer.1,5–9 There are case reports of argyria secondary to ingestion of silver solutions in patients with psychiatric disorders, including one patient with schizoaffective disorder and another with delusions of parasitosis.10,11 Our patient also suffered delusions of parasitosis, which led her to ingest colloidal silver solution for a prolonged period of time, resulting in her cutaneous presentation. The differential diagnosis for slate-gray discoloration of the skin is broad, including exposure to other heavy metals, central cyanosis, methemoglobinemia, Addison’s disease and drug-induced pigmentation from medications such as antimalarial therapy, amiodarone, and minocycline.12 However, histopathologic examination can aid in diagnosis, as skin biopsy of either normal or discolored skin will show characteristic silver granules in the basement membrane zone of the eccrine lobules.
Therapy is difficult, and the primary focus is on discontinuation of contact with or ingestion of silver compounds. The discoloration may improve slowly over time, but often persists. It is also recommended that patients avoid sun exposure to prevent further skin darkening. Treatment with hydroquinone or dermabrasion has been ineffective, as these modalities target primary epidermal pigmentation.11 However, treatments that are too aggressive can lead to unwanted dyspigmentation.14 There are case reports showing some success with the use of Q-switched ruby, Q-switched 1064-nm Nd:YAG, Q-switched alexandrite and, most recently, picosecond 755-nm alexandrite lasers.14–16

**Conclusion**

Argyria from ingestion of colloidal silver solution associated with delusions of parasitosis is a rarely reported occurrence. Histopathologic evaluation confirms the diagnosis, showing silver granular deposits around eccrine lobules. Therapy involves discontinuation of the offending agent. This case emphasizes the importance of reviewing patients’ medications, including home remedies, homeopathic treatments and over-the-counter supplements, as these seemingly innocuous therapies can be the cause of unusual presentations such as argyria.

**References**


