Iatrogenic calcinosis cutis secondary to calcium chloride successfully treated with topical sodium thiosulfate

James Abbott, MD,[a] Eric H. Kowalski, BS,[b] Stephanie Klein, MD,[a]
Rosemary DeShazo, MD,[a] and Christopher M. Hull, MD[a]
Salt Lake City, Utah and Chicago, Illinois

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INTRODUCTION

Calcinosis cutis (CC) is the result of calcium salts precipitating within the skin and subcutaneous tissue resulting in firm, sclerotic, white papules and plaques that can be painful. The etiology of CC is typically separated into the following categories: dystrophic, metastatic, idiopathic, iatrogenic, or calciphylaxis. Iatrogenic CC is commonly associated with extravasation of calcium-containing intravenous (IV) fluids. Here we report a case of iatrogenic CC caused by extravasation of calcium chloride with complete resolution after 2 months of topical sodium thiosulfate (TST) 10% lotion twice daily under occlusion.

Abbreviations used:

CC:	calcinosis cutis
IV:	intravenous
TST:	topical sodium thiosulfate

CASE REPORT

A 60-year-old man with a history of chronic obstructive pulmonary disease requiring right-sided lung transplant was admitted for cardiac arrest as a result of a complicated bronchoscopy. The lung transplant was performed 3 months prior, and the patient had been treated with tacrolimus to prevent graft rejection. He was intubated and supported in the intensive care unit for 2 weeks until he was extubated and transferred to the physical rehabilitation floor. The patient then noticed a large, painful, nonpruritic and nonevolving firm lesion on his left dorsal hand. The physical medicine team treated this lesion with antifungals for 1 week with no improvement before dermatology consult. On examination, the left dorsal hand had a large 4- x 3-cm white sclerotic plaque with a peripheral rim of erythema and geometric borders (Fig 1, *A*). A punch biopsy of the skin found aggregates of homogenous amorphous basophilic material consistent with calcium in the papillary dermis (Fig 2). Special stains for microorganisms were negative. Review of the medical records revealed the patient was administered IV calcium chloride during his cardiac arrest through a left dorsal hand IV site. It was corroborated from the medical records that extravasation of calcium chloride was the likely origin of his CC because the left dorsal hand was restricted from future IV access. The patient was started on TST 10% compounded into a lotion and instructed to apply twice daily under occlusion. After 1 month of topical therapy, the patient had 95% reduction in the size of the CC plaque and was instructed to continue for another month (Fig 1, *B*). Two months into treatment, the patient had 99% resolution and was instructed to only use the topical focally to the residual white speck for an additional 1 to 2 weeks (Fig 1, *C*). He was seen 4 months later with complete resolution of his CC.

DISCUSSION

Iatrogenic CC represents a rare dermatologic entity; however, it is most often seen during or after hospital encounters. The etiology stems from concurrent microtrauma and extravasation of IV fluids typically containing calcium salts.[1,2] Lesions develop over the course of several days to weeks and

From the Department of Dermatology, University of Utah[a] and the Department of Dermatology, University of Illinois in Chicago.[b]
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Correspondence to: James Abbott, MD, Department of Dermatology, 30 N 1900 East, 4A330, Salt Lake City, UT 84132. E-mail: jack.abbott@hsc.utah.edu.

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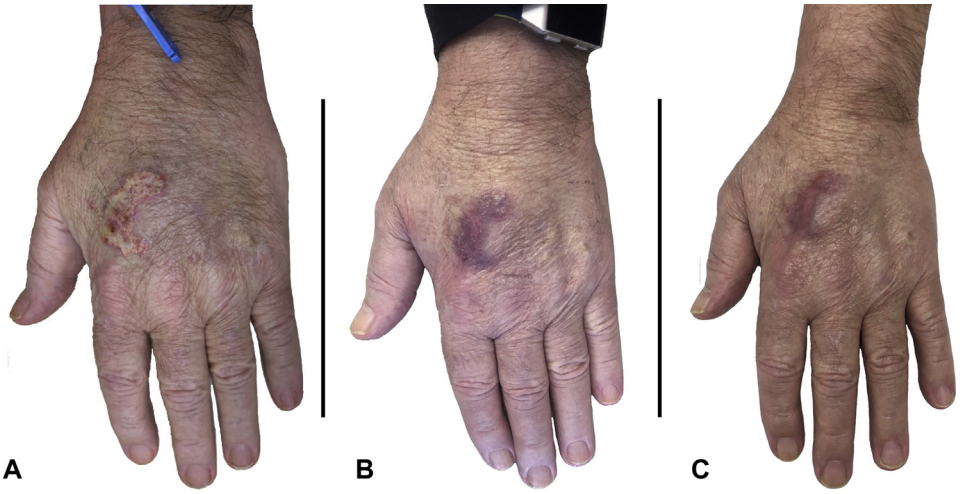

Fig 1. **A**, At initial consultation, the left dorsal hand had an approximately 4- x 3-cm irregular firm sclerotic white plaque with mild erythema noted at the peripheral rim. **B**, Dramatic improvement with a reduction in size of approximately 95% was seen after 1 month of topical sodium thiosulfate 10% lotion twice daily under occlusion. **C**, Two months of topical application resulted in near-complete resolution of the original lesion.

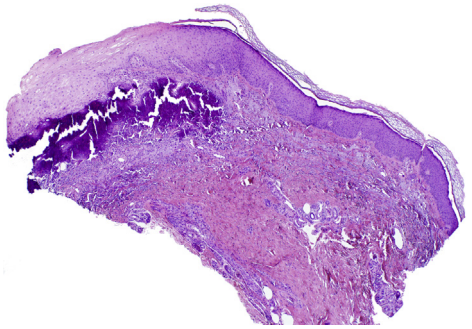

Fig 2. Punch biopsy performed at the edge of the lesion shows deposition of calcium in the papillary dermis with surrounding foreign body macrophages. Special stains for microorganisms and tissue cultures were negative. (Original magnification: x40.)

present as tender yellow to white sclerotic plaques and nodules. Ulceration is not uncommon and may be accompanied by a thick white exudate.[3] Although the exact pathomechanism of calcium salt deposition in these cases remains unclear, it is likely multifactorial in nature. The collagen-rich microenvironment of the dermis has been shown in vitro to precipitate calcium salts and may be the stimulating factor.[4] Extravasation of calcium-containing solutions into focal areas, coupled with local tissue injury and inflammation, act synergistically to promote cellular calcium release.[1] Several cases are reported of iatrogenic CC after IV administration of calcium-containing solutions or application of calcium chloride pastes.[1,5,6] Similarly, iatrogenic CC secondary to recurrent heel sticks in the neonate population is well established.[2] Extravasation of chemotherapy has also been associated with the development of CC.[7]

The diagnosis of CC is easily confirmed by histopathology and radiographic findings. In the case of iatrogenic CC, a thorough exploration of the patient's medical history and onset of symptoms is critical for identifying an etiologic agent.

Clinical trial investigations into CC treatments remain sparse, thus there is no standard therapy. Treatment recommendations stem from case reports and small case series largely centered on dystrophic CC associated with autoimmune and mixed connective tissue diseases.[8,9] Treatment has included the use of calcium channel blockers, warfarin, probenecid, and bisphosphonates. More invasive interventions such as surgical debridement and carbon dioxide lasers have also been used, all with limited and variable outcomes.[8]

TST, or its active metabolites, have been used with appreciable efficacy in treating dystrophic CC associated with autoimmune connective tissue diseases.[9,10] Mechanistically, TST is thought to harbor anti-inflammatory and antioxidant properties. However, it acts as a calcium chelating agent, increasing the solubility and hastening the dissolution of the precipitated deposits.[9,10] TST has been used successfully in the pediatric population for iatrogenic CC; García-García et al[5] showed complete resolution with 10% TST twice daily under occulsion for 6 months.

Here we report the successful treatment of iatrogenic CC using TST in an elderly, immunosuppressed

patient with significant comorbidities. Varying strengths of TST have been used ranging from 10% to 25%. Our treatment regimen mirrored that of García-García et al[5] with application of 10% TST lotion twice daily under occlusion. To our knowledge, there has only been one previous report describing TST application to iatrogenic CC.[5] We hope this case expands the boundaries of TST use to older, more high-risk patients as well as adds to the growing body of literature on the application and utilization of TST as a safe and effective first-line therapy in CC.

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