Clinical Image

Nicholas Salupo*, DO, Michelle Norris, CNP and Jonathan J. Taliercio, DO, FASN

Calciphylaxis

https://doi.org/10.1515/jom-2023-0236
Received October 17, 2023; accepted December 19, 2023;
published online January 29, 2024

A 28-year-old male on intermittent hemodialysis (IHD) for 1 year due to eosinophilic granulomatosis with polyangiitis presented with 2 weeks of thigh wounds. Serum studies showed calcium 11.3 mg/dL, albumin 3.8 g/dL, parathyroid hormone (PTH) 340 pg/mL, phosphorous 5.7 mg/dL, and 25-hydroxy vitamin D 31.5 ng/mL. An examination showed a well-demarcated, indurated, violaceous right thigh ulcer (Figure 1). A biopsy showed ulcerated epidermis with little dermal inflammation. Subcuticular blood vessels showed fat necrosis, stippled calcium deposition, and focal vascular thrombosis consistent with calciphylaxis. Sodium thiosulfate (STS) was administered thrice weekly after IHD with antibiotics and debridement. After 2 months of STS, the wound continues healing (Figure 2).

Figure 1: Right lateral thigh wound prior to sodium thiosulfate (STS) therapy.

Figure 2: Right lateral thigh wound with silver alginate hydrophilic dressing present after 2 months of sodium thiosulfate (STS) therapy.

Calciphylaxis is a life-threatening complication of advanced kidney disease with an estimated incidence of 3.49/1,000 patient years among dialysis patients [1]. It leads to calcium deposition in dermal and adipose microvasculature resulting in painful, violaceous, nonhealing ulcers [2]. Differential diagnosis includes warfarin skin necrosis, antiphospholipid syndrome, and cholesterol embolization. Risk factors include female sex, dialysis vintage, obesity, hyperparathyroidism, and warfarin [3]. Recognition is important because it is associated with a 60–80 % 1-year mortality from cutaneous infection and sepsis [4].

Wound care and pain management are cornerstones of therapy. Disease progression is slowed with dietary

***Corresponding author: Nicholas Salupo**, DO, Department of Kidney Medicine Q7, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195-0002, USA, E-mail: salupon@ccf.org. https://orcid.org/0000-0001-7347-6542
Michelle Norris, CNP **and Jonathan J. Taliercio,** DO, FASN, Department of Kidney Medicine, Cleveland Clinic, Cleveland, OH, USA

calcium, phosphorus, and vitamin D reduction, noncalcium phosphate binders (goal serum phosphorous<5.5 mg/dL), cinacalcet use (PTH goal<300 pg/mL), and dialysis clearance optimization. Mechanistically, STS reduces reactive oxygen species and chelates calcium into soluble, dialyzable calcium thiosulfate complexes, but no randomized controlled trials support its use [5]. STS is administered off-label thrice weekly after IHD until symptoms resolve, with monitoring for nausea, vomiting, and anion gap metabolic acidosis. Recalcitrant wound treatment includes parathyroidectomy, bisphosphonates, or hyperbaric oxygen.

Research ethics: Not applicable.
Informed consent: Informed consent was obtained from the individual included in this study.
Author contributions: The authors have accepted responsibility for the entire content of this manuscript and approved its submission.
Competing interests: The authors state no conflict of interest.
Research funding: None declared.
Data availability: Not applicable.

References

1. Gallo Marin B, Aghagoli G, Hu SL, Massoud CM, Robinson-Bostom L. Calciphylaxis and kidney disease: a review. Am J Kidney Dis 2023;81: 232–9.
2. McCulloch N, Wojcik SM, Heyboer M 3rd. Patient outcomes and factors associated with healing in calciphylaxis patients undergoing adjunctive hyperbaric oxygen therapy. J Am Coll Clin Wound Spec 2016; 7:8–12.
3. Yerram P, Chaudhary K. Calcific uremic arteriolopathy in end stage renal disease: pathophysiology and management. Ochsner J 2014;14: 380–5.
4. Budisavljevic MN, Cheek D, Ploth DW. Calciphylaxis in chronic renal failure. J Am Soc Nephrol 1996;7:978–82.
5. Mathews SJ, De Las Fuentes L, Podaralla P, Cabellon A, Zheng S, Bierhals A, et al. Effects of sodium thiosulfate on vascular calcification in end-stage renal disease: a pilot study of feasibility, safety and efficacy. Am J Nephrol 2011;33:131–8.