

# Cutaneous oxalosis mimicking calcinosis cutis in a patient on peritoneal dialysis



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**Key words:** calcinosis cutis; connective tissue disease; cutaneous oxalosis; lupus nephritis; oxalosis; peritoneal dialysis; secondary hyperoxaluria; secondary oxalosis; SLE.

## INTRODUCTION

Oxalosis is the systemic accumulation of calcium oxalate in tissues throughout the body and can be of primary or secondary etiology. Extrarenal manifestations are rare but can include the cutaneous deposition of calcium oxalate. In this report, we discuss the case of a peritoneal dialysis patient, who presented with cutaneous papules and nodules mimicking calcinosis cutis. Subsequent biopsy resulted in a diagnosis of cutaneous oxalosis.

## CASE REPORT

A 45-year-old woman with a history of lupus nephritis (LN) complicated by end-stage renal disease (ESRD) on peritoneal dialysis presented to the emergency department with confusion and was admitted for hypertensive encephalopathy. The patient was diagnosed with World Health Organization class III (focal) LN on renal biopsy at the age of 28. At that time, serologic parameters, including antinuclear antibody, anti-double-stranded DNA, C3, and C4, were unremarkable, and the kidneys were normal sized on ultrasound. The patient did not start treatment for LN and was lost to follow-up for the next 6 years, at which time she presented back to medical care with symptoms consistent with ESRD. The patient was subsequently started on peritoneal dialysis, which she has been on for the last 12 years. The patient's systemic lupus erythematosus was documented by rheumatology 8 years previously according to the ACR/SLICC classification criteria,

### Abbreviations used:

ESRD: end-stage renal disease  
LN: lupus nephritis

including renal biopsy consistent with LN. Repeat immunologic workup was positive for antinuclear antibody, 1:80, with a speckled pattern, but further rheumatologic workup for additional causes of ESRD was negative.

The patient's dermatologic and musculoskeletal complaints had begun 8 to 9 years previously, when she developed intermittent episodes of the Raynaud phenomenon. She has also had chronic intermittent arthralgias of both hands, punctuated by recurrent septic arthritis of the left knee and an isolated episode of right hand swelling, erythema, warmth, and tenderness to all proximal interphalangeal and metacarpophalangeal joints. Before the presentation described here, the patient had not seen a dermatologist, nor had she followed consistently with outpatient rheumatology or adhered to systemic lupus erythematosus treatment.

Dermatology was consulted during this patient's admission for hypertensive encephalopathy to evaluate her lower-extremity skin findings, which the patient had first noticed several years previously, with worsening over the past several months. She denied lesion triggers, color changes, or drainage. She confirmed pain only with lesion pressure. She denied having had previous skin biopsy. Physical

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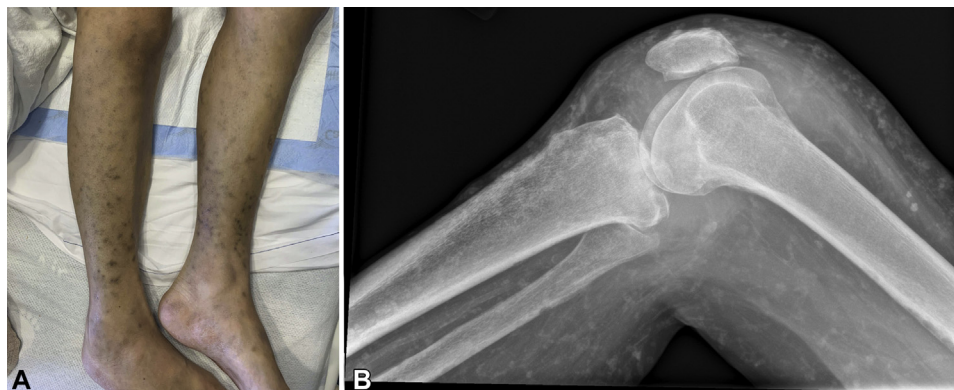
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**Fig 1.** **A**, Clinical lesions. Stocking-like, hyperpigmented macules and patches overlying firm papules, nodules, and plaques arranged in a subtle reticular pattern on both lower extremities. **B**, X-ray, left knee lateral view. Extensive patchy ill-defined calcifications throughout the soft tissues of the left distal aspects of the thigh and calf.

examination revealed stocking-like hyperpigmented macules and patches overlying firm papules, nodules, and plaques arranged in a subtle reticular pattern on both lower extremities (Fig 1, A) and upper portions of the arms. She also had firm, yellow-to-orange, well-circumscribed nodules overlying the proximal and distal interphalangeal joints of the hands (Fig 2). In the setting of ESRD and systemic lupus erythematosus, the differential diagnosis included calcinosis cutis, tophaceous gout, xanthomas, and reticulohistiocytosis. Workup included x-rays showing the following: (1) Diffuse tumoral “calcification” throughout the soft tissues of both hands, (2) multiarthrodial degeneration in the distal interphalangeal joints of both hands, (3) ill-defined calcifications of the distal aspect of the left thigh and calf (Fig 1, B), and (4) left knee effusion with significant synovitis and synovial thickening, as well as erosive changes and marrow edema. Histopathologic examination of a 6-mm punch biopsy obtained from the patient’s right thigh demonstrated radially arranged yellow-brown rhomboid crystals surrounded by histiocytes in the subcutis and reticular dermis (Fig 3, A). Crystals were observed to polarize on polarizing microscopy (Fig 3, B). These findings were consistent with cutaneous oxalosis. Of note, serum uric acid level was slightly elevated (7.7), but findings that would be diagnostic of cutaneous gout were absent, including histopathology showing amorphous crystalline material with negatively birefringent needle-like crystals on polarized microscopy.

## DISCUSSION

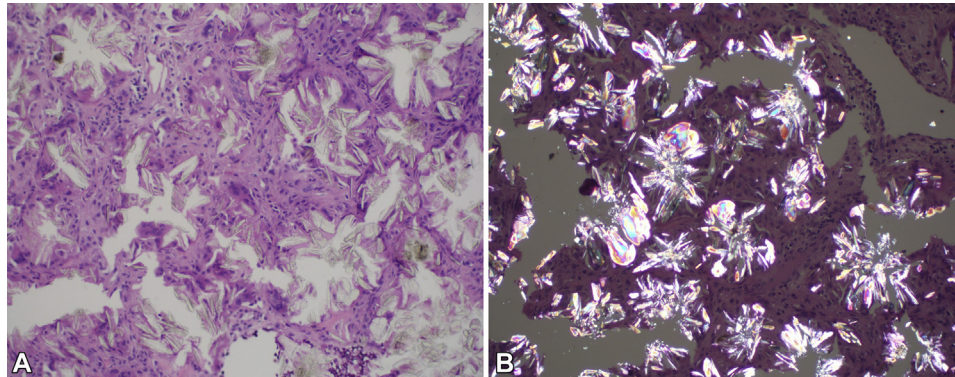
Oxalic acid is an end product of amino acid metabolism and is primarily excreted in the urine. Oxalosis is the systemic accumulation of calcium



**Fig 2.** Clinical lesions. Firm, yellow-to-orange, well-circumscribed nodules overlying the proximal and distal aspects of the interphalangeal joints of the right hand.

oxalate in tissues. Hyperoxaluria can have a primary or a secondary etiology. Primary hyperoxaluria is secondary to genetic defects in glycolate metabolism, resulting in overproduction of oxalate. Secondary hyperoxaluria may result from increased oxalate intake, increased reabsorption due to small bowel disease, or decreased excretion in renal failure (retention oxalosis).

The clinical presentation of both primary and secondary hyperoxaluria can be divided into renal versus extrarenal manifestations. Because oxalate is primarily excreted in urine, the kidney is a common organ for deposition, especially in chronic hemodialysis patients.<sup>1</sup> Depending on the location of



**Fig 3.** **A**, Histologic examination of biopsy. Radially arranged yellow-brown rhomboid crystals surrounded by histiocytes in the subcutis and reticular dermis. **B**, Multicolored, birefringent crystals. (**A**, Hematoxylin-eosin stain; **B**, light microscopy with polarized light; original magnifications: **A**,  $\times 200$ ; **B**,  $\times 200$ .)

deposition within the kidney, oxalate deposition can result in urolithiasis, nephrolithiasis, and/or nephrocalcinosis. Extrarenal manifestations can involve any organ system, including bone and skin.<sup>2-5</sup> In general, extrarenal findings are less common in hyperoxaluria secondary to renal failure than in primary hyperoxaluria.<sup>2,6</sup>

Cutaneous manifestations of oxalosis are extremely rare and vary depending on the etiology of hyperoxalemia.<sup>2,7</sup> Primary hyperoxaluria, which can mimic calciphylaxis, is characterized by vascular deposition and presents with livedo reticularis, superficial eschars, nonhealing painful ulcers, acrocyanosis, peripheral gangrene, and brawny wooden fibrosis of the extremities.<sup>3,8</sup> Secondary hyperoxalosis is characterized by extravascular deposition, resulting in acral or facial papules or subcutaneous nodules.<sup>3,9</sup> In secondary oxalosis associated with hemodialysis, miliary deposits more commonly occur in the palmar aspects of the fingers, but not the toes, a finding postulated to reflect local differences in metabolism or changes in blood circulation.<sup>10</sup> This patient's cutaneous findings were consistent with those typically observed in secondary hyperoxalosis and did not involve the toes.

In this patient, lupus glomerulonephritis likely preexisted the development of hyperoxalemia that led to the finding of cutaneous oxalosis. This patient's lack of early-age nephrolithiasis or family history of renal disease is inconsistent with expected findings in primary hyperoxaluria. If oxalosis is suspected, plasma oxalate levels should be measured.<sup>3</sup> While plasma oxalate was not measured in this patient before discharge and subsequent loss to follow-up, oxalate levels are often elevated in patients with ESRD, especially those treated with long-term dialysis.<sup>5</sup> In primary oxalosis, the treatment at the time of renal failure is limited to

combined kidney-liver transplant, while in secondary oxalosis, treatment would target underlying provocations.<sup>3,7</sup> This case demonstrates the importance of maintaining a broad differential diagnosis for cutaneous findings in patients with ESRD and autoimmune connective tissue disease and suggests that skin biopsy may increase diagnostic accuracy and allow for appropriate management in patients with cutaneous and radiographic findings otherwise suggestive of calcinosis cutis.

#### Conflicts of interest

None disclosed.

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