



# Utilization of Ultrasonography in Dermatology: Two Case Reports of Calcinosis Cutis

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Development of newer generation of cost-effective ultrasonic devices in recent years has increased the use of ultrasonography in dermatology. Several lesions can be diagnosed and managed using ultrasonography. Calcinosis cutis involves the deposition of insoluble calcium salts in the cutaneous and subcutaneous tissues. On ultrasonography, it specifically presents as hyperechoic deposits with a posterior acoustic shadowing artifact due to the acoustic properties of calcium. A 62-year-old female patient presented with a solitary, skin-colored, palpable nodule on the inner side of the right lower leg. The lesion was beneath the intact skin and detectable only on palpation. However, ultrasonography demonstrated a clear delineation of the lesion, showing hyperechoic deposits with a posterior acoustic shadow (15 MHz, linear probe). Skin biopsy and curettage were performed, revealing histological features consistent with calcinosis cutis. Four weeks after the procedure, ultrasonography performed to evaluate the outcome of treatment, showed recurrence. Another 18-year-old female patient presented with a skin-colored deep-seated nodule on the left temple. On ultrasonography, linear hyperechoic deposits with a posterior acoustic shadow were visible. Skin biopsy was performed, and histopathologic features showed calcified material in the subcutaneous tissue. These two cases of calcinosis cutis highlight the diagnostic value of ultrasonography in dermatology.

**Keywords:** Calcinosis, Diagnostic imaging, Ultrasonography

## INTRODUCTION

Among the several advantages of ultrasonography over other radiologic modalities are its swiftness and noninvasiveness. Portable ultrasonography can be used in outpatient clinics and allows point-of-care examination. Furthermore, it is preferred due to absence of secondary radiations. With the development of a newer generation of ultrasonography devices, these advantages and diagnostic values are further enhanced<sup>1</sup>. In the review of Wortsman, the author demonstrated sonographic features of dermatologic lesions commonly examined using ultrasonography, which were not only mass lesions but also inflammatory/infectious diseases, ungual lesions, and exogenous components.

Calcinosis cutis is a rare disorder characterized by calcium

deposition in the skin and subcutaneous tissues. There are four main types based on etiology and associated diseases: dystrophic, metastatic, idiopathic, and iatrogenic. There is no consensus on treatment, and medical therapies such as diltiazem, minocycline, topical thiosulfate, and surgical procedures are often used<sup>2-4</sup>. To diagnose calcinosis cutis, a patient's history and laboratory findings should be evaluated to examine associated connective tissue diseases or metabolic imbalance. Although physical examination can locate the lesion, skin biopsy is necessary to confirm the diagnosis. Sonography can also help diagnose calcinosis cutis, especially lesions buried in intact skin.

We report here two cases of calcinosis cutis that demonstrate the diagnostic utility of dermatologic ultrasonography. Furthermore, we also review the use of ultrasonography in



dermatologic field.

## CASE REPORT

### Case 1

A 62-year-old female patient presented with a 4-year history of a solitary, skin-colored, palpable nodule on the medial side of the right lower leg (Fig. 1). She had no history of trauma, intravenous injection near the site of lesion or other relevant medical history. Blood investigations for serum calcium, phosphorus, and parathyroid hormone levels revealed no abnormalities. Since the lesion was beneath intact skin, it was only detected on palpation. Sonography findings revealed linear hyperechoic deposits located in the subcutaneous tissue, with a posterior acoustic shadow (Fig. 2A). On colored Doppler examination, vascularity was not seen around the hyperechoic deposits (15 MHz, linear probe). With a provisional diagnosis of tumors with calcification including calcinosis cutis, skin biopsy was performed, and histological features consistent with calcinosis cutis were confirmed (Fig. 3A). During biopsy, yellowish calcium materials were observed and removed through curettage. Four weeks after the procedure, ultrasonography was performed to evaluate the outcome. Increased hyperechoic linear deposits were observed, suggesting recurrence (Fig. 2B). The patient was referred to the department of plastic surgery for complete excision.

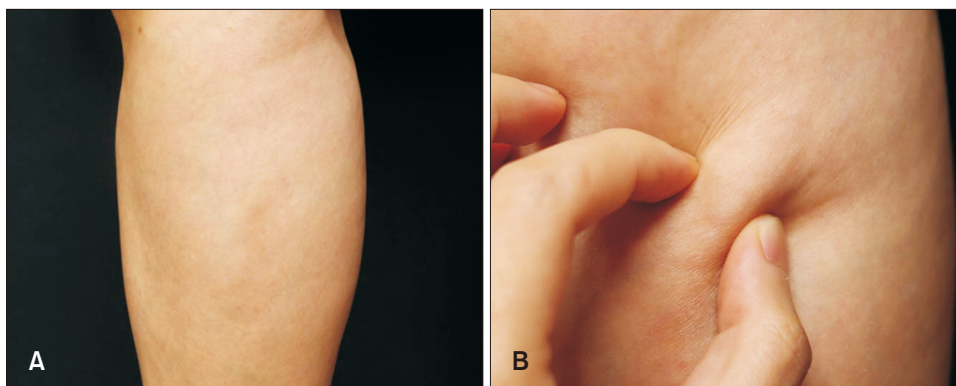
### Case 2

An 18-year-old female patient presented with a skin-colored, deep-seated firm nodule on the left temple (Fig. 4). The lesion was detected 10 years ago and had slowly increased in size; there was mild tenderness on pressure. However, the lesion seemed unchanged for several years and there had been ab-

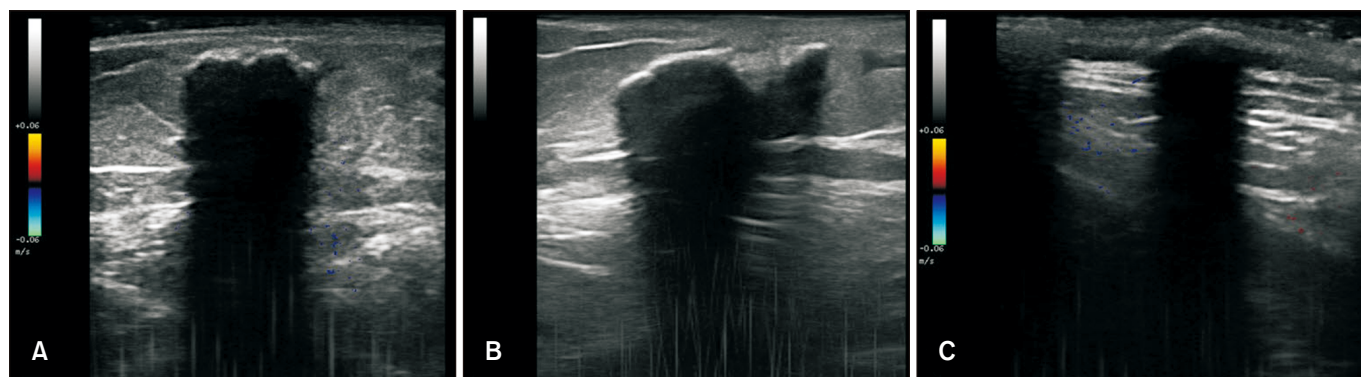
sence of discharge from the lesion. On physical examination, hard and relatively linear mass was palpated. She had no significant medical history or history of trauma. Blood investigations were not conducted. Sonography revealed linear hyperechoic deposits without vascularity in the subcutaneous tissue, with posterior acoustic shadows (Fig. 2C). We performed skin biopsy and during the examination, only yellowish calcium materials were observed without nodule or mass lesion. Histopathologic findings confirmed calcified materials in the subcutaneous tissue, which were consistent with calcinosis cutis (Fig. 3B). We referred the patient to the department of plastic surgery for complete excision. We received the patients' consent forms about publishing all photographic materials.

## DISCUSSION

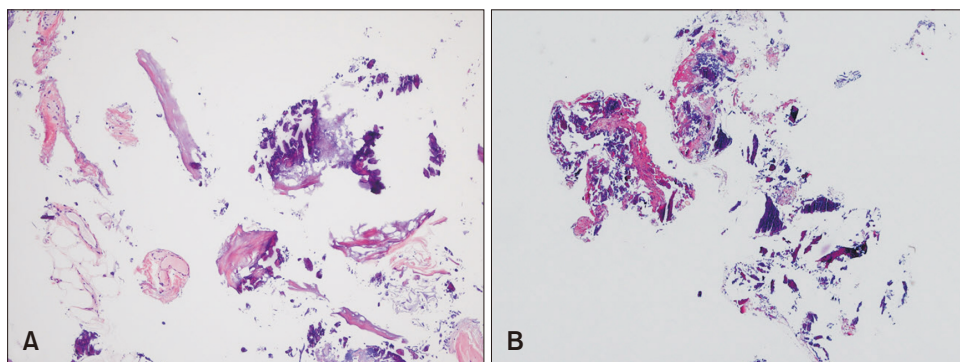
Cutaneous calcifications are one of the common dermatologic entities diagnosed on ultrasonography. On sonography, calcium deposits are hyperechoic and are visible as posterior acoustic shadows, since the sound waves cannot penetrate the surface of highly dense calcium deposits<sup>5</sup>. Pilomatricomas, calcified epidermal cysts, and foreign body reactions should be also considered in the differential diagnosis because they can exhibit features of cutaneous calcifications on ultrasonography<sup>6</sup>. Even though diagnosis of calcinosis cutis is confirmed by histopathologic findings, by correlating the ultrasonographic features of the lesion with the patient's clinical features and medical history, clinicians can narrow down the probable diagnosis quite accurately<sup>7</sup>. In both our cases, two patients showed no evidence of connective tissue diseases, metabolic disorders and trauma history. Sonography of both cases showed linear hyperechoic deposits with a posterior acoustic shadow, which supported the diagnosis of calcinosis



**Fig. 1.** Clinical presentation in case 1. (A, B) A skin-colored hardly palpable subcutaneous nodule on the right lower leg.



**Fig. 2.** Ultrasound image. (A) Linear hyperechoic deposits located in the subcutaneous tissue and observed as a posterior acoustic shadow in case 1. (B) Four weeks after curettage, hyperechoic deposits recurred in case 1. (C) Same finding with case 1 in case 2.



**Fig. 3.** Histopathologic findings. (A) Skin biopsy of the lesion showing basophilic calcified materials in the subcutaneous tissue in case 1 (H&E,  $\times 100$ ). (B) Skin biopsy of the lesion showing basophilic calcified materials in the subcutaneous tissue in case 2 (H&E,  $\times 100$ ).



**Fig. 4.** Clinical presentation in case 2. A skin-colored deep-seated nodule on the left temple (dashed circle).

cutis.

The objective information obtained on ultrasonography can help in diagnosing the lesion and deciding its further

evaluation or treatment. In our cases, the lesion could be felt only on palpation. However, using sonography, the precise location of the subcutaneous lesion and its characteristics was obtained. Although calcinosis cutis is diagnosed based on histopathologic findings, location of the lesion or the patient's general condition could make it difficult to perform biopsy. Therefore, the diagnosis is often supported by clinical manifestations and sonographic findings. In addition to the diagnostic value, ultrasonography can be used to evaluate treatment efficacy. Follow-up ultrasonographic examination (4 weeks after the curettage) demonstrated recurrence (Fig. 2B), and the patient was referred to the plastic surgery department. Due to the speed and noninvasiveness of ultrasonography, dermatologists can obtain real-time results and achieve long-term treatment efficacy without discomfort to the patient.

Furthermore, ultrasonography has recently been used as an interventional aid in dermatology<sup>8</sup>. It can guide dermatologists to perform therapeutic interventions effectively and safely. Hadian et al.<sup>9</sup> successfully treated a ganglion cyst under ultrasound guidance during a single visit to the point-of-care center. In addition, ultrasonography can be used in cosmetol-

ogy. For example, during filler injections, adverse events can be prevented by performing ultrasonography pre- and postoperatively. Moreover, adverse events such as abscesses or vascular compromise can be identified immediately<sup>10,11</sup>.

As seen from our cases and the above review, the use of ultrasonography in dermatology should be emphasized. Its noninvasiveness and cost-effectiveness provide significant benefits for both dermatologists and patients. Moreover, the successful use of ultrasonography depends on the experience and proficiency of clinicians. Therefore, dermatologists should be knowledgeable and proficient in performing ultrasonography.

### CONFLICTS OF INTEREST

The authors have nothing to disclose.

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