SKIN

BRIEF ARTICLE

A Rare Case of Auricular Cartilage Calcification Secondary to Actinic Damage

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ABSTRACT

Introduction: Auricular cartilage calcification, commonly referred to as "petrified ears," is a rare phenomenon characterized by progressive hardening of the auricular cartilage. While this condition is typically associated with endocrinopathies, metabolic disorders, or environmental insults such as frostbite or trauma, chronic actinic damage as a primary etiology has been infrequently reported. We present a case of auricular cartilage calcification in which chronic actinic skin damage was the most likely contributing factor.
Case Report: A 54-year-old male with a history of coronary artery disease and hyperlipidemia presented with progressive bilateral auricular induration without associated pain, systemic symptoms, or prior trauma. Examination revealed rigid auricles with overlying scale, consistent with chronic actinic damage. Histopathologic evaluation of a 3 mm punch biopsy demonstrated focal calcium deposition within the auricular cartilage and surrounding dermis, confirmed by Von Kossa staining. Given the absence of systemic symptoms, normal laboratory findings, and a history of bilateral actinic keratoses of the ears, actinic damage was determined to be the most likely etiology. The patient declined further laboratory workup, and no additional intervention was pursued.
Discussion: This case highlights an uncommon etiology of auricular cartilage calcification, a rare condition most often associated with systemic disease or mechanical injury. While actinic damage has been proposed as a potential contributing factor in prior reports, few cases have directly implicated chronic sun exposure as the primary mechanism. Recognition of this presentation is essential for accurate diagnosis and appropriate management, particularly in patients without a history of trauma or systemic disease.

INTRODUCTION

Calcification of the auricular cartilage, often referred to as “petrified ears,” is a rare phenomenon which presents with hardening of the auricular cartilage, usually in the absence of other symptoms.[1,2 The] etiology of this condition varies, though frostbite is thought to be the most common trigger. Other etiologies include mechanical trauma and inflammation from overlying actinic skin damage. Several systemic associations have been described, including adrenal insufficiency, diabetes mellitus, sarcoidosis, ochronosis, acromegaly, hypopituitarism, and hypothyroidism.[2]

The pathogenesis of auricular calcification or ossification in this condition is etiology-dependent. In patients with elevated serum calcium and phosphorus, the calcification may be classified as metastatic. Alternatively, dystrophic calcification is typically seen in the setting of trauma or inflammation with normal serum calcium levels.[1] Ultimately, both processes lead to ectopic deposition of calcium or salt-related compounds, which in the case of petrified ears may be visualized via x-ray/CT scan and/or histology.[3] Of note, tissue biopsy helps distinguish calcification from ossification, a clinically identical phenomenon.[2]

While actinic damage is recognized as an etiological agent across the literature, we only identified one prior case report describing this mechanism.[4] Notably, the patient in the previously described case also had a history of frostbite and trauma to the ear.[4] We therefore present a rare case of auricular cartilage calcification in which chronic actinic skin damage likely contributed to the pathogenesis.

CASE PRESENTATION

A 54-year-old male with a past medical history significant for coronary artery disease, hyperlipidemia, atrial fibrillation, and obstructive sleep apnea presented for evaluation of bilateral non-painful "hardening" of his ears, denying any associated symptoms or previous trauma to the area. On examination, the ears were rigid with diffuse scaling, suggesting chronic sun exposure (**Figure 1A, 1B**). Actinic keratoses of both ears were treated with liquid nitrogen at his last 2 visits, the first being 3 years prior to presentation and the most recent being one year prior. He denied any associated symptoms or previous trauma to the area, including elemental cold exposure. A 3 mm punch biopsy was obtained to diagnose the lesion and rule out calcinosis cutis or gout.

Figure 1. (A) and (B**)** Left ear with diffuse scaling and stony hard rigidity on palpation

The biopsy revealed focal calcium deposition within the dermis and cartilage (**Figure 2A**) and the Von Kossa calcium stain showed calcification of the auricular cartilage and surrounding dermis (**Figure 2B**). These findings were consistent with calcification of the auricular cartilage, and an x-ray was recommended for further confirmation. The patient elected for no further laboratory workup, though previous results were not suggestive of underlying systemic disease [serum calcium 9.2 mg/dL; corrected calcium 9.04 mg/dL (collected one year prior)]. This is further supported by a lack of systemic symptoms classically seen in associated endocrine or autoimmune conditions, specifically fatigue, gastrointestinal distress, or muscle weakness. In addition, a computed tomography scan of the head from 2 years prior revealed focal calcification of auricular cartilage at that time (**Figure 3**). Based on the patient's history of bilateral actinic keratoses of the ears and lack of previous trauma or systemic signs/symptoms, we determined actinic damage to be the most likely etiology. No further treatment was recommended or pursued at the time but may be considered in the future if desired or the patient becomes symptomatic.

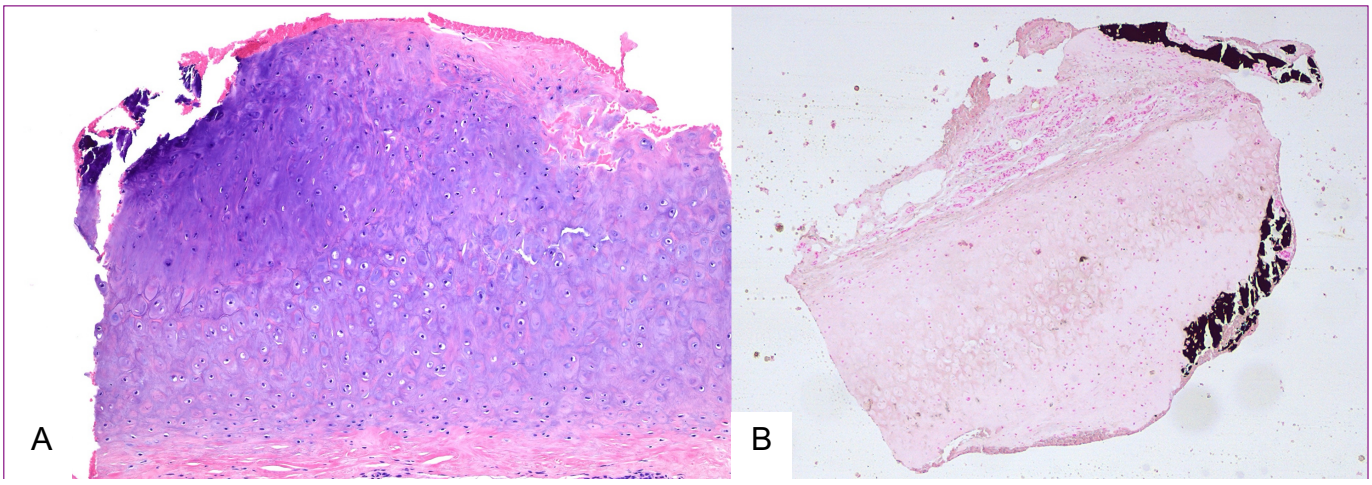

Figure 2. (A) H&E showing focal calcification of the auricular cartilage (100X) (B) Von Kossa calcium stain showing calcification of the auricular cartilage and surrounding dermis (40X)

DISCUSSION

This case describes a rare etiology of a rare phenomenon, as few cases have described auricular cartilage calcification secondary to actinic damage. Though the mechanism has not been fully described, we suspect that the pathological changes from chronic sun exposure (i.e. reactive oxygen species and DNA damage) and resultant inflammation/injury lead to dystrophic calcification in our patient.[5] While we considered a possible contributory role of prior cryotherapy treatment, it is unlikely that superficial liquid nitrogen could explain the extent of calcification found in this patient.

Currently, there are no well-established protocols for systemic workup in patients with auricular cartilage calcification. Providers often use the patient's history and clinical presentation to determine whether further evaluation is warranted. In our case, the clinical picture did not indicate an underlying systemic cause, so the decision not to pursue laboratory workup was based on patient preference. If screening for systemic

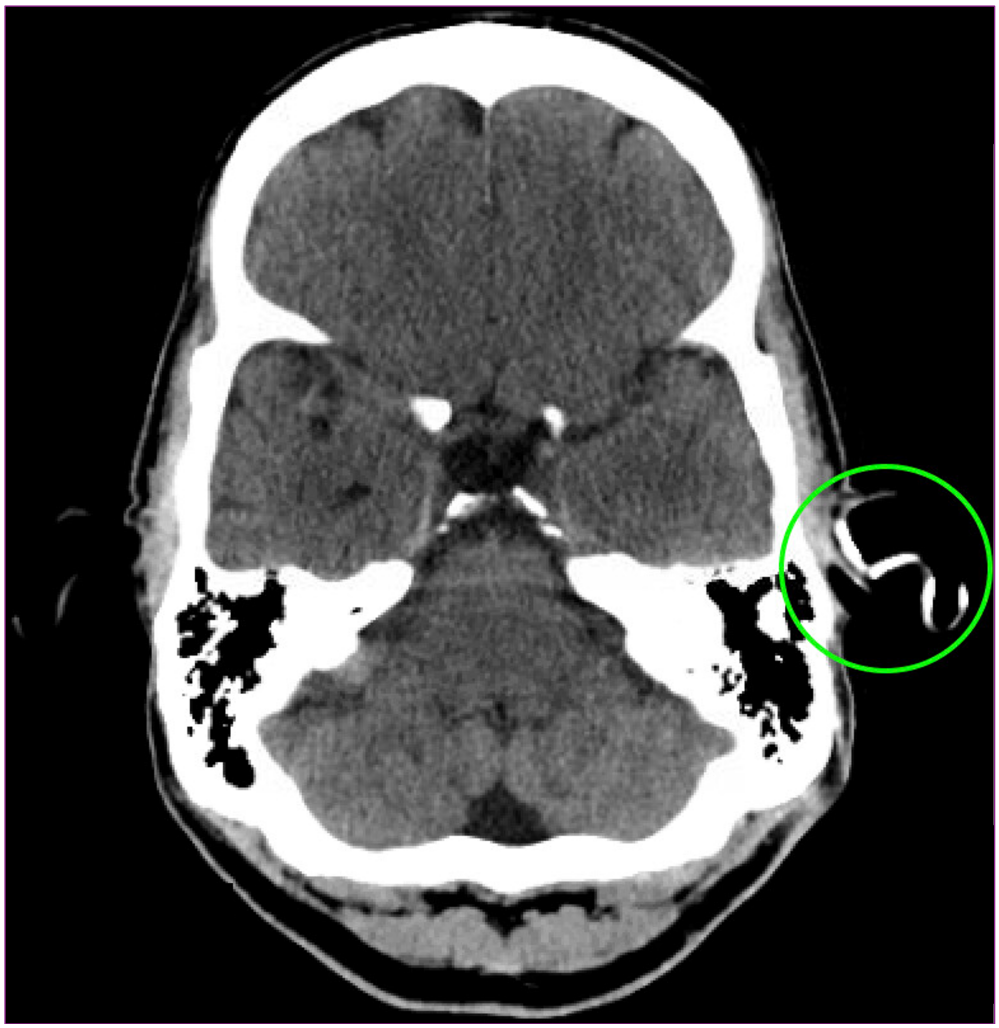

Figure 3. CT scan demonstrating calcification of the left auricular and external ear canal cartilage

conditions is indicated, next steps may include obtaining laboratory values for complete blood count, complete metabolic profile, TSH, vitamin D and serum phosphorus. Additionally, parathyroid hormone, parathyroid hormone-related protein, and cortisol levels could be considered if hypothyroidism, hypopituitarism or adrenal insufficiency are suspected.

Treatment of auricular calcification is patient dependent and often involves addressing the underlying disease process when indicated.[1] For asymptomatic patients, observation is normally sufficient, but surgical reduction is an option for those experiencing pain or discomfort.[7] Our report of auricular cartilage calcification secondary to actinic damage is only the second case we could identify of this nature. We hope this case can enhance clinical suspicion for calcification of the auricular cartilage in patients with a similar presentation.

Conflict of Interest Disclosures: None

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References:

1. Clarke JT, Clarke LE, Miller JJ. Petrified ears: calcification of the auricular cartilage. *J Am Acad Dermatol*. 2004;51(5):799-800. doi:10.1016/j.jaad.2004.06.035
2. Stites PC, Boyd AS, Zic J. Auricular ossificans (ectopic ossification of the auricle). *J Am Acad Dermatol*. 2003;49(1):142-144. doi:10.1067/mjd.2003.320
3. Aw J, Davies R, Cook JL. Stone deaf: the petrified ear—case report and review of the literature. *Radiol Case Rep*. 2015;6(2):430. doi:10.2484/rcr.v6i2.430
4. Pastor-Jane L, Martinez-Gonzalez S, Martin-Munoz L, Pujol-Montcusi J. Petrified ear with cartilage ossification and calcification. *J Am Acad Dermatol*. 2015;72(5):AB57. doi:10.1016/j.jaad.2015.02.239
5. Rstom S, Abdalla B, Blumetti T, Matos L, Pinhal M, Paschoal F. Dermoscopy and reflectance confocal microscopy in actinic keratosis, intraepithelial carcinoma, and invasive squamous cell carcinoma. *J Drugs Dermatol*. 2022;21(3):259-268. doi:10.36849/JDD.5086
6. Lee DH, Lim SC. Bilateral auricular and external ear canal cartilage calcification. *Ear Nose Throat J*. Published online June 11, 2022. doi:10.1177/01455613221103076
7. Gogate Y, Gangadhar P, Walia RR, Bhansali A. “Petrified ears” with idiopathic adult-onset pituitary insufficiency. *Indian J Endocrinol Metab*. 2012;16(5):830-832. doi:10.4103/2230-8210.100649