Invisible palmar needles: thyroid disorder-associated spiny keratoderma and the importance of proper light for visualization

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Abstract

Spiny keratoderma is a rare skin condition that presents on the palmar and plantar surfaces of the hands and/or feet. This condition is difficult to appreciate under ambient lighting but can be both physically and emotionally distressing to patients. Furthermore, because of the association with various neoplasms and systemic diseases, timely diagnosis and appropriate follow-up is of importance. We evaluate a case of spiny keratoderma in a patient with recently diagnosed hypothyroidism and emphasize the importance of proper lighting during a dermatology-focused physical examination. The patient's palmar lesions were only appreciable under LED light and with physical examination. A biopsy of the lesions confirmed the diagnosis of spiny keratoderma.

Keywords: hypothyroidism, keratoderma, neoplasm

Introduction

Spiny keratoderma is a rare condition characterized by the presence of numerous small, hyperkeratotic papules on the palmar surface of the hands and or plantar surface of the feet. Also referred to as music box spine dermatosis, this dermatologic condition can display an autosomal dominant pattern of inheritance or present as an acquired condition associated with various neoplasms and systemic disease [1]. The exact mechanism of the disease is unknown. Although there are 37 cases of spiny keratoderma reported in literature [2], herein we report a case of spiny keratoderma presenting with associated thyroid disease. This study also highlights the importance of appropriate lighting for visualization of this condition.

Case Synopsis

A 65-year-old woman presented to her primary care provider (PCP) for the recent development of sharp lesions on the palms of her hands. The patient described these new lesions as incredibly sharp and disturbing, producing a needle-like sensation when brushing her hands against her face or other parts of her body. Furthermore, she explained that because the lesions are difficult to visualize, people often assume that she is fabricating her symptoms.

The patient's recent past medical history was significant for a cardiac ablation for paroxysmal atrial fibrillation as well as a history of smoking. Her PCP performed a detailed physical examination and ordered blood work, including a complete blood count, complete metabolic panel, and thyroid stimulating hormone level. Following this visit with her PCP, she was diagnosed with hypothyroidism and referred to dermatology clinic for further work-up and characterization of her dermatologic symptoms.

On presentation to the dermatology clinic, she explained that her palmar lesions were not pruritic, but the sharpness of the projections significantly bothered her. The patient briefly attempted to treat

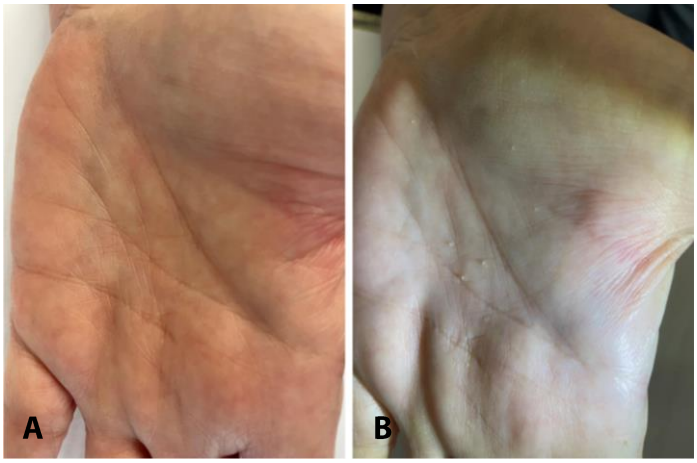

Figure 1. *Clinical image of left ventral hand.* ***A)*** *No dermatologic findings in ambient light.* ***B)*** *Multiple, spiny projections on the palmar and thenar surface when viewed under white LED light.*

these lesions with salicylic acid but had little success. No medication changes preceded her symptoms. She reported that her daughter also has similar palmar lesions and has a past medical history significant for Hashimoto thyroiditis.

On physical exam, the patient's skin initially appeared grossly normal. However, upon palpation of the patient's palms, sharp spicules were discernible bilaterally. A white LED flashlight was then employed to make these sharp areas more prominent (**Figure 1**). No plantar lesions were present. The remainder of the physical examination was unremarkable. A shave biopsy (**Figure 2**) of these projections was consistent with spiny keratoderma.

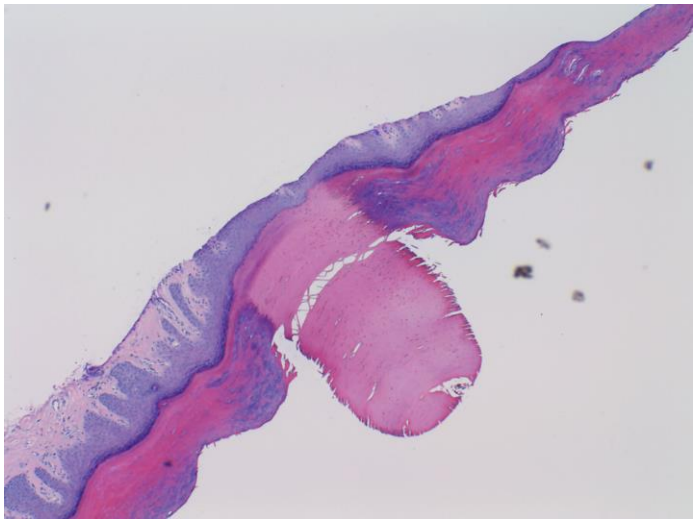

Figure 2. *Histological image from biopsy showing a distinct column of orthokeratosis with underlying hypogranulosis.*

Following her diagnosis of spiny keratoderma, a review of age-appropriate cancer screenings was performed. The patient's most recent chest X-ray and mammogram were both normal and a recent colonoscopy was significant only for a benign colorectal polyp. Ultimately, the patient's palmar lesions were treated with topical 0.1% triamcinolone ointment and tretinoin 0.25% cream. Although this case report provided insight into both the presentation and proper evaluation of spiny keratoderma, it was limited by a lack of pertinent, patient follow-up information, including treatment efficacy or disease remission.

Case Discussion

Spiny keratoderma exhibits a bimodal age distribution at diagnosis with incidence peaks occurring at less than 20 years of age and 60 years of age [3]. The hereditary form of the disease presents in younger populations, whereas the acquired form presents in older populations. The acquired form of the disease appears to be associated with various systemic diseases such as asthma, type two diabetes mellitus, polycystic kidney disease, type IV hyperlipoproteinemia, and Darier disease [2]. Furthermore, roughly 30% of cases were associated with various malignancies, including renal cell carcinoma, bronchial carcinoma, pulmonary adenocarcinoma, rectal carcinoma, breast carcinoma, nodular melanoma, myelofibrosis, multiple myeloma, leukemia, and lymphoma [2,3].

It is imperative that patients diagnosed with spiny keratoderma undergo a comprehensive work-up to rule out underlying malignancy. Additional screening modalities that should be considered when working up an acquired case of spiny keratoderma include: a colonoscopy or equivalent colon cancer screening modality, full body skin examination, low-dose CT of the lungs if risk factors, mammography, and Pap smear. Two studies even describe cases of spiny keratoderma remission after successful treatment of cancer [4,5]. However, there is no official malignancy work-up consensus at this time [5-7].

Spiny keratoderma can manifest as sharp spicules on the palms and or soles of the feet. Histologically,

spiny keratoderma is characterized by columns of parakeratotic cells in the stratum corneum with underlying hypogranulosis and epidermal depression beneath the column. The surrounding epidermis, including the stratum corneum, appears to be histologically normal. Characteristically, adjacent blood vessels are normal and no dyskeratosis or vacuolization is observed [3]. This condition must be differentiated from other conditions morphologic and histologic mimics including: arsenical keratosis [8], multiple filiform verrucae [9], palmoplantar porokeratosis [10], punctate palmoplantar keratoderma [11], acrokeratoelastoidosis [12], and nevus basal cell carcinoma [13, 14], (**Table 1**).

Spiny keratoderma spicules can be difficult to visualize with the artificial, unpolarized light employed in standard examination rooms, but can be better appreciated with the use of dermoscopy, characteristically revealing numerous round, white-to-yellow hyperkeratotic spicules [15]. It should be noted that LED lights can also serve as a cost-effective alternative to dermatoscopes as LED light is partially polarized, rendering it more comparable to natural white daylight, the gold standard lighting for total body skin examinations [16]. Ultimately, the diagnosis is confirmed with biopsy and histologic evaluation.

Although a single effective treatment option has not been fully elucidated, various pharmacotherapies have been trialed including topical and oral retinoids or emollients containing salicylic acid, urea, ammonium lactate, propylene glycol, or 5-fluorouracil [17]. Additionally, mechanical debridement, including paring and dermabrasion, can be considered. Ultimately, treatment results have demonstrated considerable variability in efficacy [18].

Conclusion

Spiny keratoderma is a rare dermatologic condition. Although the projections are generally asymptomatic, they can cause physical and emotional discomfort for the patient. A proper physical examination of these lesions requires adequate lighting to visualize the projections. The association with a variety of neoplasms and systemic diseases underscores the importance of timely diagnosis and adequate follow-up regarding age-appropriate and possibly additional malignancy screenings. In conclusion, we present a case of spiny keratoderma associated with thyroid disease. Furthermore, we note the importance of the appropriate use of light for the evaluation and diagnosis of this rare condition.

Potential conflicts of interest

The authors declare no conflicts of interest.

References

1. Corral M, Paret C, Iglesias M, et al. Spiny keratoderma. *Dermatol Online J*. 2020;26. [PMID: 33054945].
2. Chee SN, Ge L, Agar N, Lowe P. Spiny keratoderma: case series and review. *Int J Dermatol*. 2017;56:915-9. [PMID: 28681429].
3. Dokic Y, Tschen J. Spiny Keratoderma of Nonfamilial Nature and Without Systemic Disease in a Woman. *Cureus*. 2019;11:e5609. [PMID: 31700722].
4. Rosina P, Papagrigoraki A. Palmar filiform hyperkeratosis. *Int J Dermatol*. 2012;51:1483-4. [PMID: 22834644].
5. Campbell EH, Becknell C. Spiny keratoderma exposes underlying renal cell carcinoma. *JAAD Case Rep*. 2018;4:382-3. [PMID: 29693077].
6. Dominguez-Santas M, Diaz-Guimaraens B, Burgos-Blasco P, et al. Spiny keratoderma, a late COVID-19 manifestation? *Int J Dermatol*. 2021;60:e472-e3. [PMID: 34494273].
7. Apurwa A, Desai C, Agarwal S, Patil S. Spiny keratoderma: The gritty tale. *Indian J Dermatopathol Diagn Dermatol*. 2018;5:124-6. [DOI: 10.4103/ijdpdd.ijdpdd_41_18].
8. Shajil C, Mahabal GD. Arsenical Keratosis. In: StatPearlsTreasure Island (FL); 2022.
9. Al Aboud AM, Nigam PK. Wart. In: StatPearlsTreasure Island (FL); 2022.
10. Vargas-Mora P, Morgado-Carrasco D, Fusta-Novell X. Porokeratosis: A Review of Its Pathophysiology, Clinical Manifestations, Diagnosis, and Treatment. *Actas Dermosifiliogr (Engl Ed)*. 2020;111:545-60. [PMID: 32401728].
11. Dev T, Mahajan VK, Sethuraman G. Hereditary Palmoplantar Keratoderma: A Practical Approach to the Diagnosis. *Indian Dermatol Online J*. 2019;10:365-79. [PMID: 31334055].
12. Xu CC, Fu LY, Lin D, et al. A case of acrokeratoelastoidosis. *Clin Exp Dermatol*. 2018;43:819-20. [PMID: 29761526].
13. Lo Muzio L. Nevoid basal cell carcinoma syndrome (Gorlin syndrome). *Orphanet J Rare Dis*. 2008;3:32. [PMID: 19032739].
14. Bresler SC, Padwa BL, Granter SR. Nevoid Basal Cell Carcinoma Syndrome (Gorlin Syndrome). *Head Neck Pathol*. 2016;10:119-24. [PMID: 26971503].

15. Gironi LC, Landucci G, Cammarata E, et al. Neoplasia-related spiny keratoderma: Dermoscopic findings of two cases and a literature review. *Australas J Dermatol*. 2021;62:e393-e6. [PMID: 34110015].
16. Hanlon KL. Cross-polarised and parallel-polarised light: Viewing and photography for examination and documentation of biological materials in medicine and forensics. *J Vis Commun Med*. 2018;41:3-8. [PMID: 29318893].
17. Hiraldo-Gamero A, Gordillo Chaves J. Filiform palmoplantar papules. *Actas Dermosifiliogr*. 2013;104:819-20. [PMID: 23827341].
18. Torres G, Behshad R, Han A, et al. "I forgot to shave my hands": A case of spiny keratoderma. *J Am Acad Dermatol*. 2008;58:344-8. [PMID: 18068266].

Table 1. *Morphologic and histologic descriptions of the "mimics" of spiny keratoderma.*

Condition	Morphology	Key Histologic Features
Arsenical keratosis [8]	Yellow, hyperkeratotic papules and plaques affecting the palms of the hands and soles of the feet. Associated with arsenic exposure	Classic Features: acanthosis, parakeratosis and prominent, compact hyperkeratosis. +/- Vacuolated keratinocytes Papillomatosis
Multiple filiform verruca [9]	Long and narrow "frond-like" growths, often present on the face, eyelids, lips, or neck. Can present on the palms and soles	Prominent papillomatosis Koilocytic cells are pathognomonic
Palmoplantar porokeratosis [10]	Brown, erythematous papules or plaques of various sizes and shapes that displays centrifugal growth and is present on the palms and soles	Cornoid lamella (Columns of parakeratotic cells)
Punctate palmoplantar keratoderma [11]	Multiple, small asymptomatic punctate keratoses on the palms and soles. Can present with nail findings such as notching or ridging	Hyperkeratosis with epidermolysis
Acrokeratoelastoidosis [12]	Flat-topped keratotic papules and plaques affecting the hands and feet	Hyperkeratosis of epidermis Mild acanthosis
Nevoid basal cell carcinoma [13, 14]	Palmar and/or plantar flesh-colored papules with distinctive pits	Multiple incidental minute buds of early superficial BCC