

The Appearance of Pili Annulati Following Alopecia Areata

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Pili annulati is a rare autosomal-dominant hair shaft abnormality. It is characterized by alternating light and dark bands along the shaft due to air-filled cavities within the cortex of the hair shaft. Alopecia areata has been previously described as a common association with pili annulati, with improvement in alopecia areata coinciding with resolution of pili annulati. We report the case of a patient with a history of alopecia areata and alopecia universalis who developed the characteristic banded hair of pili annulati upon resolution of her alopecia areata. We provide direct microscopic examination of postregrowth hairs compared to normal and cross-polarized light microscopy.

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Case Report

A 31-year-old white woman presented with intermittent alopecia areata and alopecia universalis with loss of scalp, eyebrow, eyelash, axillary, and pubic hair of 15 years' duration. The patient had reported that prior to developing alopecia, she had completely normal hair. She stated that in the 3 years prior to presentation, she was treated with intralesional and intramuscular triamcinolone acetonide with partial regrowth of the scalp, axillary, and pubic area. Her medical history was notable for hepatitis B virus, a hiatal hernia, and gastroesophageal reflux disease for which she was

taking omeprazole. She was otherwise healthy and reported no other nail, hair, or scalp changes. Her family history was positive for eczema, but she denied a history of psoriasis or any dermatologic malignancy. Initial examination of the scalp revealed a 6×2-cm area of alopecia with exclamation point hairs at the periphery. A clinical diagnosis of alopecia areata was made. The patient was given a 40-mg intramuscular dose of triamcinolone acetonide and also was prescribed clobetasol propionate gel 0.05% that she was directed to apply once daily to the affected areas of the scalp. On the 6-week follow-up as well as 3 subsequent visits over the course of 8 to 10 months, the patient showed improvement of her alopecia with remarkable regrowth. She did not return for another examination until approximately 4 years later.

On examination 4 years later, 2 patches of alopecia were noted that were 4×6 and 2×3 cm. On this visit, she received a 40-mg intramuscular dose of triamcinolone acetonide. Over the course of the following 1.5 years, she received a total of 8 intramuscular injections (40 mg each) and she experienced complete hair regrowth. Six months after the final triamcinolone acetonide injection, the patient reported pruritus on her scalp and on examination was found to have 3 discrete areas of nonscarring alopecia with exclamation point hairs at the periphery. The vertex of her scalp was found to have hairs showing alternating light and dark bands that were consistent with pili annulati (Figure).

Comment

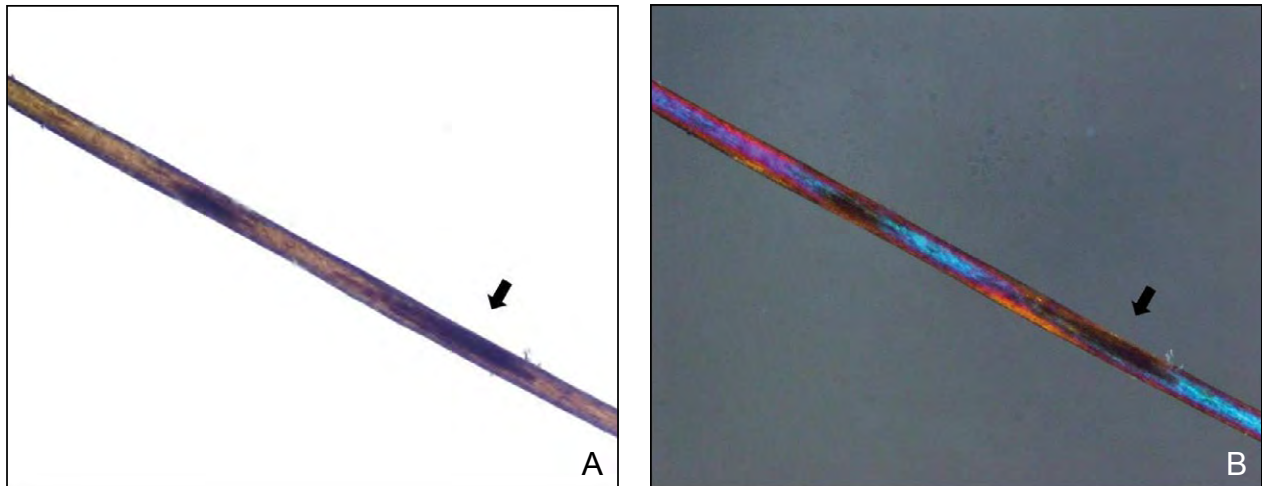
Pili annulati is an autosomal-dominant inherited hair disorder that is caused by an anomaly in keratin formation. The presentation of pili annulati may initially occur at birth or during infancy and may affect facial or axillary hair.

In pili annulati, the characteristic alternating light and dark bands appear in relationship to how light is scattered due to abnormal air-filled cavities in the hair shaft. Light microscopic examinations previously

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Examination of patient hair under light microscopy, with darker areas representing cavitation within the cortex of the hair shaft (A). Examination of patient hair under polarized light microscopy (B). The arrows point to air spaces.

have revealed that the cavities typically range in size from less than 1 μm to 10 μm or greater.¹ Light microscopy may not highlight the subtle differences as well as polarized light microscopy. Polarized light microscopy is preferred over light microscopy because of the varying phenotypes within the same individual that may be encountered that may diminish detection when only light microscopy is used.²

Alterations in basement membrane zone components in scalp sections of hair from patients with pili annulati have been viewed with transmission electron microscopy.³ Transmission electron microscopy studies have shown reduplication of lamina densa in the root bulb.⁴ Immunohistochemical studies of other scalp sections have revealed the presence of wavy basement membrane zone follicles showing antibodies to components of the lamina lucida and lamina densa as well as the anchoring fibrils. However, studies of epithelial cytokeratins have failed to illustrate an immunohistochemical difference in pili annulati and control specimens.⁴ Green et al⁵ identified a genetic locus for pili annulati mapped to the telomeric region of chromosome 12, with further studies linking it to 12q24.32-24.33.⁶

Alopecia areata is regarded as a common hair disorder in contrast to pili annulati. Smith et al⁷ reported a 19-year-old man with a lifelong history of banded hair who ultimately experienced progressive hair loss. Following treatment with topical minoxidil and intralesional triamcinolone acetonide injections, the patient experienced new hair growth that was hypopigmented and did not show the prior spangled appearance. It was postulated that minoxidil may have redirected the follicle toward the production of

a normal matrix protein resulting in phenotypically normal hair.⁷

Amichai et al⁸ also reported an adult patient with pili annulati since childhood without a personal history of alopecia areata but with a family history of alopecia areata experienced by the patient's mother and brother. Additionally, there has been a report of a patient with pili annulati whose hair retained the banded appearance even after an episode of alopecia areata.⁹ The mother of this patient stated that she had similar hair all of her life with the pili annulati hair becoming more pronounced with the development of white hair, without actually experiencing alopecia areata. Green et al¹⁰ described a case of pili annulati that disappeared following an episode of alopecia areata. In this case, the patient had banding of her hair since 2 years of age, developing alopecia areata at 3 years of age and subsequently alopecia totalis. Complete spontaneous regrowth of her hair occurred with pili annulati hair no longer being visible.¹⁰

Pili annulati has been reported to resolve after alopecia areata and coincident with alopecia areata. We describe a patient with a prior history of completely normal hair who developed pili annulati after complete resolution of alopecia areata.

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