FLOTCH Syndrome: A Case of Leukonychia Totalis and Multiple Pilar Cysts

Meghan Mansour, BS; Ryan Brothers, DO; Ross Brothers, MD

PRACTICE **POINTS**

- FLOTCH (leukonychia totalis-trichilemmal cysts-ciliary dystrophy syndrome) syndrome is an extremely rare condition that presents with multiple pilar cysts and leukonychia totalis. Pilar cysts in unusual locations along with distinct nail changes should prompt clinicians to consider further investigation for conditions such as FLOTCH syndrome.
- Although FLOTCH syndrome has been associated with other conditions such as ciliary dystrophy, renal calculi, pancreatitis, and central nervous system tumors, this does not preclude an extensive workup. Rather, careful family history may be the best predictor of clinical manifestations along the spectrum of this disease.

FLOTCH (leukonychia totalis-trichilemmal cysts-ciliary dystrophy syndrome) syndrome is a rare genetic cutaneous disorder primarily characterized by multiple recurrent trichilemmal pilar cysts and leukonychia. It may be associated with ciliary dystrophy, koilonychia, and/or less frequently renal calculi and pancreatitis inherited in an autosomal-dominant fashion. We report the case of a 25-year-old Black woman who presented with white-colored fingernails and enlarging cysts in multiple locations including the scalp, rib cage, and forearm and was diagnosed with suspected FLOTCH syndrome. Pilar cysts in unusual locations along with distinct nail changes should prompt clinicians to consider further investigation for conditions such as FLOTCH syndrome.

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Case Report

A 25-year-old Black woman with no notable medical history presented to the clinic for a surgical evaluation of cysts of several years' duration that were enlarging

From the Oakland University William Beaumont School of Medicine, Rochester, Michigan. Dr. Ryan Brothers and Dr. Ross Brothers also are from Northwest Dermatology Group, Bingham Farms & Washington Township, Michigan, and the Michigan State University College of Human Medicine, East Lansing.

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Correspondence: Meghan Mansour, BS, Oakland University William Beaumont School of Medicine, 586 Pioneer Dr, Rochester, MI 48309 (meghanmansour@oakland.edu).

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and tender. Physical examination revealed multiple firm, fixed, tender nodules on the left superior parietal scalp, left inferior frontal scalp (Figure 1A), right inferior parietal scalp, right central postauricular skin, and right inferior occipital scalp. Similar-appearing cysts measuring 1.5 to 2 cm were seen on the left rib cage (Figure 1B) and left lateral forearm. Upon further examination, there was homogeneous, nonblanchable, white discoloration of all 10 fingernails consistent with true leukonychia (Figure 1C). When questioned about the nails, the patient stated they had been this color her whole life. Moreover, the patient confirmed that her brother's nails had a similar appearance.

The patient subsequently underwent elliptical excision of the cysts located on the left medial forehead and left rib cage, and histopathology revealed trichilemmal pilar cysts with dystrophic calcification, dermal fibrosis, and mild chronic inflammation (Figure 2). The pathology report also noted that the anatomic site was somewhat unusual; however, the features were otherwise typical and diagnostic. Given the presentation of multiple pilar cysts throughout the body, leukonychia totalis, and positive family history, the patient was diagnosed with FLOTCH syndrome. Unfortunately, the patient was lost to follow-up following the excision, and no further management could be provided.

Comment

Leukonychia is an abnormality of the nail that results in a visible distribution of white color across the nail plate. It can be classified as *totalis* when covering the entire nail or *partialis* when covering localized areas of the nail. The disease also is categorized as acquired or inherited. Acquired leukonychia may appear after damage to a particular area of the nail or secondary to an underlying systemic disease, clinically appearing as white puncta or transverse striae. Hereditary leukonychia is rare, primarily covering the entire nail (totalis), and often is inherited in an autosomal-dominant pattern.[3,4] The appearance of this disease can be an isolated occurrence or may be a component of a condition such as FLOTCH syndrome, as proposed in this case.

Pilar cysts (also known as trichilemmal cysts) are benign, slowly growing, firm, subcutaneous nodules that are similar to epidermoid cysts but arise from the root sheaths of hair follicles. Pilar cysts are inherited in an autosomal-dominant pattern and are caused by a mutation involving a 2-hit mechanism of variants of the phospholipase C delta 1 gene, *PLCD1*. Patients typically present with multiple cysts,[5] as in our case.

This association of leukonychia and multiple pilar cysts previously has been reported in 7 family lines.[1-3,6-9] The molecular basis of FLOTCH syndrome is unknown, and these combined diagnoses may be of syndromic nature. Histologic observations of leukonychia and the mechanism of the creation of pilar cysts suggest derivation from similar abnormal keratinization in the nail beds and hair follicles, respectively.[6]

The first familial association between leukonychia totalis and sebaceous cysts was described by Bauer[2] in 1920. In 1975, Bushkell and Gorlin[7] reported a similar inherited association with the addition of a history of renal calculi. In 1986, Friedel et al[1] coined the term *FLOTCH syndrome* when reporting a case of an affected family presenting with leukonychia, recurrent cysts, and ciliary dystrophy. Slee et al[8] reported 2 cases of pancreatitis experienced by patients presenting with these cysts and leukonychia. The etiology of the pancreatitis was unknown, leading researchers to believe it may be a complication associated with the spectrum of diseases.[8] In 2008, Morin et al[6] proposed that those with linked leukonychia and trichilemmal cysts may be at risk for neuromas or spinal tumors and suggested systematic screening after observing a family member with an ependymoma and bilateral multiple acoustic tumors. Rodríguez-Lojo et al[3] described a 5-generation family with leukonychia totalis and numerous pilar cysts. Mutoh et al[9] reported another 5-generation family with associated leukonychia and multiple pilar cysts as well as koilonychia. One family member had a reported history of renal calculus.[9]

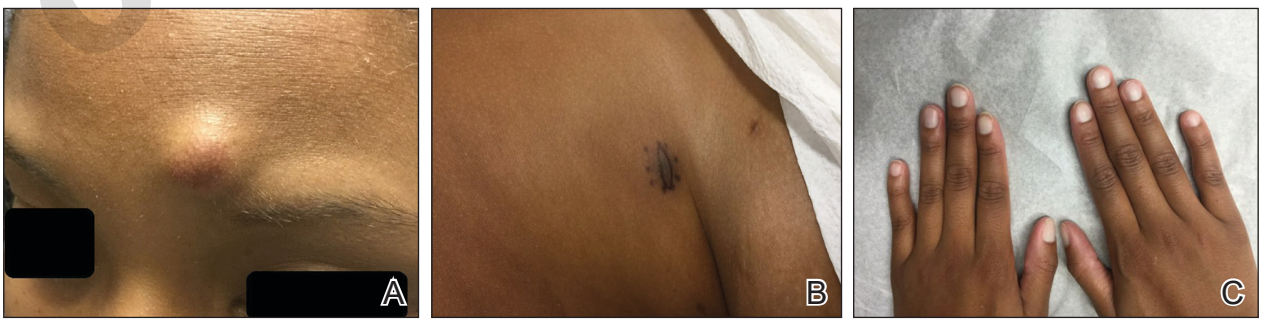

FIGURE 1. FLOTCH (leukonychia totalis-trichilemmal cysts-ciliary dystrophy syndrome) syndrome. A, A well-circumscribed nodule on the left inferior frontal scalp with overlying erythema and no prominent follicular ostia. B, A similar firm, mobile, violaceous nodule on the left rib cage with no follicular ostia. C, Homogeneous rue leukonychia involving all 10 fingernails with no associated onychodystrophy or subungual or periungual hyperkeratosis.

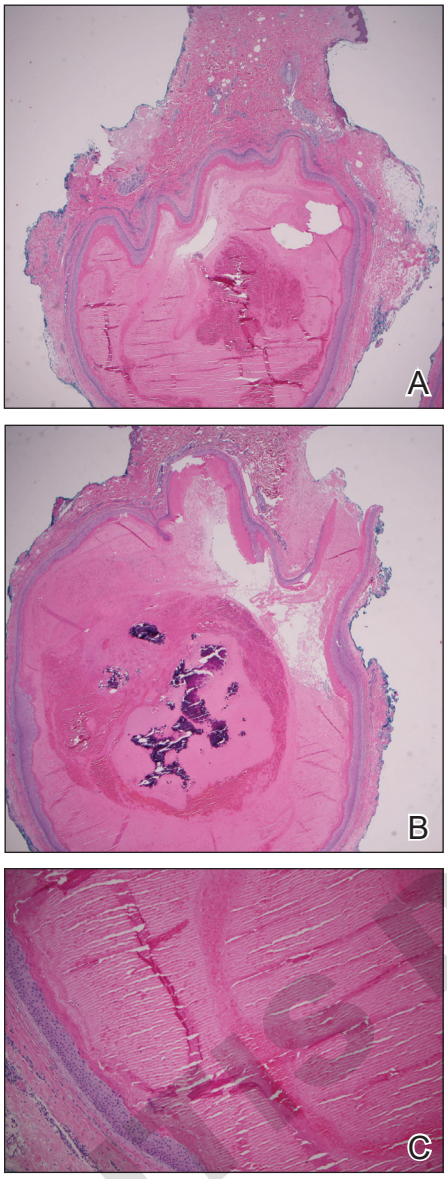

FIGURE 2. A and B, Histopathology of a trichilemmal cyst on the left inferior medial forehead and of a trichilemmal cyst on the left rib cage, respectively, revealed central dystrophic calcification, dermal fibrosis, and mild chronic inflammation (H&E, original magnifications ×40). C, Higher magnification of the cyst on the left rib cage showed abrupt, dense, pink, homogenized keratin with the granular layer missing (H&E, original magnification ×100).

In our case, FLOTCH syndrome was suspected given the patient's concurrent pilar and follicular infundibular cysts. No specific treatment was indicated; however, as seen in prior cases and in ours, many patients prefer to have the cysts excised. A more comprehensive investigation could have revealed other associations, such as ciliary dystrophy, renal calculi, or pancreatitis. It is possible that in conjunction with the syndrome, patients could develop other such clinical manifestations. Pilar cysts most frequently are found on the scalp, yet in patients with concurrent leukonychia, the cysts have been shown to also develop in other regions of the body, as seen in our patient and in the case reported by Mutoh et al.[9] Given the autosomal-dominant nature of this disease and the keratinizing structures affected, we confer with the hypotheses that a general keratin dysfunction is suspected. Further investigation is needed to determine the exact altered genetic mechanism or deficiency that may be causing this abnormal keratinization as well as a more extensive examination of patients to confirm if other described symptoms may be related.

REFERENCES

1. Friedel J, Heid E, Grosshans E. The FLOTCH syndrome. familial occurrence of total leukonychia, trichilemmal cysts and ciliary dystrophy with dominant autosomal heredity [in French]. *Ann Dermatol Venereol*. 1986;113:549-553.
2. Bauer AW. Beiträge zur klinischen Konstitutionspathologie, V. heredofamiliäre leukonychie und multiple atherombilderung der kopfhaut. *Z Menschl Vererb. Konstitutitionslehre*. 1920;5:47-48.
3. Rodríguez-Lojo R, Del Pozo J, Sacristán F, et al. Leukonychia totalis associated with multiple pilar cysts: report of a five-generation family: FLOTCH syndrome? *Eur J Dermatol*. 2011;21:484-486.
4. Claudel CD, Zic JA, Boyd AS. Idiopathic leukonychia totalis and partialis in a 12-year-old patient. *J Am Acad Dermatol*. 2001; 44:379-380.
5. Hörer S, Marrakchi S, Radner FPW, et al. A monoallelic two-hit mechanism in *PLCD1* explains the genetic pathogenesis of hereditary trichilemmal cyst formation. *J Invest Dermatol*. 2019;139:2154-2163.e5.
6. Morin G, Desenclos C, Jeanpetit C, et al. Additional familial case of subtotal leukonychia and sebaceous cysts (Bauer syndrome): belong the nervous tumours to the phenotype? *Eur J Med Genet*. 2008;51:436-443.
7. Bushkell LL, Gorlin RJ. Leukonychia totalis, multiple sebaceous cysts, and renal calculi. *Arch Dermatol*. 1975;111:899-901.
8. Slee JJ, Wallman IS, Goldblatt J. A syndrome or leukonychia totalis and multiple sebaceous cysts. *Clin Dysmorphol*. 1997;6:229-233.
9. Mutoh M, Niiyama S, Nishikawa S, et al. A syndrome of leukonychia, koilonychia and multiple pilar cysts. *Acta Derm Venereol*. 2015; 95:249-250. doi:10.2340/00015555-1893