

Kyrle's Disease

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Kyrle's disease is an acquired perforating dermatosis that is frequently associated with an underlying disorder, such as diabetes mellitus or chronic renal failure. The disease presents as multiple discrete, eruptive papules with a central crust or plug, often on the lower extremities. Histologically, a keratotic plug in an atrophic epidermis is observed and may penetrate the papillary dermis. Importantly, transdermal elimination of keratotic material with no collagen or elastic fibers is noted. Although several therapies have been suggested, the course of Kyrle's disease is often chronic. This article reports an illustrative case of Kyrle's disease and reviews the literature on diagnosis and management.

Kyrle's disease, or hyperkeratosis follicularis et para-follicularis in cutem penetrans, was first described by J. Kyrle in 1916 in a diabetic woman who presented with generalized hyperkeratotic nodules.¹ *Acquired perforating dermatosis* is a term used to describe perforating dermatoses occurring in adult patients. Kyrle's disease, a subtype of acquired perforating dermatosis, is commonly seen in patients with diabetes, renal disease, and, rarely, liver disease. We present a case of Kyrle's disease in a patient with a history of renal transplantation.

CASE REPORT

A 46-year-old Filipino woman presented with multiple well-circumscribed, eruptive papules on the right lower thigh immediately above the knee region (Figure 1). Many of the lesions exhibited a predominant central plug (Figure 2). They developed over a period of 2 to

3 months and were not pruritic. There was no history of trauma or previous therapy. The differential diagnosis for these lesions included Kyrle's disease, multiple keratoacanthomas, and other perforating disorders, such as reactive perforating collagenosis and perforating folliculitis.

Medical history was remarkable for severe diabetes with secondary nephropathy, and the patient was undergoing renal dialysis as a result of associated renal failure. She had also undergone gastric bypass surgery for morbid obesity 2 years previously and successfully lost more than 150 lb.

Histologically there was a markedly thickened parakeratotic plug associated with basophilic degenerated cellular debris within an invaginated epidermis. Mild spongiosis was noted in the underlying epidermis, with vacuolated keratinocytes. The parakeratotic and dyskeratotic cells were seen penetrating through the epidermis. There was an adjacent papillated and verrucous epidermal hyperplasia, with hypergranulosis and vertically oriented collagen bundles in the papillary dermis. The histologic findings, especially when correlated with the medical history, were most consistent with Kyrle's disease. The absence of transepidermal elimination of collagen and elastic fibers as confirmed by trichrome and Verhoeff-Van Gieson stains, respectively, excluded reactive perforating collagenosis and elastosis perforans serpiginosa.

PERFORATING DISORDERS

Perforating disorders are a group of papulonodular disorders characterized by transdermal elimination of some

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Figure 1. Multiple well-circumscribed, eruptive papules on the right lower thigh, just above the knee of a patient with Kyrle's disease.



Figure 2. Kyrle's disease lesions exhibiting a predominant central plug.

components of the dermis, such as keratin, collagen, and elastic fibers. The classification is based on the nature of the eliminated substance.² Kyrle's disease is usually classified as a subtype of acquired perforating dermatosis, which, along with reactive perforating collagenosis, elastosis perforans serpiginosa, and perforating folliculitis, comprises the major perforating diseases.^{3,4} Transdermal elimination of collagen, elastic fibers, and degenerated follicular contents with or without collagen or elastic fibers is seen in reactive perforating collagenosis, elastosis perforans serpiginosa, and perforating folliculitis, respectively.^{2,4,5} Transdermal elimination of keratotic material with no collagen or elastic fibers is seen in Kyrle's disease.^{2,4,5}

OVERVIEW OF KYRLE'S DISEASE

Kyrle's disease is regarded as a genetically determined disease with onset during adulthood, usually between the ages of 30 and 50 years, but onset as early as age 5 years and as late as 75 years has been reported.⁵⁻⁸ The mode of inheritance of Kyrle's disease is unclear as both autosomal dominant and autosomal recessive patterns have been reported.⁷⁻¹⁰ Kyrle's disease has been reported in conjunction with diabetes mellitus, chronic renal failure, hyperlipoproteinemia, and, rarely, paraneoplastic disease; however, it may also be seen in patients who do not have a history of such conditions.¹⁰⁻¹⁵

Kyrle's disease is clinically characterized by hyperkeratotic papules and nodules, with a central keratotic plug most commonly located on the lower extremities.^{6-8,16,17} The lesions may resemble any one of the 4 perforating disorders. Pruritus may or may not accompany the lesions. Cunningham et al¹⁶ noted these lesions to have a marked disposition for the calf, the tibial region, and the posterior thigh. A female-to-male ratio of up to 6:1 has been reported.¹⁶ Although Koebner phenomenon has been noted in some cases,

other authors have failed to notice such a correlation.^{8,16} Ocular changes, such as keratoconjunctivitis, corneal opacification or scarring, and posterior sub-capsular cataract, can be seen in patients with periocular or ocular involvement.^{8,17}

Shivakumar et al⁷ recently reported a case of familial Kyrle's disease in a 30-year-old man with onset at age 5 years. The patient presented with multiple asymptomatic lesions on both the lower and upper extremities, upper back, palms, and soles. Corneal and conjunctival involvement, as well as involvement of the palms and soles along with dental anomalies, was also noted in all affected family members in an autosomal dominant pattern.⁷

The exact pathogenesis of Kyrle's disease is not known. Kasiakou et al¹² suggested an infectious etiology for Kyrle's disease as the patient they presented improved with oral clindamycin (300 mg) 3 times a day for one month. Abnormal keratinization has been proposed by Tappeiner et al,¹⁸ who suggested that keratinization occurs faster than epidermal proliferation. Detmar et al¹³ suggested that defective differentiation of the epidermis and the dermoepidermal junction owing to alteration of the underlying glycosylation processes may be responsible for the lesions seen in Kyrle's disease. Morgan et al¹⁹ suggested that elevated serum and tissue concentrations of fibronectin may be responsible for inciting increased epithelial migration and proliferation, culminating in perforation.

HISTOLOGY OF KYRLE'S DISEASE

In Kyrle's disease, a keratotic plug is seen histologically in an atrophic epidermis and may penetrate the papillary dermis.^{16,20} There is usually an underlying dermal histiocytic and lymphocytic infiltrate, which constitutes the foreign body granulomatous reaction. Orthokeratosis and

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parakeratosis are also seen.^{10,16} Abnormal keratinization is seen in some patients.⁶ As previously noted, transdermal elimination of keratotic material with no collagen or elastic fibers is observed in Kyrle's disease.^{2,4,5}

DISEASE COURSE AND MANAGEMENT

The course of Kyrle's disease is chronic. It has been suggested that patients may have a better prognosis if the associated diseases are treated.¹⁰ Treatments reported in the literature for Kyrle's disease includes cryotherapy, laser therapy, systemic and topical retinoids, and narrow-band UVB.^{14,21-24} Saleh et al²¹ reported success with 1 mg/kg per day of isotretinoin in 5 weeks but noticed relapse with cessation of therapy. Baumer et al²² noticed complete remission after 6 months with acitretin using an initial dose of 30 mg/d. Kasiakou et al¹² noted improvement with oral clindamycin (300 mg) 3 times a day for one month. Topical tretinoin has also been shown to be effective.^{14,23}

COMMENT

Kyrle's disease is an acquired perforating dermatosis that is frequently associated with an underlying disorder, such as diabetes mellitus or chronic renal failure. The disease presents as multiple discrete, eruptive papules with a central crust or plug, often on the lower extremities. In Kyrle's disease, a keratotic plug is seen histologically in an atrophic epidermis and may penetrate the papillary dermis, and there is transepidermal elimination of keratotic debris without collagen or elastic fibers. Most cases are observed in adults. Various therapies have been reported, including cryotherapy, laser therapy, narrow-band UVB, and use of topical or systemic retinoids.

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