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Grand Rounds

A 48-year-old man presents with bilateral corneal deposits

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History

A 48-year-old African American man was referred by an outside ophthalmologist for evaluation of bilateral corneal opacities after a routine eye exam. The patient denied any changes in vision, pain, foreign body sensation or photophobia. He had no history of ocular trauma or surgery. He had no family history of ocular disease. His parents and three children all had normal eye examinations. The patient had no past ocular history. His past medical history was significant for hypertension, for which he took irbesartan-hydrochlorothiazide.

Examination

On examination, his best-corrected visual acuity was 20/20 in his right eye and 20/30 in his left eye. The pupils were equally reactive with no afferent pupillary defect. Slit-lamp examination (see Figures 1–3) was significant for bilateral small, discrete, sharply demarcated, grayish-white opacities in the anterior central stroma with intervening clear areas. Notably, there was no conjunctival inflammation. The sclera was white and quiet. The anterior chamber was deep and quiet in both eyes. Tonometry and Schirmer's test were normal in both eyes. On funduscopic examination, the optic disc, macula and vessels were within normal limits in both eyes.

Ancillary Testing

None.

Treatment

None.

Differential Diagnosis

The differential diagnosis of bilateral small, discrete, sharply demarcated grayish white opacities in the anterior central stroma should include all of the following: macular dystrophy, corneal dystrophy of Bowman's layer, Avellino dystrophy, lattice dystrophy, Schnyder crystalline dystrophy, Fleck dystrophy and granular dystrophy. Macular dystrophy is an autosomal recessive dis-

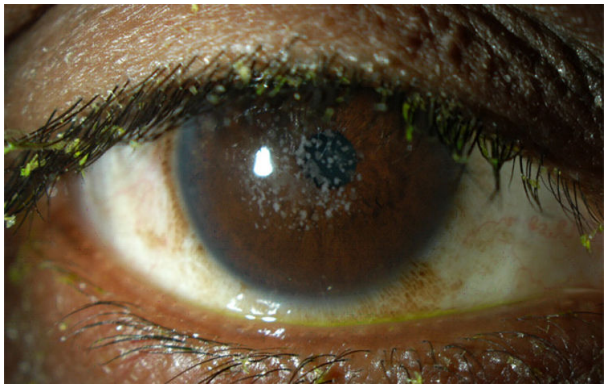

Figure 1. External photo of the right eye.

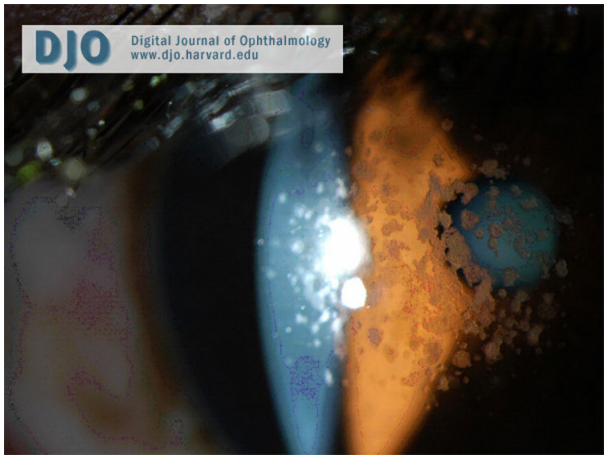

Figure 2. In type 2 granular corneal dystrophy, the "bread crumb" lesions coalesce into fewer larger ring-shaped granular deposits with sharply defined intervening clear zones.

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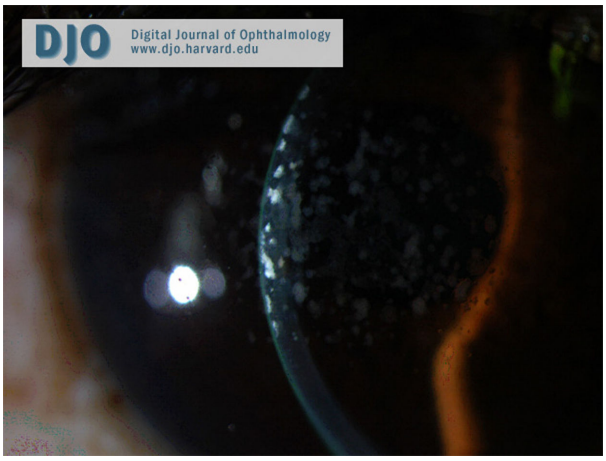

Figure 3. Slit-lamp photograph demonstrating anterior stromal location of the deposits.

ease, which typically presents with peripheral and central focal, grey-white, superficial stromal opacities with intervening corneal haze. Patients are typically symptomatic with decreased vision and often have recurrent erosions. Corneal dystrophy of Bowman's layer presents as central white reticular opacification. These lesions predispose the patient to painful recurrent epithelial erosions, which may lead to scarring and a decrease in vision, a feature not present in our patient. Avellino corneal dystrophy may present similarly to our patient; however, these patients typically have corresponding glass-like branching lines seen in lattice dystrophy. Schnyder crystalline corneal dystrophy, a progressive stromal dystrophy, typically presents with central opacification, a dense corneal arcus and decreased corneal sensation, none of which were present in our patient. Fleck dystrophy may present as discrete, flat gray dandruff-like lesions. However, it occurs asymmetrically and typically involves the periphery as well. Granular corneal dystrophy presents with bilateral small, discrete, sharply demarcated grayish white opacities in the anterior central stroma with intervening clear areas. Although typically diagnosed by the characteristic clinical exam and patient history, this dystrophy can be confirmed by genetic testing. Histopathologically the granular deposits stain red with mason trichrome stain.[1]

Diagnosis

This patient has granular corneal dystrophy, also known as Groenouw dystrophy. Granular corneal dystrophy is a bilateral, non-inflammatory condition that results in the deposition of hyaline material in the anterior stroma. The diagnosis of granular corneal dystrophy is best made by slit-lamp examination and a thorough patient history.

Our case is unusual in that our patient presented with no family history of any corneal dystrophy. Granular corneal dystrophy classically has an autosomal dominant inheritance pattern with strong penetrance. This dystrophy has been linked to a locus on region 5q22-32 on chromosome 5, as part of the BIGH3 complex, coding for keratoepithelin.[2] That our patient did not have a family history of this autosomal dominant disease may be explained by recent reports of de novo mutations in the BIGH3 gene, which have led to the development of granular corneal dystrophy.[3] Alternatively, this patient's family members may harbor a gene mutation, and due to phenotypic non-penetrance associated with type 2 granular corneal dystrophy, may not manifest the disease.[4]

Granular corneal dystrophy is an uncommon disease without any gender predilection. It is more commonly present in Caucasian individuals. Our patient is African American, and it is less commonly seen in this population.[5] Although lesions may present earlier in life, vision is typically unaffected until the third or fourth decade. Some patients may complain of mild photophobia from light scatter due to the opacities. Ocular surface pain from recurrent corneal erosions occurs more commonly in the subset of patients in whom Bowman's layer is involved.

There are three clinical forms of granular corneal dystrophy. Type 1 is the most frequent. It occurs early in life with crumb-like opacities that may slowly progress into disc-like lesions. The lesions in this variant may extend anteriorly to involve Bowman's layer. Type 2 patients typically present in their second decade, with fewer larger ring-shaped granular deposits in the anterior stroma with sharply defined intervening clear zones. Erosions are infrequent in this variant and vision is unaffected because of the intervening clear areas. The opacities may extend posteriorly as the patient ages. The third type of granular corneal dystrophy presents in infancy with superficial lesions, confined to Bowman's layer, resembling Reis-Bücklers corneal dystrophy. Our patient has type 2 granular corneal dystrophy. His slit-lamp examination discloses large, sharp, ring-shaped granular deposits with intervening clear zones. He has retained good visual acuity and has fortunately not developed recurrent erosions.

In the early stages of granular dystrophy no treatment is needed. In patients who develop recurrent erosions, symptomatic treatment with lubricating ophthalmic ointment, bandage contact lenses, superficial keratectomy or

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phototherapeutic keratectomy may be used. Visual acuity is typically affected when the intervening clear zones begin to take on a ground glass appearance. When visual acuity is affected, penetrating keratoplasty or deep anterior lamellar keratoplasty can be considered.[6] Recurrences of the dystrophy may occur and typically appear as diffuse superficial subepithelial lesions in the periphery.

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