Isolated corneal perineural amyloidosis: a unique presentation of lattice corneal dystrophy

Aafreen Bari , Ananya Parampalli Ravindra, Rajesh Sinha

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Ophthalmology, AIIMS, New Delhi, India

Correspondence to
Professor Rajesh Sinha; sinharaj1@gmail.com

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CASE DESCRIPTION

A man in his 30s presented with painless progressive diminution of vision in his right eye for 6 months. On examination, visual acuity was 0.32 (20/63) and 1 (20/20), and intraocular pressures were 12 mm Hg and 14 mm Hg in the right and left eyes, respectively. On slit-lamp examination, both eyes revealed abnormally thickened structures typically arising within the limbal area and extending superficially towards the central cornea. They were in continuity as well as dichotomously branching (figure 1A,B). His right eye had inferotemporal stromal ground-glass haze (figure 1C,D). Corneal sensations were decreased in both eyes. Fundus examination of both eyes revealed normal morphology.

Anterior segment optical coherence tomography (Optovue, Fremont, California, USA) showed these structures as hyper-reflective foci in corneal stroma with underlying shadowing (figure 2A). Confocal microscopy showed beaded corneal nerves at depths of subepithelium and stroma with wraparound deposits (figure 2B). A diagnosis of bilateral prominent corneal nerves was made, and investigations to know the underlying aetiology were performed (online supplemental table 1).

Additional ocular examinations that were done included electroretinogram and Herpes Simplex Virus (HSV) tear film PCR. Systemically, blood pressure was checked and a peripheral neurological examination was done to look for any peripheral nerve thickening or sensation loss. Thereafter, ECG and blood investigations for complete blood count, liver and renal function tests, thyroid and parathyroid hormone profile were performed. ECG suggested arterioventricular block and atrial arrhythmia. These changes have been described in literature to be associated with cardiac amyloidosis for which he was advised consultation in the Department of Cardiology.[1] All other tests were within normal limits, thus ruling out multiple endocrine neoplasia, Refsum's disease, leprosy, neurofibromatosis, Riley-Day syndrome, lipoid proteinosis and ichthyosis.

Considering the corneal perineural substance deposition and ECG changes, corneal neural amyloidosis was assumed to be the primary pathology. The patient did not give consent for biopsy in view of satisfactory visual acuity. He was managed conservatively with lubricants, given refractive correction and counselled for the need of corneal transplantation in future.

The corneas are specialised tissue innervated by long ciliary nerves, sub-branch of the trigeminal nerve with neural plexuses at various levels. They typically have a diameter of 0.2–2 μ.[2] They are unmyelinated C-type sensory fibres visible only in the periphery where they are thicker and posterior.

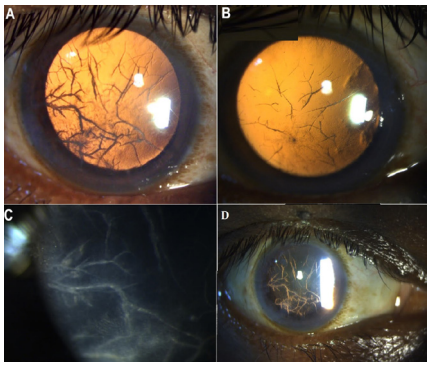

Figure 1 (A,B) Retro-illumination image of right and left eyes with thickened corneal nerves arising from limbal cornea and dichotomously branching towards the central cornea. (C) The inferotemporal area of the right cornea with ground-glass haze and prominent corneal nerves. (D) Slit-lamp biomicroscopic image of the right eye highlighting the corneal nerves from their limbal origin towards the central cornea with dichotomous branching and inferotemporal haze.

If the corneal nerve diameter is greater than the normal, it may appear prominent. Thickened or prominent corneal nerves are early hallmarks of important systemic diseases. Observing them and investigating the aetiology may be life-saving in certain conditions.

Lattice corneal dystrophy (LCD) type IV may present with absent or polymorphic amyloidosis. Age and mutation determine the phenotypic appearance. In some cases, there might not be any lattice lines or only a subepithelial ground-glass haze on the central or inferior cornea. Some may also present as prominent corneal nerves with amyloid wrapped around them.[3] Zhu *et al*[4] have described

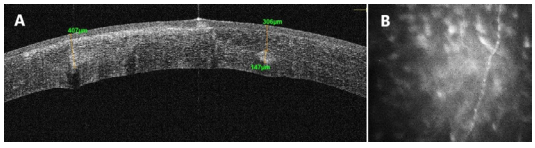

Figure 2 (A) Anterior segment optical coherence tomography (Optovue, Fremont, California, USA) showing corneal nerves as hyper-reflective foci in stroma with underlying shadowing. (B) In vivo corneal laser scanning confocal microscopy revealed stromal perineural substance deposits with beaded appearance.

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it as a neurotropic phenomenon in LCD where in vivo confocal microscopy provided a rapid, non-invasive way to observe the perineural amyloid deposition. It was graded as 0, I and II based on severity of involvement.[4]

In our case, we observed type IV LCD with isolated corneal perineural amyloid deposition with grade I neurotropic phenomenon and minimal stromal involvement. It highlights the unique presentation of LCD and the role of confocal microscopy in documenting and studying the grades of corneal nerve involvement in the condition.

Learning points

- A thorough systemic investigation is utmost important in cases of prominent corneal nerves to timely diagnose life-threatening diseases.
- Lattice corneal dystrophy may present as diverse phenotypes—with or without corneal stromal and corneal neural involvement. Isolated corneal perineural amyloidosis is also a clinical variant in its spectrum.
- Confocal microscopy is a quick, non-invasive method to assess and grade the perineural deposits in cases of lattice corneal dystrophy.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

ORCID iD

Aafreen Bari http://orcid.org/0000-0001-8520-283X

REFERENCES

1 Cheng Z, Zhu K, Tian Z, *et al*. The findings of electrocardiography in patients with cardiac amyloidosis. *Ann Noninvasive Electrocardiol* 2013;18:157–62.
2 Brines M, Culver DA, Ferdousi M, *et al*. Corneal nerve fiber size adds utility to the diagnosis and assessment of therapeutic response in patients with small fiber neuropathy. *Sci Rep* 2018;8:4734.
3 Weiss JS, Møller HU, Aldave AJ. IC3D classification of corneal dystrophies-edition 2 [published correction appears in Cornea. 2015 Oct;34(10):e32]. *Cornea* 2015;34:117–59.
4 Zhu F, Li M, Zhang C, *et al*. In vivo confocal microscopy qualitative investigation of the relationships between lattice corneal dystrophy deposition and corneal nerves. *BMC Ophthalmol* 2021;21:449.