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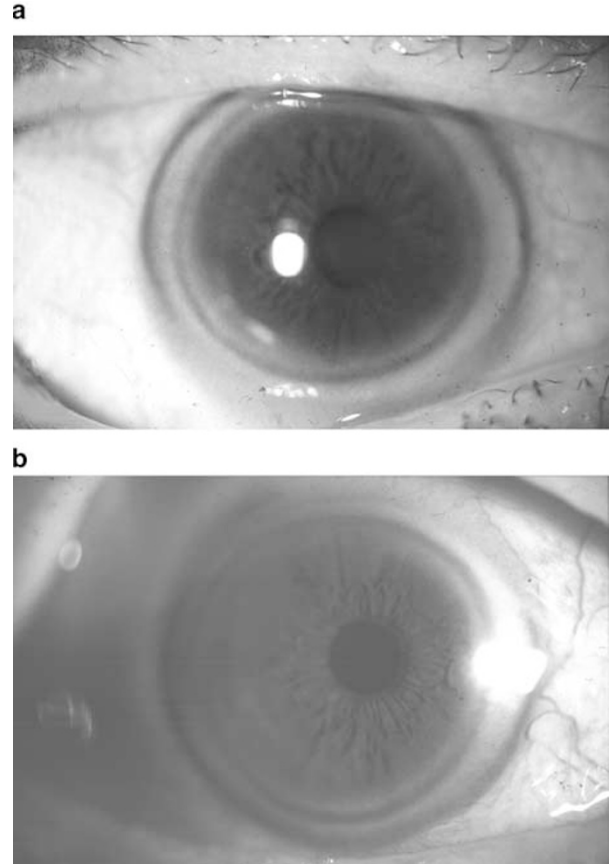
Sir,  
**Double arcus cornealis**

Introduction

Arcus cornealis (corneal arcus) is a single corneal circle of lipid deposits parallel to the limbus that usually affects both eyes symmetrically.<sup>1</sup> This greyish stromal ring appears in the superior and inferior corneal periphery and extends around it. Its origin is presumed to be from the deep scleral vascular plexus and it appears in 20–35% of the population usually in older age.

Case report

A 75-year-old Caucasian patient complained of ocular burning and tearing for a couple of months. His medical history was positive for hypercholesterolaemia, tinnitus, and benign prostatic hypertrophy. His visual acuity was

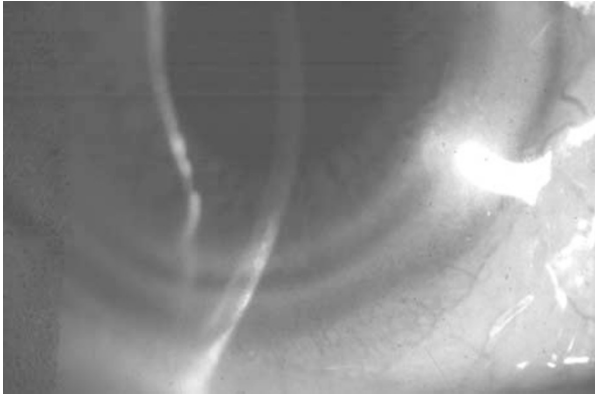


**Figure 1** (a) Slit-lamp photograph of the right eye of a 75-year-old patient with double arcus cornealis. The outer ring has inner and outer distinct margins while the inner ring has an inner indistinct margin and is less uniform. Between the rings and the limbus are two lucid intervals of Vogt (original magnification  $\times 16$ ). (b) A slit-lamp photograph of the left eye showing identical findings ( $\times 16$ ).

20/25 in each eye. Ocular examination revealed seborrhoeic blepharitis and bilateral double arcus cornealis (Figure 1). The double arcus was composed of two complete greyish rings at the level of the deep stroma separated by two clear intervals (Figure 2). The inner ring was narrower than the outer one and more distinct at the upper and lower part of the cornea. Fundus examination was normal. The patient was treated for the blepharitis and was followed for 2 years. Over this period, the two corneal rings increased gradually in their density but not in size. Lipid serum profile showed high cholesterol levels (250 mg/dl). Triglycerides, high-and low-density lipoproteins, and lecithin-cholesterol acyltransferase (LCAT) were normal.

Discussion

Arcus cornealis appears as a single greyish ring parallel to the limbus and separated from it by a 1 mm lucid



**Figure 2** (a) higher magnification ( $\times 25$ ) showing a more detailed contour of the double arcus cornealis.

interval of Vogt.<sup>1</sup> It develops as a result of lipid deposition in the deep corneal stroma and the limbal sclera, and its prevalence increases with age. In children, it may be a manifestation of hyperlipidemia, but in elderly people it may be an isolated finding. Arcus cornealis should be differentiated from other lipid metabolisms affecting the cornea, such as LCAT deficiency, 'fish eye' disease, or Tangier disease where lipid deposition extends into the centre of the cornea.

Double corneal arcus were recently described in two patients from India.<sup>2</sup> However, this report had no follow-up on the patients, lipid profile was not reported, and no theory regarding the pathophysiology of the findings was suggested.

In our case, the innermost ring was narrower and less distinct than the peripheral one. It was more distinct in the upper and lower quadrants of the cornea, as usually seen in typical single arcus cornealis. The patient had hypercholesterolaemia.

The development of a second ring of lipids may suggest that lipids diffused from perilimbal vessels may migrate through the stroma according to properties such as their size and polarity. Similar phenomena can be seen when diffusion zones are created in separation of lipids<sup>3</sup> or antigens and antibodies seen as Mancini radial rings<sup>4</sup> and Ouchterlony immudiffusion rings.<sup>5</sup> In these laboratory techniques, the agents are separated based on their structural properties and create sediments where they are bound to other molecules through a complementary binding site. Differences in the lipid compositions of the two rings in the arcus may support this theory, if a biopsy is obtained and analysis of lipids is performed. Another explanation is that the formation of the arcus is inherent and that they are formed *in situ* either as single or double ring. The classic theory concerning the appearance of arcus cornealis is that lipids migrate from the limbal vascular arcade to the peripheral cornea and the clear interval of Vogt is formed

due to absorption of the lipids that are closer to the vascular arcade.<sup>1</sup> The appearance of two rings makes the second part of the classic theory less plausible.

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## Sir, Late presentation of severe thyroid eye disease

The presentation of thyroid eye disease is usually closely temporally related to the diagnosis of thyrotoxicosis. A very small percentage of patients with thyroid eye disease develop sight-threatening disease due to compressive optic neuropathy. We report a case of severe thyroid eye disease with sight loss presenting 14 years after the diagnosis of thyrotoxicosis.

## Case report

A 57-year-old Caucasian female, who smoked five cigarettes a day, presented with a severe reduction in right visual acuity associated with proptosis. Fourteen years previously, she had been treated with carbimazole