CASE REPORT

Cloudy Cornea with Arcus Juvenilis in a Case of Dense Deposit Disease

Pranita Sahay, Ishan Pandya, Prafulla Kumar Maharana, Jeewan S Titiyal

Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Correspondence to

Dr Prafulla Kumar Maharana, drpraful13@gmail.com

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SUMMARY

A 25-year-old male patient presented with complaints of blurred vision in both eyes since 2 years. The patient was a known case of nephrotic syndrome with dyslipidaemia for which he was on diuretics and lipid-lowering agents for 3 years. On examination, his visual acuity was 6/9 in both eyes with cloudy cornea and arcus juvenilis. Fundus examination was within normal limits. On systemic work-up, his lipid profile was deranged with increased serum total cholesterol, very low density lipoprotein, low density lipoprotein and triglyceride. The serum high density lipoprotein was decreased. Renal function test revealed elevated serum creatinine with significant proteinuria. Renal biopsy was suggestive of dense deposit disease on immunofluorescence and transmission electron microscopy. Ocular manifestation of dense deposit disease is characterised by retinal drusen, pigmentary atrophy, choroidal neovascular membrane and atypical serous retinopathy. To the best of our knowledge, anterior segment changes in dense deposit disease has not been reported. This is the first case reporting cloudy cornea with arcus juvenilis in a case of dense deposit disease.

BACKGROUND

Dense deposit disease, also known as membranoproliferative glomerulonephritis (MPGN) syndrome type 2, is a rare disease. The ocular manifestations reported includes drusens, retinal pigmentary changes, drusenoid pigment epithelial detachments, subretinal choroidal neovascular membrane (CNVM) and atypical serous retinopathy.¹⁻⁷ Anterior segment changes have not been reported. Herein, we report a case of dense deposit disease with cloudy cornea and arcus juvenilis in a 25-year-old male patient.

CASE PRESENTATION

A 25-year-old male patient presented with complaints of blurred vision in both eyes for 2 years. He was a diagnosed case of nephrotic syndrome with dyslipidaemia for which he was on diuretics torasemide 10 mg once a day, aspirin 75 mg once a day and rosuvastatin 10 mg once a day by the primary treating physician. On examination, the unaided visual acuity was 6/9 on Snellen acuity chart in both eyes. The intraocular pressure was 14 and 16 mm Hg in the right and left eye, respectively. On slit-lamp examination, diffuse corneal clouding was noted with dense arcus (figures 1–2). The corneal thickness was normal (figure 3). On

indirect ophthalmoscopic examination of the fundus, a normal disc and macula was noted in both eyes (figure 4). The patient was emmetropic on retinoscopic examination.

INVESTIGATIONS

The patient was suspected to be a case of fish eye disease based on his ocular manifestation of diffuse corneal clouding and dense arcus in the presence of dyslipidaemia and nephrotic syndrome.

The patient was referred to nephrology department for further evaluation of his renal status.

The lipid profile was deranged with raised serum total cholesterol (285 mg/dL), triglyceride (334 mg/dL), very low density lipoprotein (66 mg/dL) and low density lipoprotein (204 mg/dL). The high density lipoprotein was found to be reduced (14 mg/dL). The renal function test revealed raised serum creatinine 1.72 mg/dL with the rest of the parameters being within normal limits. The 24-hour urinary protein was 539.8 mg/dL indicating significant proteinuria. The total protein was reduced to 5.1 g/dL.

The lecithin cholesterol acyl transferase (LCAT) enzyme was found to be within normal limits. The direct immunofluorescence test of the renal biopsy specimen revealed a complement mediated (C3) MPGN. Transmission electron microscopy of the same confirmed the diagnosis of dense deposit disease.

DIFFERENTIAL DIAGNOSIS

Bilateral diffuse corneal opacification with a complete corneal arcus in a 25-year-old male patient

Figure 1 Slit-lamp photograph of right eye in diffuse illumination showing diffuse corneal haze with arcus juvenilis.

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Figure 2 Slit-lamp photograph of left eye in diffuse illumination showing diffuse corneal haze with arcus juvenilis.

almost always points towards disorders of lipid metabolism, such as LCAT deficiency, fish eye disease and Tangier disease.⁸ Central crystalline dystrophy of Schnyder can present with bilateral corneal opacity with arcus lipidosis. In this age group, however, the presentation differs depending on the age of presentation and at this age the opacities are usually central corneal haze and may be associated with crystals, which was absent in our case. In Tangier disease, the corneal opacities are minimal and are only evident on slit-lamp examination. It is usually associated with systemic abnormalities such as yellow tonsils, hepatosplenomegaly, lymphadenopathy and neuropathy. All these features were not present in our patient. In fish eye disease, the corneal haze is quite remarkable even visible with naked eye. Fish eye disease is usually free of any systemic manifestations other than rare xanthomas. In our case, haze was apparent only in slit-lamp examination and there was associated renal dysfunction. In addition, there was no Apo A-1/alpha-LCAT deficiency that is seen in fish eye disease. In LCAT deficiency, again, the corneal haze is quite remarkable and even visible with the naked eye. Systemic manifestations like anaemia, proteinuria, chronic renal failure (similar to our case), hypertension and atherosclerosis can be there. However, there will be total LCAT (alpha and beta)

Figure 3 Slit lamp photograph of left eye in focal slit illumination showing normal corneal thickness with corneal haze.

Figure 4 Ultra-widefield fundus photograph of right (A) and left (B) eyes showing normal fundus.

deficiency, which was not there in our case. In our case along with dyslipidaemia, there was evidence of intramembranous electron-dense deposits on transmission electron microscopy of the renal biopsy specimen that confirmed the diagnosis of dense deposit disease.

TREATMENT

The patient was already on aspirin 75 mg once a day and rosuvastatin 10 mg once a day as advised by the primary treating physician. From an ophthalmology point of view, no active intervention was advised.

OUTCOME AND FOLLOW-UP

The patient was asked to follow up every 3 months for cornea as well as fundus evaluation.

DISCUSSION

Dense deposit disease, also known as MPGN type 2, is a rare renal disorder with a prevalence of 2–3 cases/1 000 000 population.⁹ The male:female ratio is 2:3 with women having a more aggressive course of the disease. Its inheritance pattern is poorly understood. It is characterised by abnormal regulation of the alternate complement pathway.¹⁰ Its onset is usually in the first–second decade of life with features of nephrotic or nephritic syndrome, and it usually results in end-stage renal disease within 10 years of onset of disease. Its diagnosis is confirmed with renal biopsy, wherein immunofluorescence test is positive for C3 in the absence of immunoglobulin and transmission electron microscopy shows electron-dense changes of the glomerular basement membrane.¹¹

Duvall-Young *et al* in 1989 first reported the ocular manifestations in 17 cases of MPGN type 2. None of these cases had any ocular symptoms. All cases had normal anterior segment with retinal drusen being the only positive finding in these cases.¹²

Savige *et al*, in his case series of six patients with dense deposit disease, noted drusens with impaired night vision in all the cases. Drusens were associated with retinal atrophy, pigmentary changes and haemorrhage. In late stages, some cases developed subretinal CNVM and atypical serous retinopathy.¹ The anterior segment was normal in all these cases.

McAvoy *et al* in his case series of 26 cases found that 15 of the 17 adult cases had ophthalmoscopically visible drusen with pigmentary changes of which only one case developed CNVM. None of the children in this case series developed retinal changes.²

The ocular manifestations described constitute presence of drusens with associated pigmentary changes. Therefore, cases of dense deposit disease are advised routine ophthalmological screening to rule out presence of drusen and its complications like subretinal CNVM and atypical serous retinopathy.¹

Association of corneal haze and dense deposit disease has never been reported in literature. To the best of our knowledge, this

is the first case of dense deposit disease with anterior segment changes in the absence of fundal changes. The cloudiness in LCAT deficiency, which generally first appears in adolescence or early adulthood, consists of small greyish dots of cholesterol (opacities) distributed across the cornea. Similar mechanism may also be involved in dense deposit disease. Thus, abnormal lipid profile secondary to renal dysfunction may probably explain this rare manifestation. However, attributing the opacities to lipid panel abnormalities needs further research and evidence.

Learning points

- ▶ Cloudy cornea with dense arcus juvenilis in a young patient points towards systemic disorder that needs evaluation.
- ▶ Dense deposit disease is a rare disease with known ocular involvement in the form of drusen and retinal pigmentary changes.
- ▶ Corneal cloudiness in the absence of fundal changes may also occur in cases with dense deposit disease.

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