Literature Review of Cystoid Macular Edema in Iridocorneal Endothelial Syndrome and Its Response to Nepafenac 0.1%

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Brief report

Keywords: Iridocorneal endothelial syndrome (ICE), non-steroidal anti-inflammatory drugs (NSAIDs), cystoid macular edema (CME)

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Abstract

Background Iridocorneal endothelial syndrome (ICE) is a rare disease which happens usually in women at 20-40 years of age. About 50% of patient with such disease develops glaucoma.

Case presentation A 29-year-old woman presented in August 2015 with right eye blurring of vision for 6 months. On examination, the corneal endothelial with beaten metal appearance was noted. Right eye correctopia with iris atrophy and periphery anterior synechiae were seen. Mottled appearance of the macula which tallied with the optical coherence tomography (OCT) findings of cystoid macular edema (CME) was found. An non-steroidal anti-inflammatory drugs (NSAIDs) eye drops (NEVANACÒ Nepafenac ophthalmic suspension 0.1%) was commenced for long term. She was re-examined 2 years later in 2018. Her vision was 6/6. OCT and fundus fluorescence angiography (FFA) finding were normal.

Conclusion The NSAIDs was the only treatment received by the patient and throughout the years, her CME has subsided. A long term use of Nepafenac 0.1% has shown to be effective in treating CME in ICE syndrome.

Background

Iridocorneal endothelial syndrome (ICE) is a rare disease which happens usually in women at 20–40 years of age. About 50% of patient with such disease develops glaucoma. Human simplex virus has been proposed as the causative agent. [1, 2]

The acquired condition consists of three overlapping syndromes: Essential iris atrophy. Chandler syndrome and Cogan-Reese syndrome. The endothelial cells in the syndrome is found to be abnormal with its migration across the angle, the trabecular meshwork and the anterior iris, forming a membrane over these structures. Thus giving rise to secondary open-angle glaucoma. Eventually, this progresses into angle closure as adhesions and contractions of the membrane over the iridocorneal angle. In the progressive iris atrophy, severe iris changes, correctopia, pseudopolycoria, atrophy and ectropion uveae can develop. [1, 2]

Up to date, there were three publications reported on the case of iridocorneal endothelial syndrome with cystoid macular edema.

Case Presentation

A 29-year-old woman presented with sudden right eye blurred vision for 6 months. She is emmetrope. Her medical and family history was unremarkable. On the examination, her right eye vision was 6/12, pinhole 6/9 (Snellen unaided) and left eye 6/6 (Snellen unaided). She is orthophoric and no relative afferent pupillary defect elicited. Hammered silver appearance of the cornea was seen [Figure 4]. Correctopia was noted with iris atrophy at 4 to 7 o'clock [Figure 1,2]. Patches of periphery anterior synechiae were seen at 2, 4, and 10 o'clock [Figure 1,3,7]. Gonioscopy showed Shaffer grade 3–4 in most of the quadrants [Figure

6]. Bilateral intraocular pressure was 10 mmHg. The right optic disc was 0.2, pink and the macula appeared dull and mottled.

On the optical coherence tomography, right central macular thickness was 357micron with cystoid macula edema [Figure 8,9.10]. Fundus fluorescein angiography was carried out [Figure 10]. Parafoveal microaneurysm was seen in the artero-venous phase. Hyperfluorescence leakages was increasing in size and intensity over the venous phase. Petaloid pattern was seen in the late venous phase.

The patient was commenced on a topical non-steroidal anti-inflammatory drugs (NSAIDs) (NEVANAC® Nepafenac ophthalmic suspension 0.1%) for long term. However, she defaulted her follow up. She came back 2 years later for an eye assessment. Her both eyes' vision were 6/6 (Unaided Snellen) with IOP remained normal and the right eye fundus appeared normal. On the OCT, the right eye macular was normal at 257 micron. No signs of macula edema were noted. FFA showed normal angiography with no leakages through the phases or increase in foveal avascular zone [Figure 9,11].

Conclusions

Spontaneous development of cystoid macula edema in the ICE syndrome is rare. A literature review on ICE syndrome includes 87 references from 1978 to 2002 showed that there were no reports of association with macular or papillary edema. The common causes of cystoid macular edema include diabetic retinopathy, uveitis, post-surgery macular edema, vitreo-macular traction, and usage of prostaglandin analogues. None of the above-mentioned causes was found.

Fourmaux et al [4] have speculated the development of CME in ICE can be due to the abnormal contracture endothelial cells, which causing the breach of the inner blood-retinal barrier.

In our case, the patient's macular edema has subsided in the subsequent examination. This can be due the effectiveness of the NSAIDs eyedrops in inhibiting the inflammatory process and thus treating macular edema. A similar finding was reported by Suzuki et al [3], where the CME resolved after the topical nepafenac 0.1% was used for 4 weeks. It was postulated that the prostaglandin-like material from the abnormal endothelial cells can possibly disturbed the inner blood-retinal barrier. The NSAIDs appeared effectively eliminated the macular edema.

A similar case was first reported by E. Fourmax of a 44-year-old woman who was treated with acetazolamide 325 mg/day. It was not successful and subsequently a subtenon injection of 40 mg triamcinolone in 2002. A rapid recovery and stabilization of macular was noted.[4]

However, in another case reported by Kocaoglan H et al, a similar condition was found in a 38-year-old woman and she was treated with topical prednisolone acetate 1% and ketorolac tromethamine 0.5% QID for 3 months, but the CME persisted. [5]

Both Nepafenac and Ketorolac belonged to the same group but they differ structurally and pharmacologically. Ketorolac is a not prodrug and it exerts its effect by inhibiting prostaglandin biosynthesis after it penetrates the cornea. Nepafenac, on the other hand, is a prodrug which is less polarized and penetrates the cornea easier. In the anterior chamber, it converts into Amfenac by intraocular hydrolases, and distribute rapidly to ciliary body, cornea, iris, retina and choroid. [6]

Furthermore, topical NSAIDs and topical steroids have become a standard preoperative treatment regimen for preventing CME. It appeared that topical NSAIDs is more effective in re-establishing the blood aqueous barrier, as quantitatively measured with anterior ocular fluorophotometry [7]. In a study by Miyake et al, Nepafenac was found to me more effective in preventing angiographic CME and blood aqueous barrier disruption.[8].

In reference to the above cases, we may conclude that Nepafenac 0.1% is more superior in treating cystoid macular edema in patients with iridocorneal endothelial syndrome.

Abbreviations

CME – cystoid macular edema

FFA – Fundus fluorescence angiography

ICE – Iridocorneal endothelial

IOP – intraocular pressure

NSAIDs – Non-steroidal anti-inflammatory drugs

OCT – optical coherence tomography

QID – Quarter in die (four times a day)

Declarations

Ethics approval and consent to participate

Ethics approval -

Not applicable

Consent to participate –

Verbal and written consents for participation and publication are obtained from the patient.

Consent for publication

Yes

Availability of data and material

Not applicable

Competing interests

No competing interests found among the authors

Funding

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Authors' contributions

Lee Hong Nien – case collection and follow up, manuscript preparation, editing and review

Fazliana Ismail – Manuscript editing and review

Visvaraja Subrayan – Manuscript editing and review

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Figures

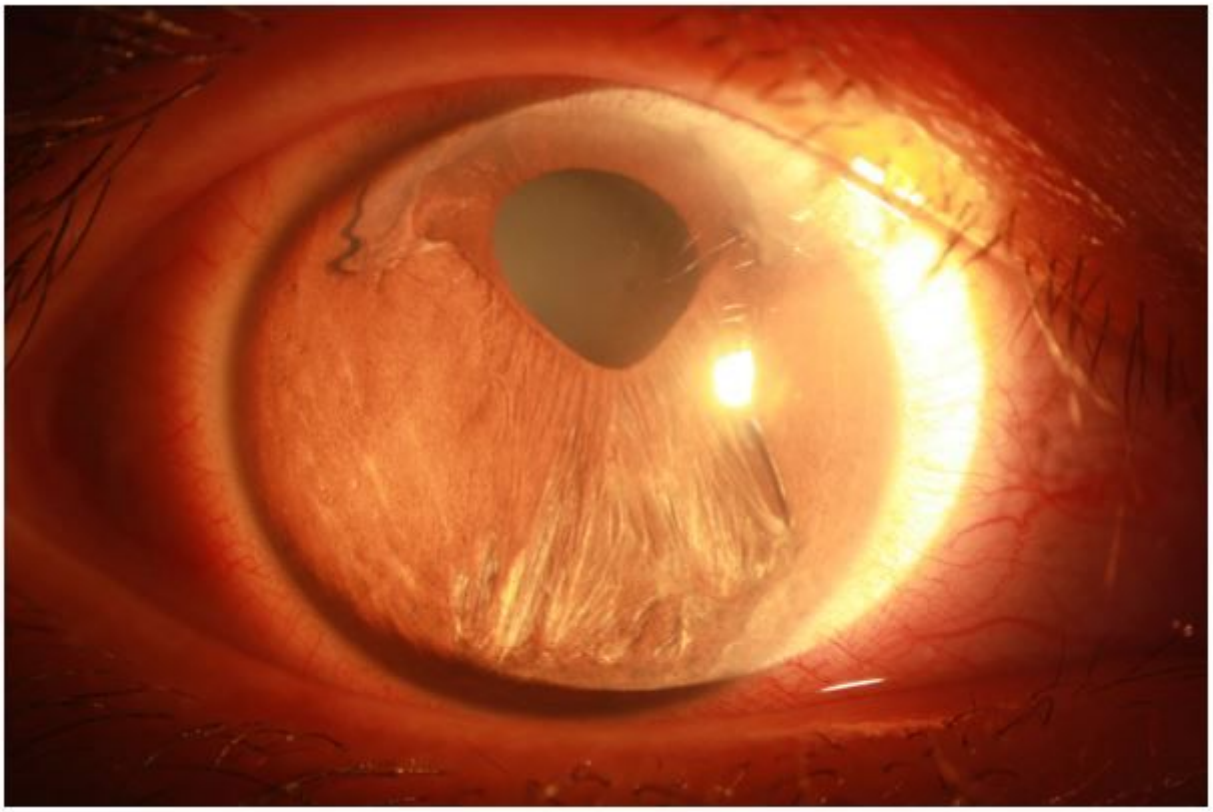

Figure 1

Right eye correctopia, iris atrophy and PAS at 2, 4 and 10 o'clock.

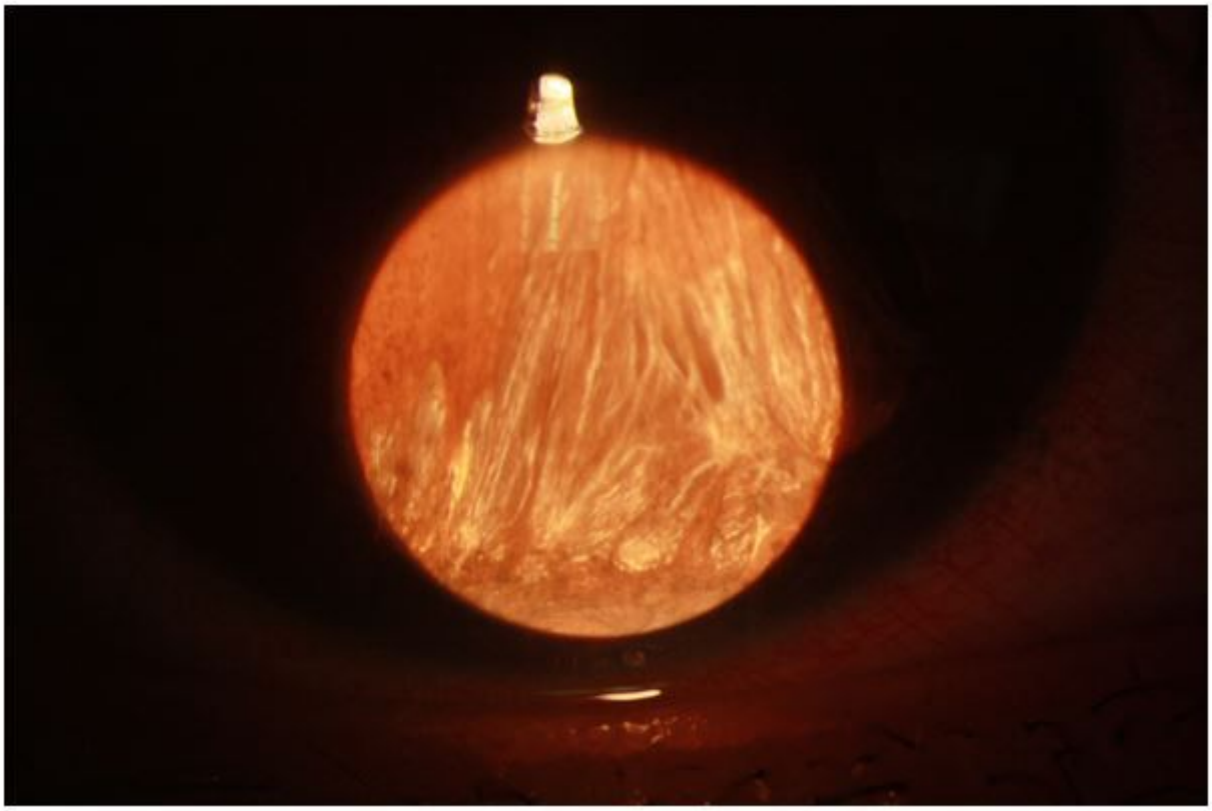

Figure 2

Right eye iris atrophy.

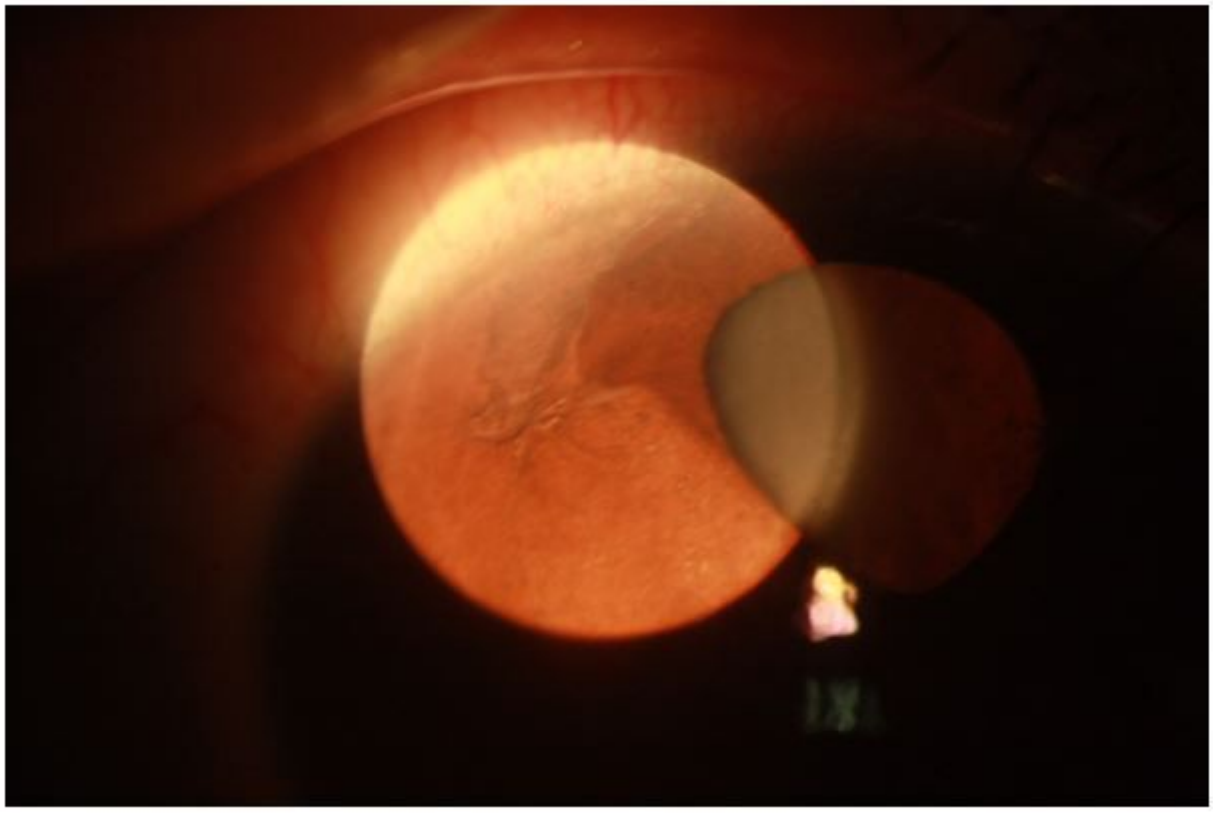

Figure 3

Right eye peripheral anterior synechiae (at 10 o’clock)

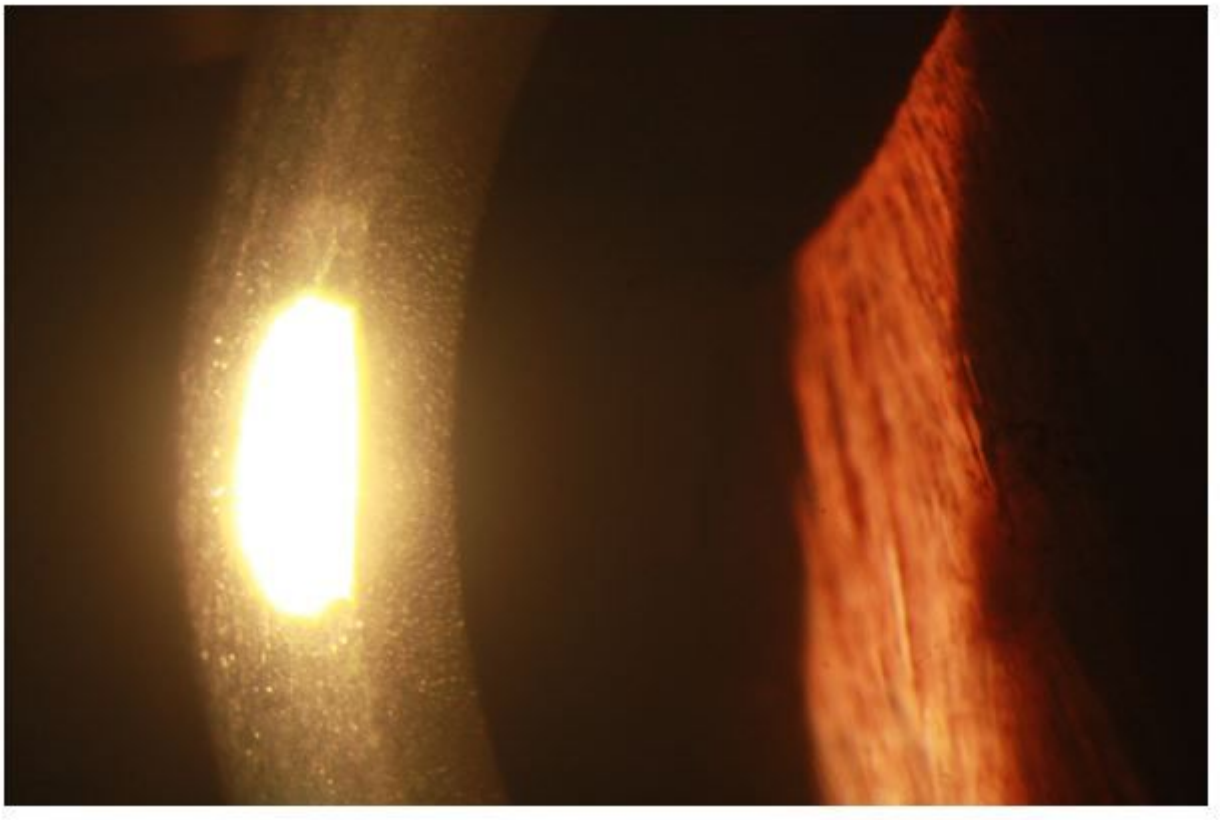

Figure 4

Right eye endothelial with hammered silver appearance.

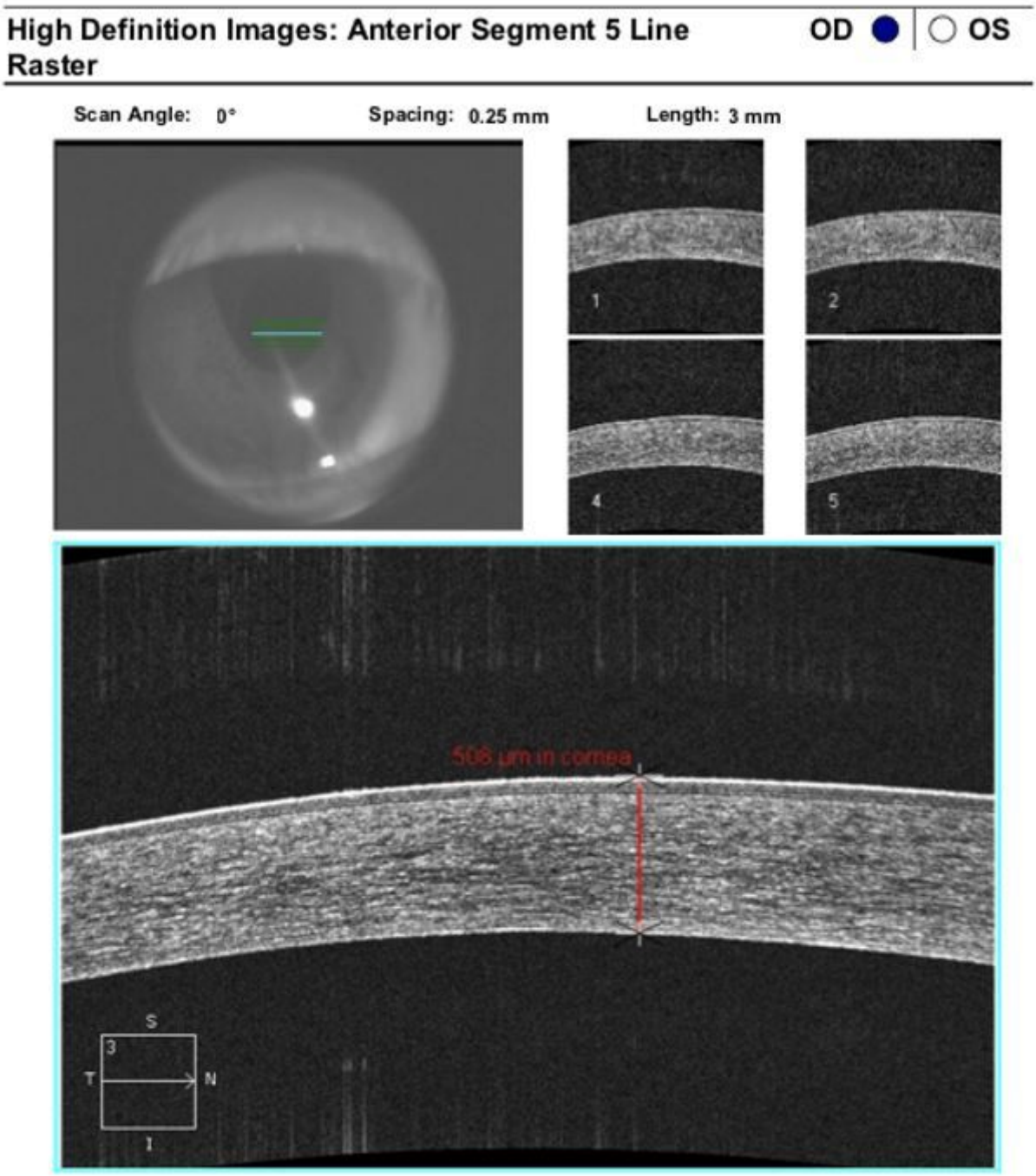

Figure 5

Cross section of right eye cornea center, with thickness of 508micron.

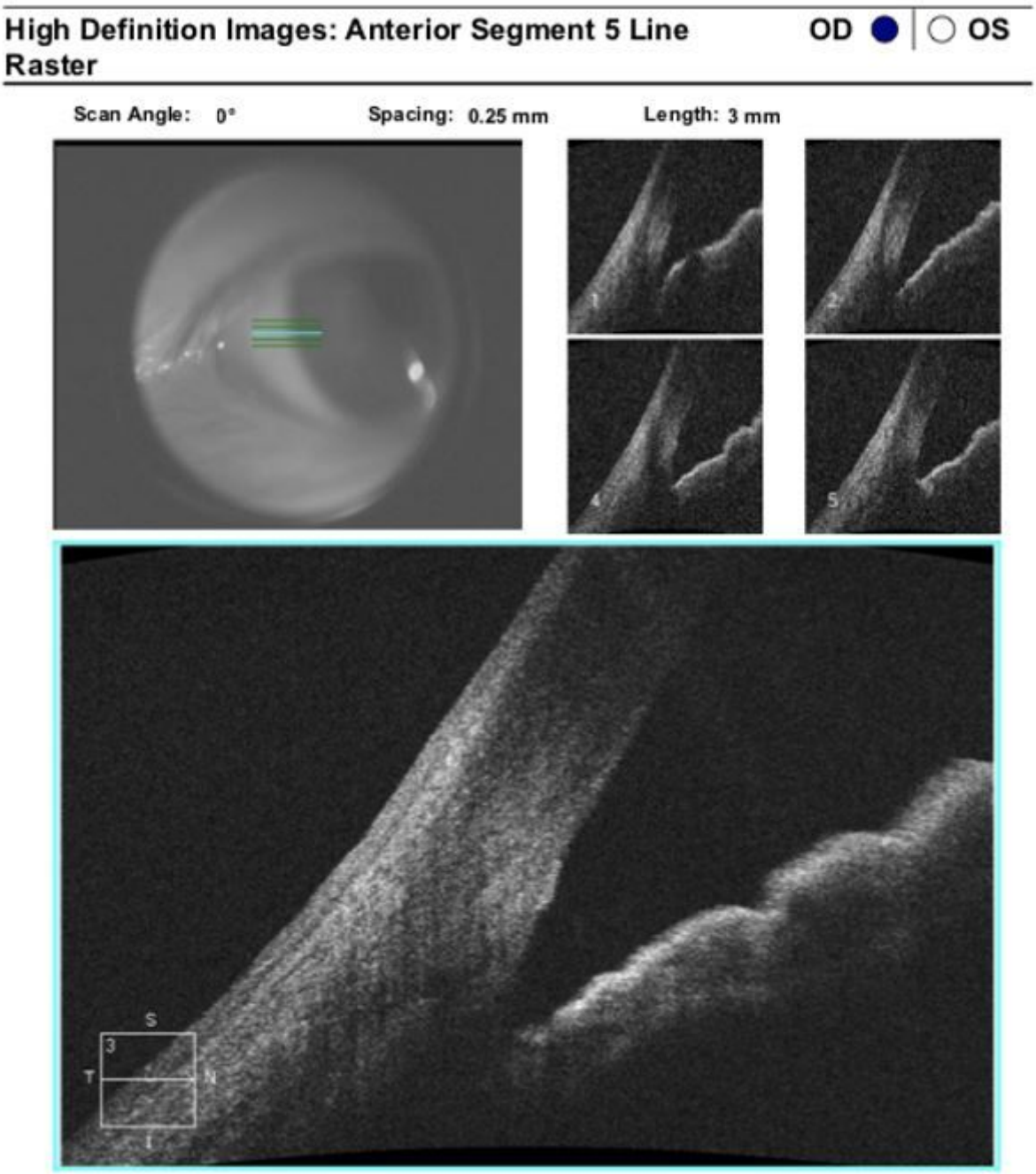

Figure 6

Iridocorneal angle of right eye at 9 o'clock position, showing an open angle.

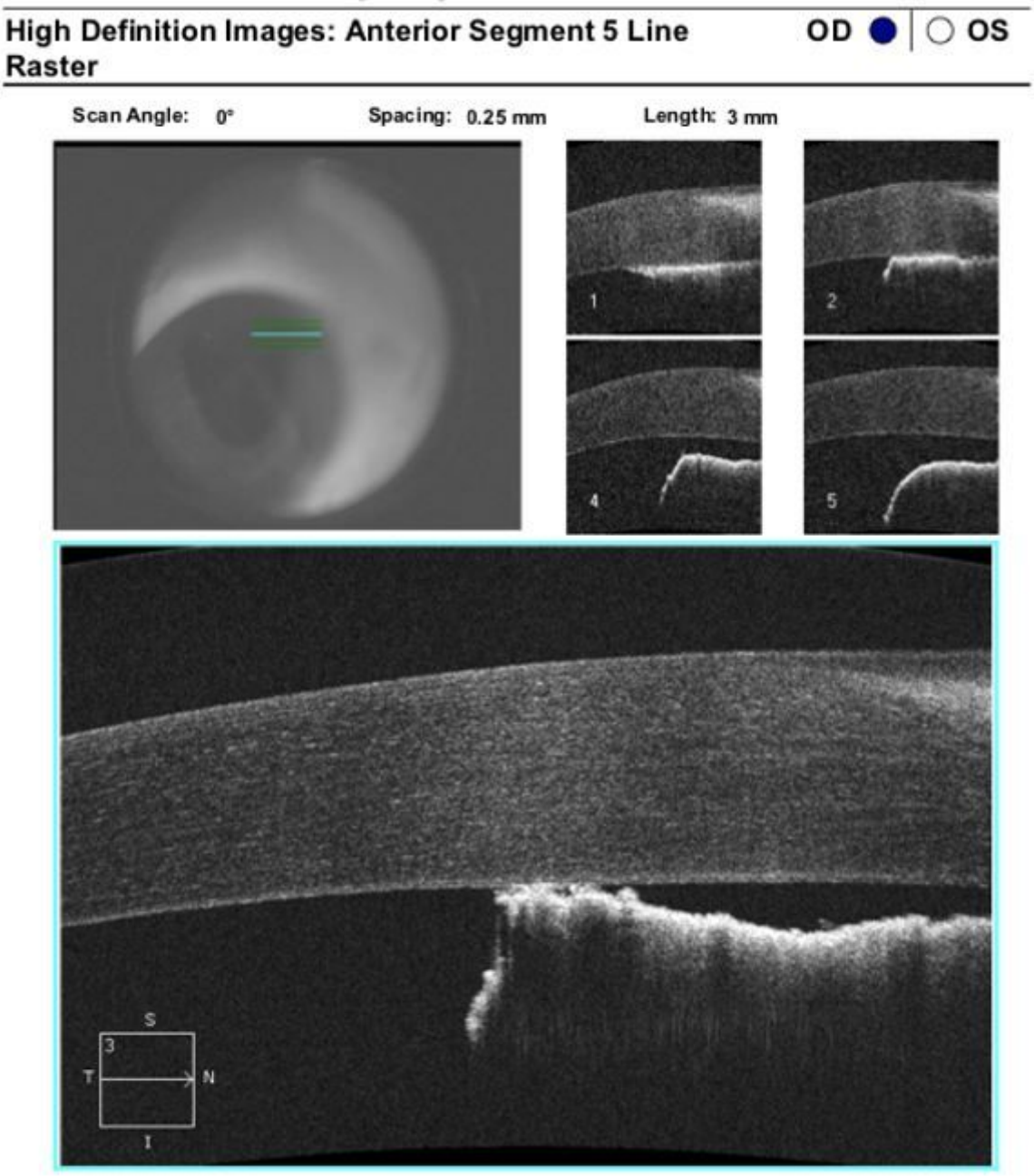

Figure 7

Periphery anterior synechiae at 2 o'clock position of right eye

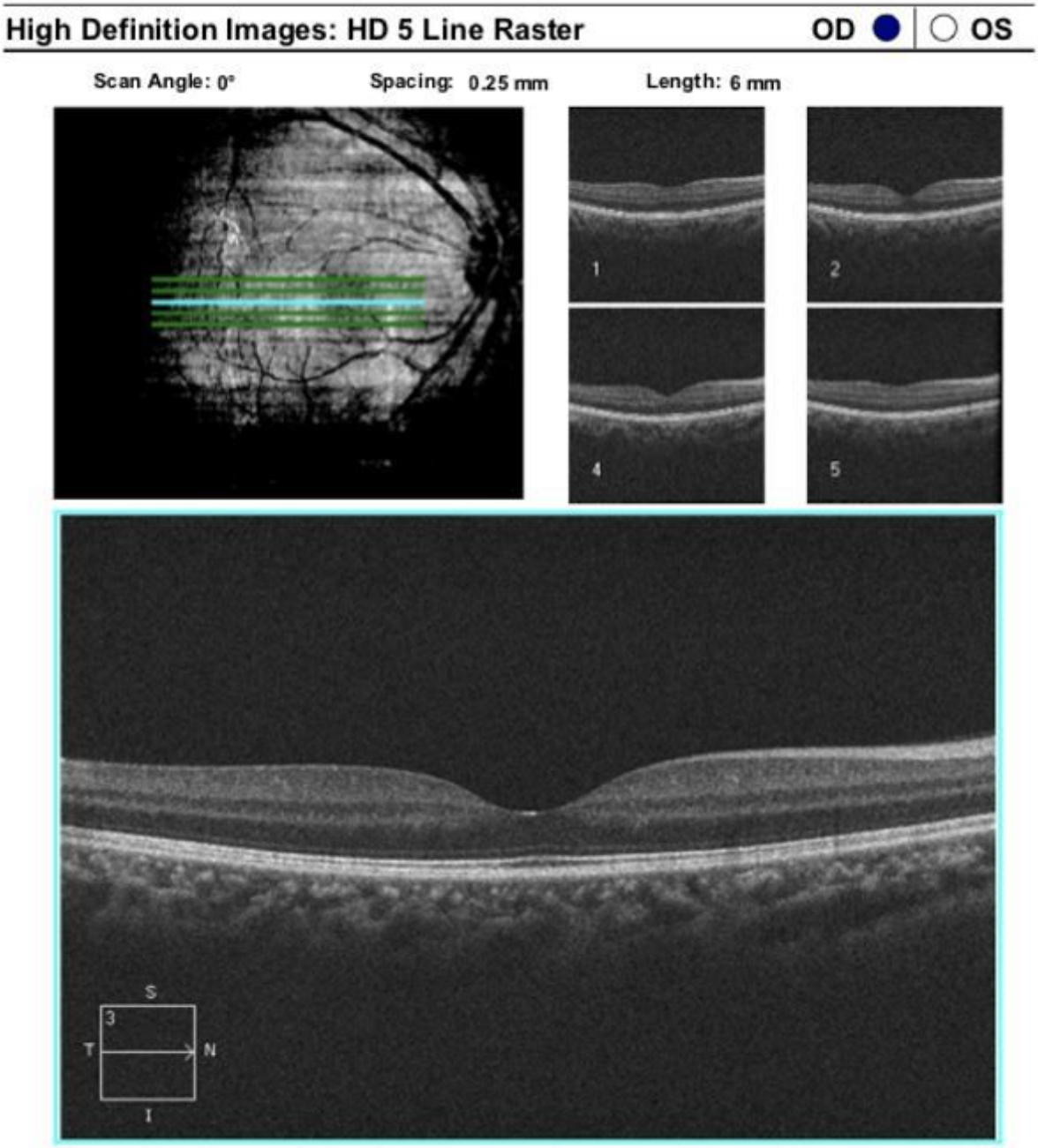

Figure 8

OCT macula of right eye showed a total resolution of cystoid macular edema.

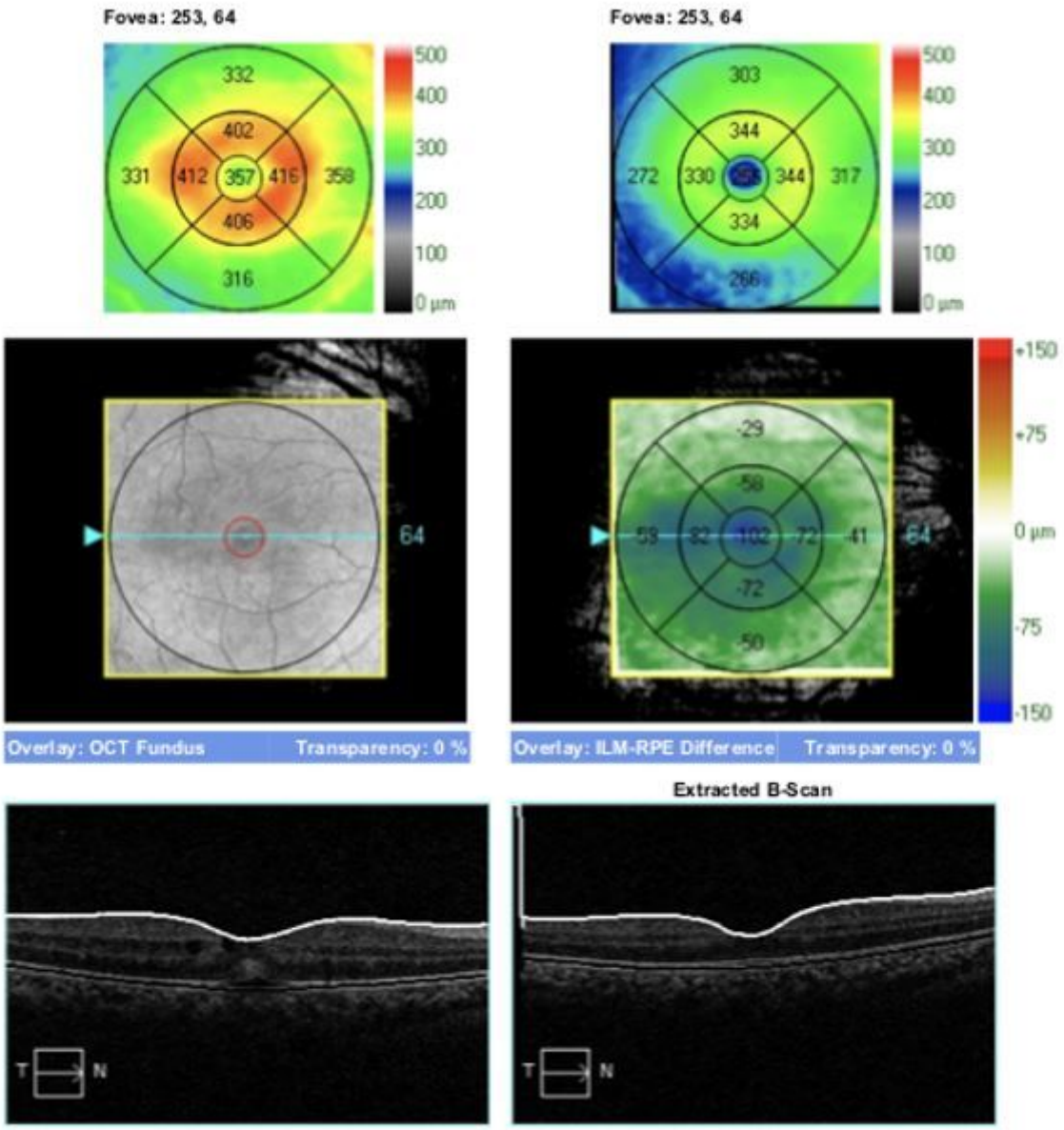

Figure 9

A comparison of the OCT macula taken before and after the commencement of treatment with Nepafenac 0.1%.

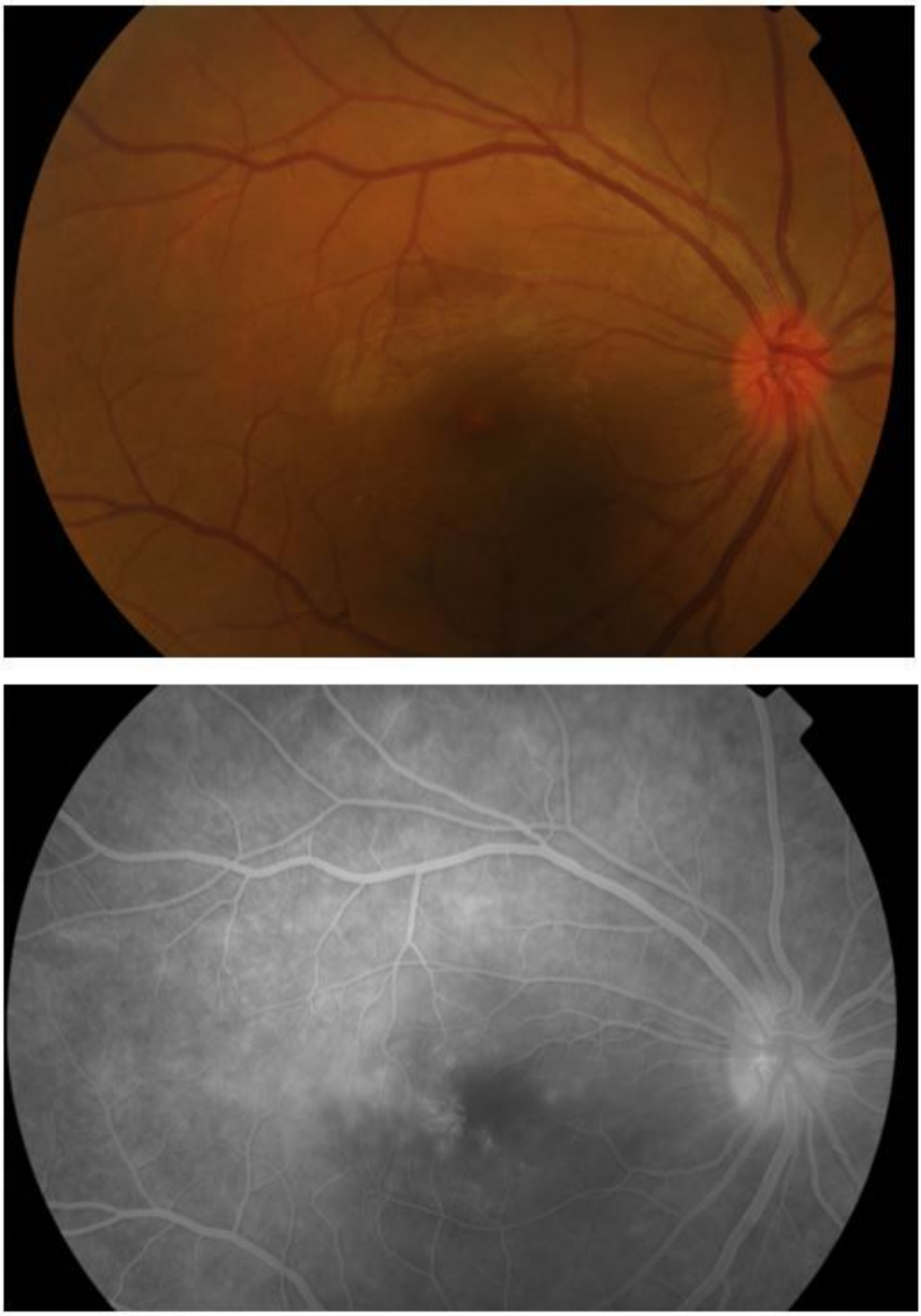

Figure 10

Upper – colour fundus photo of right eye, before commencement of treatment. Lower –Fluorescein Angiography of right eye, taken at mid-venous phase, before commencement of treatment.

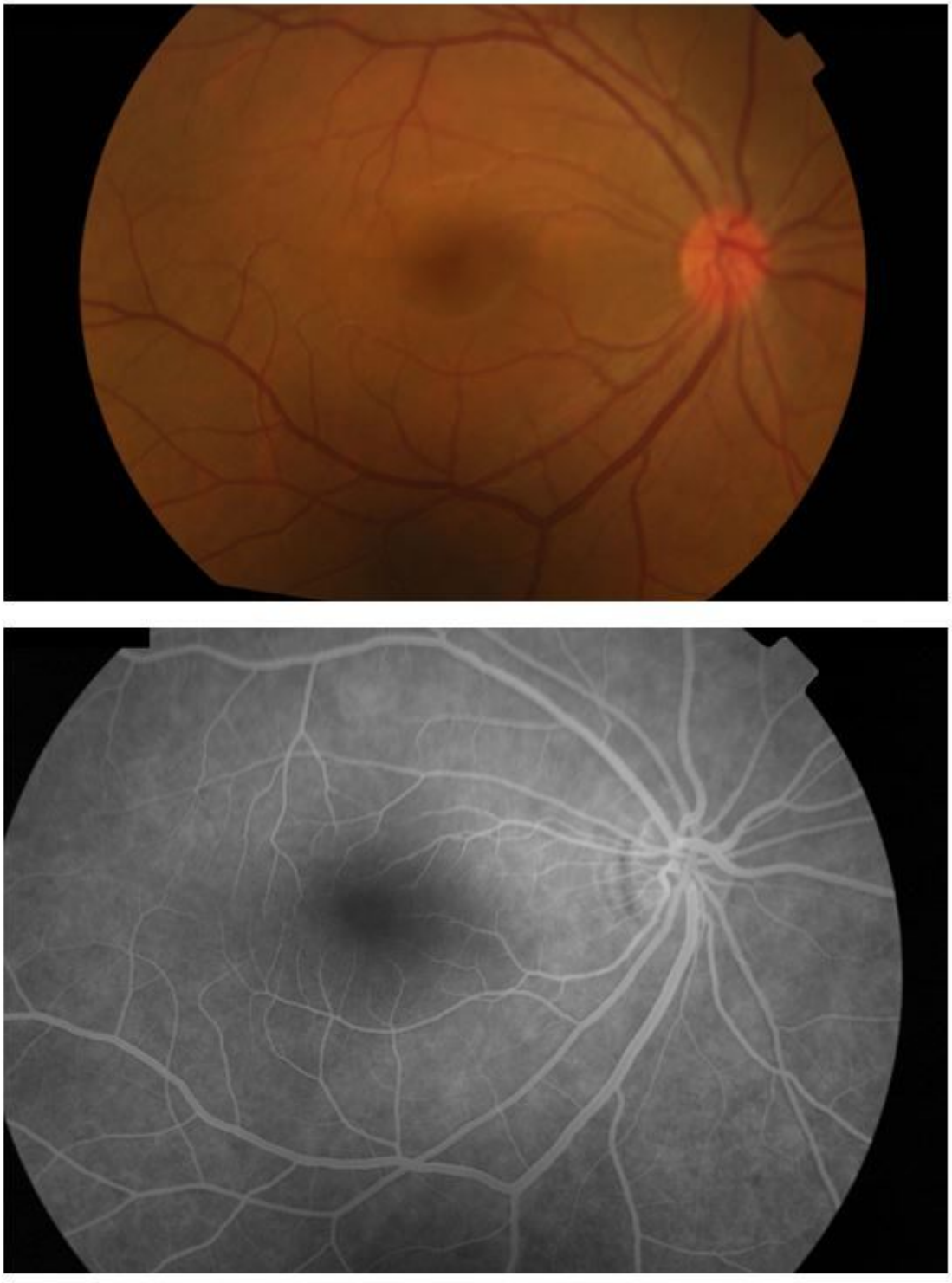

Figure 11

Upper – colour fundus photo of right eye, after commencement of treatment. Lower –Fluorescein Angiography of right eye, taken at mid-venous phase, after commencement of treatment.