



Nanophthalmic Eyes and its Associated Complications with Refractive Error Correction Using RGP Contact Lens - A Case Study

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Abstract

Nanophthalmos is one of the rare genetic diseases characterised by the presence of abnormally small eyes inducing high degree of hypermetropia. It is very often associated with primary angle closure glaucoma, uveal effusion, absence of foveal pit, shallow anterior chamber, diffuse macular thickening, rudimentary foveal avascular zone, scleral collagen fibers abnormalities etc. We report a case a 26 year old patient had axial length of 15.18mm (OD) and 15.24mm (OS). The patient was asymptomatic and had angle almost closed. The patient was prescribed a suitable power spectacle that improved his vision to 6/12 in both eyes. This study importantly focuses the incidence of angle closure glaucoma in nanophthalmic eyes. The angle closure glaucoma in nanophthalmic eyes is asymptomatic silent killer despite the fact that intraocular pressure is within the normal range. So, it is mandatory for the patients who are nanophthalmic to have glaucoma examination.

Keywords: Nanophthalmos; Genetic; Hypermetropia; Closure; Glaucoma; Axial Length; Pressure

Nanophthalmos is a rare genetic disease characterized by the abnormally small eyes secondary to compromised growth inducing high degree of hypermetropia [1,2]. It is very often associated with primary angle closure glaucoma, uveal effusion, absence of foveal pit, shallow anterior chamber, diffuse macular thickening, rudimentary foveal avascular zone, scleral collagen fibers abnormalities etc. [3,4]. It may be present with familial or sporadic disorder with autosomal-dominant or recessive inheritance. Five genes and two loci have been implicated in familial forms [3,5]. The five genes are MFRP, TMEM9, PRSS56, BEST1 and CRB1 [3]. The refractive error can be corrected by the spectacles as well as with contact lens despite having their few limitations [6,7]. However due to high power, optical aberrations are associated with the use of spectacle is comparatively more than aberrations associated with the contact lens. Usually the total dioptric power of eye is about 60D [8,9]. However, in this case the total power of the optical system of eye is

almost 73D in both eyes even if the power of crystalline lens is not considered when RGP is fitted [6,7].

Case Presentation

A 26 year old patient came to our OPD for LASIK opinion. His Chief complaints were redness, itching and watering since last 2 days. He had no history of ocular and systemic illness. He used spectacle for the first time when he was 5 years old and continued the same spectacle till he became 12 years old. At the age of 12, his spectacle prescription became +13.00DS (OD) and +13.50 (OS). He continued the same spectacle for 6 years. At the age of 18, he began to use soft contact lens for 2 years and since last 6 years he had been using the spectacle of +15.00DS(OD) and +16.00DS(OS). The visual acuities with PGP were 6/18 in both eyes. The dry acceptance were +15.25DS/-0.25DC*180 and +15.50DS/-0.50DC *140 in right and left eye respectively with visual acuity of 6/12 in both

eyes. The slit lamp examination was done. Mild swelling on upper eyelid, few SPKs on nasal side of cornea and mild congestion on conjunctiva were seen through slit lamp examination in right eye. However, anterior segment of left eye was within normal limit. Antibiotic and lubricant eye drops were prescribed for 3 days.

Follow up after 3 days

Non-Contact Tonometry values were 11 mm Hg(OD) and 13mm Hg(OS). The cycloplegic refraction was done using Tropicamide. The cycloplegic refraction revealed +18.00DS (OD) and +18.50 DS (OS).The visual acuity of each eye was same i.e.6/12.

The fundus exam showed hypermetropic fundus with absence of foveal pit in both eyes. However peripheral retinal was ok. The patient was called for follow up after 2 days.

Follow up after 2 days

The Dry acceptance values were +16.50DS (OD) and +16.50DS/-0.50DC*140 (OS).The Near Vision was N12 at 30cm (OU). The biometry was done using IOL MASTER 700. The axial lengths were 15.18mm(OD) and 15.24mm (OS). The central Anterior chamber depth were 2.93mm (OD) and 2.89mm (OS). The lens thickness is considerably less in right eye (1.39mm) but in left eye it was 2.30mm. Central Corneal Thickness were 497 micrometer (OD) and 499micrometer (OS). The keratometric values were 49.94D at 0 and 50.30D at 90 in right eye and 49.84D at 119 and 50.14 D at 29 in left eye. The gonioscopy revealed that none of the angle structure were visible indicating the close to zero angle grading. The anterior segment OCT (angular) was done which confirmed the gonioscopy findings. The patient was advised for all glaucoma work up but he denied. The patient was called for follow up after 2 days.

Follow up after 2 days

The patient came to Contact lens unit. The best corrected visual acuities with RGP contact lens (FP90, blue tinted with lenticular design) were 6/12 in both eyes. The Base curves of Contact were 6.75(OD) and 6.80 (OS) with total diameter of 9.8mm.The final powers of contact lens with best corrected Visual acuity of 6/12 in both eyes were +21.50DS (OD) and +22.00DS (OS). There was sufficient corneal coverage by the lens with well centration with lid fit. The overall fitting of contact lens was visually, optically and mechanically optimal. The patient was called for follow up after 1 week.

Follow up after 2 days

The patient was comfortable with the contact lens. The contact lens was well centered with sufficient corneal coverage. The visual acuities with contact lens were 6/12 in both eyes.

Discussion

Due to natural increase in size of the crystalline lens inside the small eye ball in patients with nanophthalmos, there is always a high risk of developing chronic angle closure painless glaucoma in middle age [1,8]. The central Anterior Chamber Depth is not informative in nanophthalmic eyes regarding glaucomatous changes [8,9]. Peripheral ACD is of utmost importance. Retinal changes include the macular hypoplasia, ocular cystinosis, retinal cysts, retinal detachment, cystoid macular oedema and pseudopapilloedema etc [5,6]. The hyperopic eye is due to short axial length (15-20) mm [1]. Nanophthalmos occurs very often bilaterally. The contact lens has widely increased the field of view and its reduced weight in comparison to the thick lens has increased its use especially while using for high refractive error correction [10,11].

Conclusion

There are many complications associated with the nanophthalmos. This study importantly focuses the incidence of angle closure glaucoma in nanophthalmic eyes. The angle closure glaucoma in nanophthalmic eyes is asymptomatic silent killer despite the fact that intraocular pressure is within the normal range. So, it is mandatory for the patients who are nanophthalmic to have glaucoma examination.

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