

## Unocular high myopia: A case series

Arti Sareen, Mukta Sharma, Sunder Singh Negi

From MO, Department of Ophthalmology, Deen Dayal Upadhyay Zonal Hospital (DDUZH) Shimla, Himachal Pradesh, India.

**Correspondence to:** Dr Mukta Sharma, Department of Ophthalmology, Deen Dayal Upadhyay Zonal Hospital Shimla - 171013, Himachal Pradesh. E-mail: rtsareen@hotmail.com

Received - 11 August 2019

Initial Review - 14 September 2019

Accepted - 24 September 2019

### ABSTRACT

Anisometropic myopia is a rare and unique entity in which the two eyes of the same individual have grown unequally. This poses the risk of amblyopia in the more myopic eye if not detected and corrected early in life. Here, we present a case series of four cases of unocular amblyopia. In all the four cases, there was a disparity in axial length of the two eyes. The other parameters including keratometry readings were normal in all the cases. This led to unocular myopia. The anisometropic amblyopia hence caused led to a decrease of vision in the concerned eyes. This unilateral amblyopia caused could have been easily prevented if the timely diagnosis had been made and treatment instituted early in life.

**Keywords:** Blindness, Myopia, Unocular, Visual acuity.

Though myopia is a very common condition and its incidence is on the rise, [1] it was estimated in 2010 that uncorrected refractive error was the most common cause of distance vision impairment affecting 108 million people, and was the second most common cause of blindness globally [2]. The prevalence of refractive error and related visual impairment in school-going children aged 5-15 years, in an urban population in New Delhi was 7.4% as reported by Murthy et al [3]. Myopia could be due to increased refractive power (either of the cornea or the lens) or due to an increased axial length. Mostly, it is found symmetrically in both the eyes.

Anisometropic myopia is a unique condition where ocular development, with an identical genetic background and identical environmental conditions, occurs asymmetrically producing significantly different refractive errors [4] which may lead to anisometropic amblyopia if not detected and treated early in life. We present a case series of 4 cases of unocular high myopia who presented to eye OPD within a span of 6 months. The age of the patients was 40 years, 35 years, 42 years and 24years. All four cases had resultant amblyopia due to ignorance and late detection.

### CASE SERIES

#### CASE 1

A 40-years-old male presented to Eye OPD with the chief complaint of a history of decreased vision in both his eyes (R>L) since childhood. On General physical examination, his vitals were stable and systemic examination was within normal limits. On local examination, his visual axis and pupillary reactions were normal. His vision in the right eye was finger counting (FC) 1m with an error of -21.0 DSph (after which he showed no improvement). His anterior chamber was normal on slit-lamp examination. The vitreous was degenerated and showed abundant vitreous strands. The fundus examination showed enlarged optic disc with a myopic crescent. The foveal reflex was dull and chorioretinal degeneration was present. The vision in the left eye was 6/18 which improved to 6/9 with -1.0DSph. The rest of the examination was normal in the left eye.

The intraocular pressure (IOP) was 12 and 14 mmHg in the right and left eye, respectively. The axial length was 29.41mm

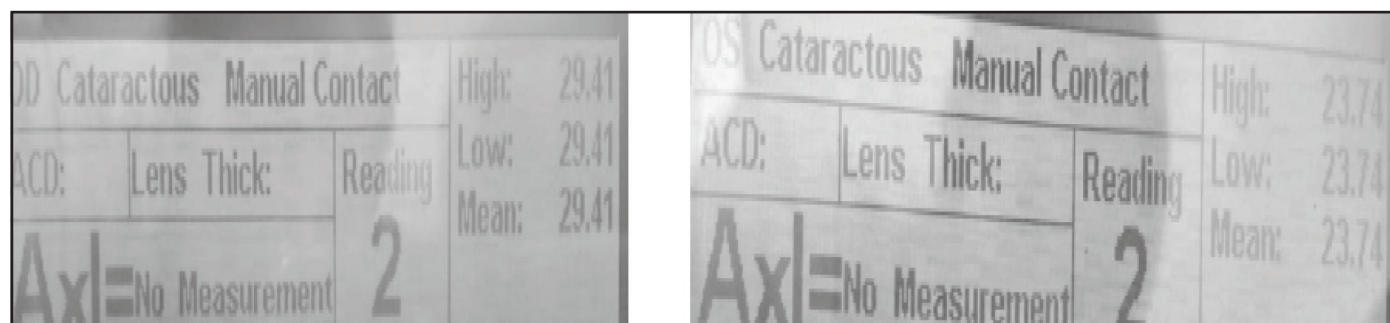
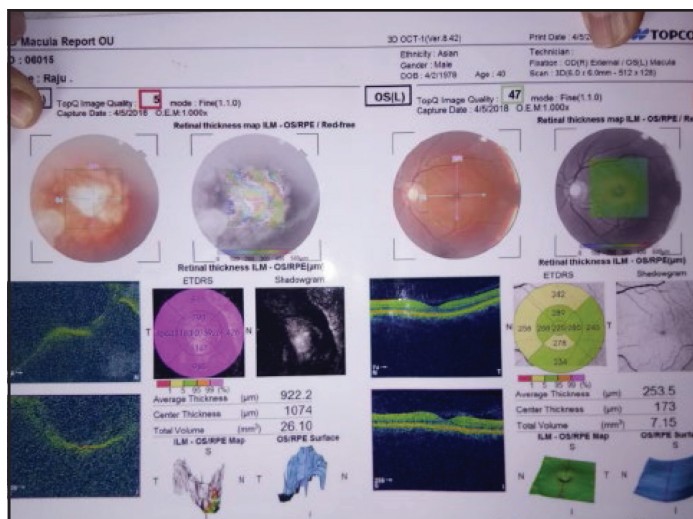


Figure 1: Difference seen in axial lengths of the two eyes of the same patient (case 1).



**Figure 2: OCT picture showing difference in fundii (case 2).**

in the right eye and 23.74mm in the left eye. The K1 and K2 readings were 44.05D/44.26D and 44.85D/44.30D in the right and left eye respectively. The screenshot of axial length of both the eyes was as shown in Fig. 1. The diagnosis of unioocular high myopia with anisometropic amblyopia was made. There was nothing that could be offered in the form of treatment as he had unioocular amblyopia for a long time (since childhood). The patient is on regular follow-up and has been told to report if he experiences any flashes of light or sudden onset of floaters.

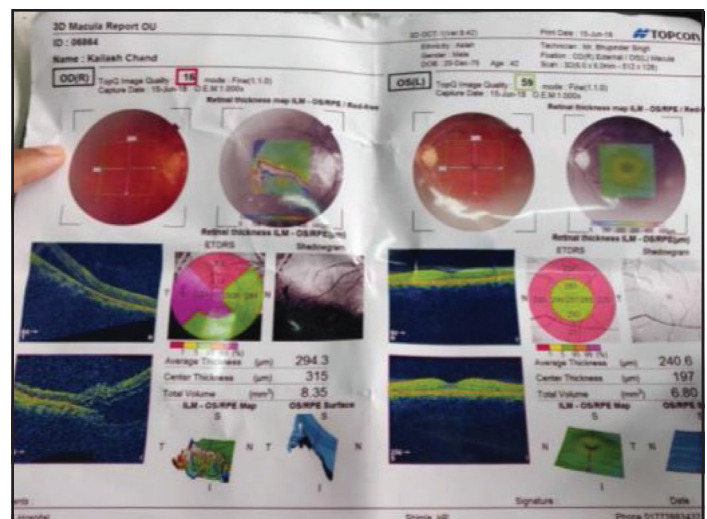
### CASE 2

A 35-year-old female presented to Eye OPD with a history of decreased vision in both her eyes (L>R) since childhood. Her general physical and systemic examination was within normal limits. On local examination, the visual acuity in her right eye was 6/60 which improved to 6/9 with -4.5DSph. The rest of the examination was normal. The left eye had a visual acuity of FC 1 foot with an error of -20.0DSph with which the patient showed no improvement. The fundus examination showed enlarged optic disc with myopic crescent and peripapillary atrophy and chorioretinal degeneration.

The IOP was 11 and 15 mmHg in the right and left eye, respectively. The axial length was 24.93 mm in the right eye and 29.60 mm in the left eye. The K1 and K2 readings in the right and left eye were 44.05D and 44.85D respectively and 44.30D and 46.65D in the left eye respectively. Her Optical Coherence Topography (OCT) picture was as shown in Fig. 2. She was prescribed glasses for her right eye as it showed improvement to 6/9 and was kept under regular follow-up and report early if she had experienced and floaters or flashes.

### CASE 3

A 42-years-old male presented in Eye OPD with the chief complaint of a history of sudden decrease of vision in his right eye which already had decreased vision since childhood. His



**Figure 3: OCT picture showing inferior RD in the right eye (case 3).**

general and systemic examination was found to be normal. On ocular examination, his visual axis and pupillary reactions were normal. His vision in the right eye was hand movements close to face (HMCF) with an error of -10.0 DSph (after which he showed no improvement). His anterior chamber was normal on slit-lamp examination. The vitreous was degenerated and showed abundant vitreous strands and cells in vitreous. The fundus examination showed enlarged optic disc with a myopic crescent. There was a fresh retinal detachment (RD) inferiorly (Fig. 3). The vision in the left eye was 6/6. The rest of the examination was normal in the left eye.

The IOP was 4 and 16 mmHg in the right and left eye respectively. The axial length was 27.77mm in the right eye and 23.31mm in the left eye. The K1 K2 readings in the right were 40.10D and 41.50D respectively and 41.20D and 41.65D in the left eye respectively. He was referred to a vitreoretinal surgeon for his retinal detachment.

### CASE 4

A 24-years-old male presented to Eye OPD with the chief complaint of a history of decreased vision in his left eye for which he wanted a visual disability certificate. The general physical examination was normal. Onocular examination, his visual axis and pupillary reactions were normal. His vision in the right eye was 6/6 with no error. His anterior chamber was normal on slit-lamp examination. The vision in the left eye was HMCF which showed no improvement and had an error of -12DSph with -2.0D Cyl at 180 degrees.

The fundus examination showed enlarged optic disc with myopic crescent and peripapillary atrophy and chorioretinal degeneration. The IOP was 16 and 18 mmHg in the right and the left eye respectively. The axial length was 23.83mm in the right eye and 27.06mm in the left eye. The K1 K2 readings in the right were 44.05D and 44.25D respectively and in the left eye were 44.27D and 43.78D respectively. He was issued a visual disability certificate with 30% visual disability and kept under regular follow-up.

## DISCUSSION

Anisometropia decreases during the early years of life (presumably through emmetropization and binocular vision development) and increasing during childhood and adolescence (associated with myopia development), throughout middle age (approximately 30 to 50 years) the prevalence of anisometropia remains relatively stable. This may be related to the stability of distance refraction during this period of adult life [5,6,7,8,9]. So, in all our four cases the amblyopia had set in at an early age but due to ignorance these patients never seemed medical advice.

Unioocular high myopia, though, a rare finding could either be due to different axial lengths or different refractive powers (corneal or lenticular) of both the eyes. To differentiate between the two, we find out the axial length and the corneal powers of both the eyes. It has been found that axial length elongation of the more myopic eye was responsible for the unilateral high myopia in 94% of the cases as shown by results in other studies [10,11]. In all our 4 cases too, the different axial length was the cause of anisometropia.

The main aim of treatment in such cases is a good binocular vision. Effective myopia control results in less severe myopia and less vitreous chamber elongation than would otherwise occur [12]. Pang Yi *et al* showed improvement in visual acuity of the amblyopic eye in children aged 4-14 years if a full refractive correction was accompanied with patching and near activities [13]. A study by Pollard *et al* reported visual acuity of 20/40 or better in patients of unilateral myopia after amblyopia treatment which was possible only if such cases were detected earlier than 6-7 years of age [14]. The Pediatric Eye Disease Investigator Group studies 507 amblyopic subjects 7 to 17 years and referred that younger age was associated with greater visual acuity [15].

Amblyopia treatment was not possible in our cases as the age of the patients was past the age of amblyopia treatment. The unioocular decrease in vision in all the 4 cases could be attributed to anisometropic amblyopia. Also, all the cases had no associated findings such as strabismus, aniridia, cataract etc which could have also led to early detection. The prognosis for good vision with normal binocularity lied in the early detection and timely management of these cases with full refractive correction, patching, and near activities.

## CONCLUSION

These cases emphasize the need for creating awareness and early referral to an ophthalmologist for detailed checkups if decreased

visual acuity (especially unioocular) is suspected in children. Also, the regular health checkups of school-going children need to be monitored for their efficacy. Unioocular visual loss in all these patients could have been prevented if the timely intervention had been done.

## REFERENCES

1. Holden BA, Frickle TR, Wilson DA, Jong M, Naidoo KS, Sankaridurg P, *et al.* Global Prevalence of Myopia and High and Temporal Trends from 2000 through 2050. *Ophthalmol.* 2016;123:1036-42.
2. Bourne RR, Stevens GA, White RA, Smith JL, Flaxman SR, Price H, *et al.* Causes of vision loss worldwide, 1990-2010: a systematic analysis. *Lancet Glob Health.* 2013;1:e339-49.
3. Murthy GV, Gupta SK, Ellwein LB, Munoz SR, Pokharel GP, Sanga L, *et al.* Refractive error in children in an urban population in New Delhi. *Invest Ophthalmol Vis Sci.* 2002;43:623-31.
4. SJ Vincent, Collins MJ, Read SA, Carney LG. Myopic anisometropia: ocular characteristics and aetiological considerations. *Clin Exp Optom.* 2014;97:291-307
5. Linke SJ, Bavaria J, Munzer G, Steinberg J, Richard G, Katz T. Association between ocular dominance and spherical / astigmatic anisometropia, age, sex: analysis of 10264 myopic individuals. *Invest Ophthalmol Vis Sci.* 2011;52:9166-73.
6. Guzowski M, Fraser Bell S, Rohtchina E, Wang JJ, Mitchell P. Asymmetric refraction in an older population: the Blue Mountains Eye Study. *Am J Ophthalmol.* 2003;136:551-3.
7. Haegerstrom-Portnoy G, Schneck ME, Brabyn JA, Lott LA. Development of refractive errors into old age. *OptimVus Sci.* 2002;79:643-649.
8. Weale RA. On the age-related prevalence of anisometropia. *Ophthalmic Res.* 2002;34:389-92.
9. Haegerstrom-Portnoy G, Schneck ME, Lott LA, Hewlett SE, Brabyn JA. Longitudinal increase in anisometropia in older adults. *OptimVusSci* 2014;91:60-7.
10. Sorsby A, Leary GA, Richards MJ. The optical components in anisometropia. *Vis Res.* 1962;2:43-51.
11. Weiss AH. Unilateral high myopia: optical components, associated factors and visual outcome. *Br J Ophthalmol.* 2003;87:1025-31.
12. Fanai V, Usharani L, Kamei GL, Soreingam K. Unilateral High Myopia and its Complications- A case report. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS).* 2014;04-6.
13. Pang Y, Allision C, Frantz KA, Block S, Goodfellow GW. A prospective Pilot Study of Treatment Outcomes for Amblyopia Associated with Myopic anisometropia. *Arch Ophthalmol.* 2012;130:579-84.
14. Pollard ZF, Manley D. Long term results in the treatment of unilateral high myopia associated with amblyopia. *Am J Ophthalmol.* 1974;78:397-9.
15. Scheiman MM, Hertle RW, Beck RW, Edwards AR, Birch E, Cotter SA, *et al.* Pediatric Eye Disease Investigator Group. Randomized trial of treatment of amblyopia in children 7 to 17 years. *Arch Ophthalmol.* 2005;4:437-47.

*Funding: None; Conflict of Interest: None Stated.*

**How to cite this article:** Sareen A, Sharma M, Negi SS. Unioocular high myopia: a case series. *Indian J Case Reports.* 2019;5(5):401-403.

Doi: 10.32677/IJCR.2019.v05.i05.001