as in Wyburn-Mason syndrome.[5] On the other hand, iris racemose hemangioma, conjunctival racemose hemangioma—and now episcleral racemose hemangioma—have not been associated with a systemic condition.[6] In our case, there were no neurological findings, and brain MRI was unremarkable.

There are several episcleral/conjunctival vascular lesions that can resemble the episcleral racemose hemangioma including lymphangioma, varix, cavernous hemangioma, and capillary hemangioma. Conjunctival lymphangioma/lymphangiectasia presents with dilated randomly ectatic lymphatic vessels of variable diameter and with surrounding hemorrhage, occasionally with a deeper, diffuse orbital component.[1,7,8] Conjunctival varix appears with a solitary dilation of a preexistent vein, rarely found isolated to the conjunctiva, and can undergo slow thrombosis with phlebolith formation.[1,9] Conjunctival cavernous hemangioma occurs in the deep stroma as a red or blue multilobular mass, appearing like concord grapes, histopathologically composed of dilated congested veins separated by thick connective tissue septae.[7] Finally, conjunctival capillary hemangioma typically presents in infancy, although acquired lesions in adults have been reported, and this lesion appears red, without hemorrhage, and vascular details are not resolvable.[1,7]

Literature Search

PubMed was queried without date or language restriction on July 26, 2018, using the following terms: *sclera racemose hemangioma* and *episclera racemose hemangioma*.

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Mirror image hypermetropic anisometropia in a pair of monozygotic twins

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In monozygotic twins two embryos are formed from a single fertilized egg. In "mirror image twins" identical siblings have reverse asymmetric features in the right and left sides of the body. We report the case of twins with mirror-image hypermetropic anisometropia. They were referred to an ophthalmologist at the age of 3.5 years for amblyopia. Cycloplegic refraction of twin 1 was +1.00 in the right eye and +4.50 −0.75 ×180 in the left eye; of twin 2, +4.75 −1.00 ×180 and +1.25. Keratometry and axial length were measured with Lenstar LS 900 when the twins were 6 years of age. In twin 1, the axial length was 22.18 mm in the right eye and 20.97 in the left eye; in twin 2, 20.94 mm and 22.13. Keratomtry of both eyes of these twins was relatively equal.

Case Report

Female monozygotic twins were referred to Shiraz University of Medical Sciences at the age of 3.5 years for evaluation of amblyopia. The twins shared physical characteristics (weight, height, head circumference, iris color, interpupillary distance), and their zygosity was assessed by the pediatrician and determined by questionnaire and standard genotyping. Twin 1 was left-handed and twin 2 was right-handed. Both twins underwent a complete ophthalmic examination, including visual acuity, ocular motility testing, cycloplegic refraction, and fundus examination. Cycloplegic refraction was performed 45 minutes after instillation of 2 drops of cylopentolate 1% using the Topcon RM-800 autorefractometer (Topcon Medical System, Japan).

On examination, "mirror image" hypermetropic anisometropia was discovered. Twin 1 had anisometropia with hypermetropic astigmatism in the left eye. Her cycloplegic refraction was +1.00 in the right eye and +4.50 −0.75 ×180 in the left eye. Twin 2 had anisometropia with hypermetropic astigmatism in the right eye. Her cycloplegic refraction was +4.75 −1.00 ×180 in the right eye and +1.25 in the left eye. The best-corrected visual acuity was 20/100 in the amblyopic eyes and 20/25 in the

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Table 1. Biometric data of twins

	Twin 1		Twin 2	
	Right eye	Left eye	Right eye	Left eye
Axial length, mm	22.18 mm	20.97 mm	20.94 mm	22.13 mm
K1	42.55 D* 178°	42.19 D* 175°	42.42 D* 180°	42.46 D* 176°
K2	42.81 D* 88°	43.05 D* 85°	42.86 D* 90°	42.70 D* 86°
Mean K	42.68 D	42.62 D	42.64 D	42.58 D

D, diopter; *K*, keratometry reading.

unaffected eyes. There was no ocular deviation. Fundus examination was normal. After prescription of glasses, their amblyopia was treated by patch therapy. They were reexamined at 6 years of age. The best-corrected visual acuity had improved to 20/30 in the amblyopic eyes and 20/20 in the unaffected eyes. Keratometry and axial length were measured with Lenstar LS 900 (Haag-Streit, Koeniz, Switzerland). See Table 1.

Discussion

In a study on monozygotic and dizygotic twins, Hammond and colleagues[1] reported that heritability was 90% for myopia, 89% for hyperopia, and 47%-49% of total astigmatism. In their study of monozygotic and dizygotic twins, Dirani and colleagues[2] reported that heritability of refractive error was 88% in men and 75% in women; heritability of the axial length was 94% in men and 92% in women.[2]

In identical twins, a fertilized egg splits within 3-8 days of gestation. In mirror image twins, this splitting occurs later and results in reverse phenotypic differences between the right and left sides.[3] Mirror imaging has been observed in approximately 25% of identical twins, although there have been very few reports of mirror imaging in the ophthalmic literature.

Stanković-Babić and colleagues[4] reported 12-year-old twins with mirror-image myopic anisometropia associated with extensive chorioretinal atrophy and amblyopia. These patients had moderate myopic astigmatism in opposite eyes. Axial length measurements were 26.22 mm/23.29 mm in one and 23.61 mm/26.67 mm in the other. Two pairs of mirror image myopic anisometropia have been reported in Japan.[3] One pair had a high amount of myopic anisometropia associated with exotropia and macular hypoplasia. The more myopic eyes were 3.02 and 2.88 mm longer than the other eyes. Another pair had moderate myopic anisometropia. The more myopic eyes were 2.11 and 1.34 mm longer than the other eyes. A pair of identical twins with mirror-image minimal myopic anisometropia and intermittent exotropia has also been reported in Korea.[5] In 3 of these pairs of twins who presented with mirror image axial myopic anisometrpia, the difference of axial lengths between the eyes had been the causative factor.[3,4]

Dirani and colleagues reported 2 pairs of mirror-image congenital esotropia. In one pair it was associated with bilateral concordant high hypermetropia, +5.75 D and +5.75 D in one twin and +6.75 and +7.50 in the other.[6] In another pair, congenital esotropia was associated with anisometropia, less myopia of the esotropic eye in one twin and more hypermetropia of the esotropic eye in the other.[7] A pair of 6-year old identical twins with mirror-image esotropia and bilateral hypermetropic astigmatism has also been reported.[4]

Ocular biometric parameters, including corneal power and axial length have been evaluated in several studies to clarify the cause of the anisometropia. In one review, the investigators concluded that difference in axial length is the main cause of myopic anisometropia and that other characteristics, such as corneal refractive power, contributes little.[8] In a study of 30 school-age patients with amblyopia, Burtolo and colleagues noted that difference in axial length is responsible for hypermetropic anisometropia.[9]

Park and colleagues[10] reported a sister and brother with reverse myopic anisometropia. The differences in spherical equivalents between the two eyes were 12.50 D in the sister and 6.875 D in the brother. Keratometry of the right and left eyes was nearly the same in both subjects. The axial lengths of the eyes were 25.67 and 24.15 mm in the sister and 23.50 and 25.41 mm in the brother. It can be considered as evidence that severe myopic anisometropia may be a genetic phenomenon.

To our knowledge, this is the first report of mirror-image hypermetropic anisometropia. The corneal power of both eyes of these twins was the same, but the interocular difference in axial length was 1.21 mm in twin 1 and 1.19 mm in twin 2. Clearly the main cause of anisometropia in these identical twins was the interocular difference in axial length. This case underscores the possible genetic basis of hypermetropic anisometropia.

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Microperimetry and swept-source optical coherence tomography in the assessment of the preferred retinal locus in a child with macular retinoblastoma in the remaining eye

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Assessing the visual capabilities that remain to children affected with bilateral retinoblastoma has relied on psychophysical tests based on recognition visual acuity. We report a case in which fundus-driven perimetry and swept-source optical coherence tomography was performed in a patient with a macular tumor in the remaining eye as a novel way of further assessing fixation after oncological disease and treatment.

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Retinoblastoma is the most common intraocular malignancy in infancy.[1] Clinically it can present with bilateral tumors and multiple foci. Advances in the management of children with bilateral disease have led to improved rates of survival and globe preservation. Nevertheless, 38% of children with bilateral involvement have some form of visual impairment.[2]

Microperimeters have emerged as a valuable resource for quantitative measure of visual field sensitivity while having a live view of the fundus,[3] allowing a better understanding of fixation patterns in several pediatric conditions with macular involvement,[4] but it has not been previously described in retinoblastoma patients. The diagnostic abilities of microperimeters broaden our understanding of the residual visual function in those patients with poor fixation stability or extrafoveal fixation patterns, particularly in those affected by macular tumors. Once an eccentric preferred retinal locus (PRL) has been identified, rehabilitation strategies, such as biofeedback training can then be considered to enhance quality of life.[5] Children affected with macular retinoblastoma can show unexpectedly good visual behavior, given the extent of retinal damage from the disease itself or administered treatments.[6] This depends on the nature of the adaptations made by the child's visual system to use a parafoveal location as a PRL. We report the use of microperimetry in locating the new fixation area of a child affected with a macular tumor in her remaining eye and the use swept-source optical coherence tomography (SS-OCT) to study the structure of the retina in the identified area.

Case Report

This study project was approved by the Royal London Hospital Institutional Review Board. Our purpose was to assess children with one remaining eye and to confirm that the PRL was used for day-to-day activities and not suppressed when the other eye was used. We did not enroll for perimetry children with high-amplitude nystagmus, because the determination of the PRL would have been difficult.

Of 5 patients affected with bilateral retinoblastoma enrolled and consented, only 1 could complete the extensive clinical examination, microperimetry testing, and swept-source optical coherence tomography (SS-OCT) with reliable results at 9 years of age. This patient had presented to the Retinoblastoma Unit for treatment of bilateral retinoblastoma with macular involvement. Treatment with systemic chemotherapy, focal laser and cryotherapy was administered prior to enucleation of her left eye for reactivated retinoblastoma at 8 years of age. Nine months after enucleation, her best-corrected visual acuity