blind after 20 years of age.[3,8] Thus, it is important to investigate glaucoma in BBS patients in order to minimize the deleterious effects of this possible association in a syndrome with bad visual prognosis.

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Sir,

Corneal endothelial cell density in a normal Pakistani population

A healthy corneal endothelial cell count is vital for corneal clarity. The corneal endothelial cell density is known to decrease with age in normal populations. Corneal endothelial cell densities are important considering suitable corneal buttons for penetrating keratoplasties. These densities may also prove useful in identifying populations at risk of developing corneal decompensation following cataract extraction by phacoemulsification.

We collected data, by prospective data collection, from a Pakistani Punjabi population presenting in our outpatients department, with complaints ranging from decreased vision due to cataracts, refractive errors, and other pathological conditions unrelated to the anterior segment. Patients with corneal pathologies, dystrophies, dry eye states, ocular trauma, ocular surgery, contact lens wear, glaucoma or increased IOP, uveitis, and diabetes were excluded.

A total of 450 eyes of 225 Pakistani volunteer patients were included aged between 20 and 70 years and of both sexes. The mean age of the patients was 45.4 years. In all, 118 males and 107 females were included. Corneal endothelial cell densities were counted on Konan Non Con Robo SP6000 specular microscope by fixed frame method (Figure 1).

On average, our results showed a mean endothelial cell count of $2654 \pm 341/mm^2$ (1SD), with a range of 1960–3691 endothelial cells/mm^2. Detailed results are shown in Table 1.The breakdown of mean endothelial cell density by age clearly shows decreasing cell counts with increasing age (Figure 2). We compare the endothelial cell counts in our population to those previously published in the literature (Table 1).

Discussion

Age-related changes in the density of the human corneal endothelium are well described in literature.[1,2] Our figures for the corneal endothelial cell counts in a Pakistani Punjabi population closely resemble Indian and Caucasian eyes but show significant differences when compared to Japanese eyes.[3] However, the data published by Matsuda *et al*[4] considers smaller number of eyes when compared to the other two quoted figures.

The strength of our series is the large number of patients with apparently healthy corneas, prospective data collection, and relatively large number of patients in each patient subgroup.

These endothelial cell counts are significant as they identify potential healthy corneal graft donors in our population. These populations would be expected to have the same risks of developing corneal decompensation as Caucasian and Indian populations, following cataract extraction by phacoemulsification.

Our figures show that Pakistani Punjabis may be potential donors of corneas with good endothelial counts. Punjabi populations in Pakistan and Asian British populations belonging to the same ethnic backgrounds in England may be expected to have similar patterns of corneal endothelial cell density as shown by our small study.

Encouraging more organ donations in the UK and abroad from these populations may mean significant work.[5] Significant changes in opinion in these populations would be needed to encourage more organ donations. Attitudes and perceptions may limit the potential of organ harvesting for transplant surgery especially in ethnic minority groups.[6] Pakistani Muslims generally have adverse feelings towards organ donation.[7] This has its roots in tradition and partly in personal interpretations of religion. Religious scholars from the south Asia (Indo-Pak regions) have diverse views on this topic, which may have an impact on organ donation decisions by potential donors. However, most Islamic scholars favour organ transplantation including corneal transplant surgery.[8] Organ donation would be considered a matter of personal interpretation of religion and choice of individuals. This is an issue, which needs tactful approach, when counselling for potential organ donation in ethnic minority groups.

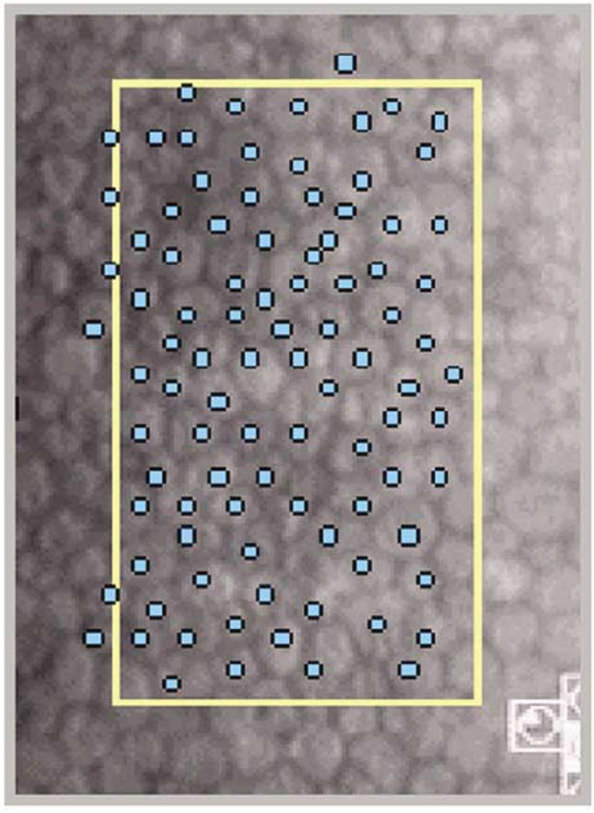

Figure 1 Endothelial cell count (fixed frame method).

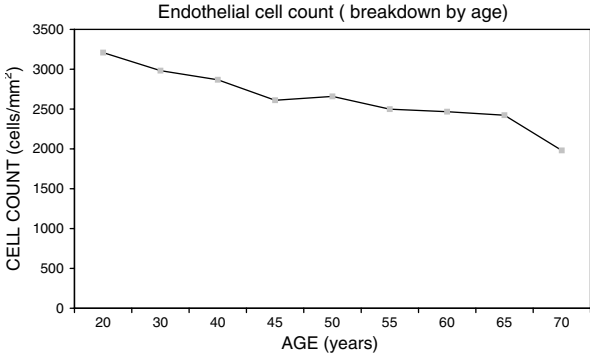

Figure 2 Graph showing decreased endothelial cell counts with increasing age in our patients.

Table 1 Results and number of eyes involved compared to previously published studies of Rao *et al* and Matsuda *et al*

Age group (years)	*No. of eyes*	*Mean cell density (cells/mm² ±1SD) our study*	*No. of eyes*	*USA*[4] *(cells/mm² ±1SD)*	*No. of eyes*	*Japan*[4] *(cells/mm² ±1SD)*	*No. of eyes*	*India*[3] *(cells/mm² ±1SD)*
20–30	110	2981±190	11	2997±324	18	3893±259	104	2782±250
31–40	80	2842±194	6	2739±208	10	3688±245	96	2634±288
41–50	82	2585±208	11	2619±321	10	3749±407	97	2408±274
51–60	76	2452±158	13	2625±172	10	3386±455	98	2438±309
61–70	102	2338±282	08	2684±384	6	3307±313	88	2431±357

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Sir,

Treating obstructive sleep apnoea syndrome: does it improve visual field changes?

We report suspicious glaucomatous field changes improving with continuous positive airway pressure (CPAP) in a patient diagnosed with obstructive sleep apnoea syndrome (OSAS).

Case report

A 49-year-old man reported difficulty in focusing for near, intermittent diplopia and blurred vision. He complained of snoring, hypersomnolence, and a family history of glaucoma. Right visual acuity was 6/4 with $+0.75/+0.50\times55$, Left 6/5 with $+1.50$ DS. N5 for near with $+2.00$ add.

Intraocular pressure on applanation tonometry was 17 mmHg in both eyes. Discs were healthy with 0.4 cup–disc ratio. Cover tests and ocular motility were normal. Automated Humphreys 24-2 visual field (VF) test showed a bilateral glaucomatous upper arcuate scotoma with good reliability indices, test duration of 10 min (Figure 1) that was reproducible. Gonioscopy did not show evidence of narrow angles. Thyroid function tests and MRI were normal.

Oximetry diagnosed severe obstructive sleep apnoea with a 58% lowest desaturation point. CPAP relieved symptoms immediately. Over the next 2 years, right VF improved with reduced test duration (Figure 2).

Comment

Obstructive sleep apnoea is characterized by intermittent pharyngeal airway closure with cessation of breathing during sleep, terminated by arousal. It presents as excessive daytime fatigue with decreased cognitive abilities.

OSAS is diagnosed by overnight polysomnography and calculating respiratory disturbance index, that is, total apnoeas and hypopnoeas divided by the hours of sleep. Patients are treated with CPAP during sleep. Early recognition and treatment of SAS avoids cardiovascular and neurological complications.[1] OSAS has been reported in association with primary open angle glaucoma.[1] Geyer *et al*[2] found equal prevalence of glaucoma in OSAS as in the general population. Ophthalmic findings in OSAS are floppy eyelid syndrome,[3,4] keratoconus,[5] papilloedema,[6] and ischaemic optic neuropathy.[7] Optic nerve vascular dysregulation secondary to OSAS-induced arterial hypertension and arteriosclerosis or the imbalance between nitric oxide (a vasodilator) and endothelin (a vasoconstrictor) has been suggested to contribute to optic neuropathy.[7,8] There have been no reports of VF changes in OSAS patients before or after treatment. Improved VF could be due to improved cognitive ability and alertness following CPAP. Patients with OSAS, visual symptoms, and suspicious VF should be tried with CPAP.