Introduction

Primary angle closure glaucoma (PAC(G)) is the major form of glaucoma in Asia, compared to primary open angle glaucoma (POAG), which is the predominant disease among Caucasians and Africans.

In China, it is estimated that PAC(G) affects 3.5 million people and 28 million have blindness due to PAC(G) in Mongolia, Singapore, China and India. By 2030, PAC(G) will affect 300 million and 3.5 million will be blind.

PAC(G) has been recognized as a common condition in Europeans, sparse data suggests that PAC(G) is uncommon among European-derived people. It has been reported that there is a prevalence rate of around 0.1% in the population aged 40 years and older.

A population-based study in northern Italy found a higher prevalence of 0.8%.

Prevalence, clinical types, association with peripheral anterior chamber depth in the Caucasian and African populations has not been recognized as a common condition in Europeans, sparse data suggests that PAC(G) is uncommon among European-derived people. It has been suggested by Quigley that the choroid has a significant role in the mechanism of angle closure, and the choroidal expansion theory. Increases in the volume of the anterior choroid (uveal expansion) may influence the ciliary body. This may have a mechanical effect causing forward and upward rotation of the iris causing narrowing of the angles.

Cross-sectional Ciliary body area was measured in 4 quadrants from the edge of the pars plana to the ciliary sulcus. The anterior margin being the suprachoroidal space, and sclero-choroidal margin.

The mean CBA for these 4 quadrants was calculated and compared to a control group of 30 normal eyes with open angles of a similar axial length (AXL), and ethnicity (caucasian). Lens thickness (LT) was also measured. The two groups were age and sex matched.

Statistical analysis was by analysis of variance.

Methods

Consecutive patients with a diagnosis of primary angle closure glaucoma (PAC(G)), as diagnosed by gonioscopy, were recruited from glaucoma clinics at Birmingham & Midland Eye Centre, Birmingham, UK.

Exclusion criteria: Any other ophthalmic pathology, previous surgery.

Fifty eyes (25 patients) underwent UBM using a Lin 50 UBM probe (Quantel medical, Clermont Ferrand) and SL-OCT examination (Heidelberg Engineering, Germany).

A scan biometry was also performed: measuring axial length (AXL), lens thickness (LT), and anterior chamber depth (CBA).

Pupil block was identified by the iris contour as per UBM. As shown in Figure 1 below.

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Results

The mean AXL in the eyes with pupil block was 22.3 mm (range 20.8-23.4 mm), compared to 22.4 mm in the controls (range 21.0-23.5 mm).

Mean LT was 4.83 mm in the group with pupil block and 4.36 mm in the controls.

The mean cross sectional area of the ciliary body was 1.92 mm² in the group with pupil block and 1.35 mm² in the controls.

Significance of p<0.025 was noted between the two groups in lens thickness and ciliary body area.

Conclusions

Eyes with pupil block revealed significant increases in lens thickness and ciliary body area. The effect of lens thickness in pupil block is well described, this is the first time that increased ciliary body area has been described as a possible mechanism in pupil block and subsequent angle closure. As the ciliary body is a uveal extension of the choroid, this study supports Quigley’s theory that uveal expansion is a possible mechanism in angle closure glaucoma.

Gohdo found thin ciliary bodies in patients with narrow angles. He suggested that ciliary body atrophy causes anterior rotation of the ciliary processes due to reduced attachment of the ciliary body to the scleral spur. However their study was limited as it included only the meridional cross-section of the ciliary body.

In common with other Caucasians with angle closure the axial lengths of patients in this study were shorter than the population mean, and therefore may have influenced the thickness of the anterior choroid and hence ciliary body area.

The study highlights the need to evaluate the size as well as the anterior rotation of the ciliary body in patients with pupil block. Furthermore, this can only be achieved using ultra biromicroscopy, as anterior segment OCT does not give a sufficiently detailed view of the ciliary body.

References