

学 位 論 文 要 旨

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論 文 名 前眼部光干渉断層計を用いた片眼性偽落屑症候群の前眼部形態の検討：
両眼不对称発症機序の解明

Pseudoexfoliation (PEX) syndrome is a common age related disorder of the extracellular matrix that can affect 10%–20% of people older than 60 years worldwide. The ocular manifestation of PEX syndrome is the production and progressive accumulation of abnormal extracellular fibrillar material in almost all the inner wall tissues of the anterior segment of the eye. This characteristic alteration predisposes the eye to a broad spectrum of intraocular complications including phacodonesis and lens subluxation, angle closure glaucoma, melanin dispersion, poor mydriasis, blood-aqueous barrier dysfunction, posterior synechiae, etc.

Up to 76% of patients with PEX are initially diagnosed as having unilateral PEX. However, several reports on the follow up of patients with unilateral PEX documented that 74% to 81.6% of the unilateral cases became bilateral, suggesting that unilateral PEX is in fact a bilateral but asymmetric condition. The factors affecting the conversion from unilateral to bilateral disease are not known, and the pathogenic mechanism underlying the asymmetric condition has not been determined.

The aim of this study was to explore the mechanism underlying the asymmetry of unilateral PEX. We used anterior segment optical coherence tomography (AS-OCT) to study patients clinically diagnosed with unilateral PEX. The dynamic dark-light changes of anterior chamber angle (ACA) and iris configurations were captured with AS-OCT real time video recording. Comparisons were made for the morphology of the anterior segment of affected eyes, their fellow eyes and normal controls.

METHODS

Subjects

We studied 45 consecutive patients with unilateral PEX syndrome and Forty-five age- and sex-matched normal controls.

AS-OCT Measurement and Image Processing

Fourier domain AS-OCT (Swept-source 1000 CASIA) was used to capture the changes of the ACA and the iris during pupillary dilation and light-induced constriction. The following parameters were analyzed: **(A) Anterior chamber parameters:** ①angle measurements (angle opening distance at 500 μ m, AOD500; trabecular-iris space at 500 μ m, TISA500 and trabecular-iris angle at 500 μ m, TIA500), ②central anterior chamber depth (ACD), and ③pupillary diameter. **(B) Iris configurations:** ④iris thickness (IT) at the dilator muscle region (DMR) measured at one-half of the distance between the scleral spur (SS) and the

pupillary margin; iris thickness at the sphincter muscle region (SMR) measured at 0.75 mm from the pupillary margin, ⑤iris convexity (IC), and ⑥iris area. (C) **Iris-lens contact distance (ILCD)**: A customized soft was developed for the measurement of the iris-lens contact distance.

RESULTS

Anterior Chamber Angle (ACA) Morphology

In the dark, the AOD500 between the three groups were not significant. When the pupils were constricted by light, the AOD500 of the PEX eyes was significantly smaller than that of the fellow eyes ($P=0.021$) and the normal eyes ($P=0.008$). The AOD500 of the fellow eyes was also significantly smaller than that of the normal eyes ($P=0.037$). The dark-to-light changes of the TIA500 and TISA500 showed similar results among the three groups.

Iris Configuration

The mean iris convexity of the PEX eyes was $286.3\pm 63.7\mu\text{m}$ in the dark and $251.5\pm 72.4\mu\text{m}$ in the light. The iris convexity was significantly greater in the PEX eyes than that of their fellow eyes both in the dark and the light ($P=0.029$ and $P=0.038$, respectively; paired t -tests). The convexity of the iris of the fellow eyes was also larger than that of the normal controls.

Iris-Lens Contact Distance (ILCD)

The differences in the ILCD between PEX and fellow eyes were significant both in dark and light ($P=0.001$ for both). In the light, the ILCD of the fellow eyes was also significantly longer than that of normal control eyes ($P=0.035$)

CONCLUSION

Our data revealed that PEX eyes had significantly shallower anterior chamber, decreased ACA in light and increased iridolenticular contact distance. These features may compose a unique anterior chamber microenvironment of hypoxia, increased concentration of inflammatory cytokines which are all responsible for the development or progress of PEX. Fellow eyes shared similar findings but could be at a preclinical stage. The discrepancy of anterior chamber morphology between PEX and fellow eyes could be the underlying determinant for the asymmetry in unilateral PEX.

キーワード (3~5)	Pseudoexfoliation syndrome Anterior segment optical coherence tomography Anterior chamber Iris configuration
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