Age-related morphological change of the anterior chamber in healthy Japanese subjects

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Background

- Glaucoma attacks rarely occur in younger-aged people, but do often occur in elder-aged hyperopic women.1,2)
- Age-related morphological change of the anterior chamber is thought to be involved in the pathophysiology of an acute angle-closure glaucoma attack.

To date, there have been few reports regarding the evaluation of the age-related morphological change of the anterior chamber.

Purpose

In this study, we evaluated the anterior chamber morphology of healthy Japanese subjects in relation to patient age.

Subjects

This study involved 1554 healthy Japanese volunteer subjects who underwent a glaucoma screening test at Kyoto Prefectural University of Medicine from March 2005 to March 2011. Of those, 1178 phakic, glaucoma-free subjects (419 males, 759 females; mean age: 54.1±14.9 years) who were ultimately diagnosed as normal by glaucoma specialists were selected for this study.

Methods

Diagnosed as normal.
- Glaucoma specialists selected glaucoma-free subjects who were ultimately diagnosed as normal via a glaucoma screening test that included frequency-doubling technology in the screening program, non-mydriasis fundus photography, slit-lamp examination, and intraocular pressure measurement by noncontact tonometer.

- In all enrolled subjects, anterior chamber depth (ACD), anterior chamber volume (ACV), and anterior chamber angle (ACA) measurements were obtained by use of the Scheimpflug 3D camera (Pentacam; Oculus Inc., Wetzlar, Germany).

- The subjects were then divided into 6 groups according to age as follows: 1) less than 30 years of age, 2) 30-39 years of age, 3) 40-49 years of age, 4) 50-59 years of age, 5) 60-69 years of age, 6) 70 or more years of age. The ACD, ACV, and ACA data among these groups were then compared.

- The Mann-Whitney U test and the Tukey-Kramer test were used for statistical analysis.

- Only the right-eye data from each subject were used for statistical analysis.

Results 1: Classification of Subjects

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male N</th>
<th>Female N</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;29</td>
<td>200</td>
<td>250</td>
<td>450</td>
</tr>
<tr>
<td>30-39</td>
<td>250</td>
<td>300</td>
<td>550</td>
</tr>
<tr>
<td>40-49</td>
<td>300</td>
<td>350</td>
<td>650</td>
</tr>
<tr>
<td>50-59</td>
<td>350</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>60-69</td>
<td>400</td>
<td>450</td>
<td>850</td>
</tr>
<tr>
<td>≥70</td>
<td>450</td>
<td>500</td>
<td>950</td>
</tr>
</tbody>
</table>

Results 2: Anterior Chamber Depth (ACD, mm)

- No significant differences in ACD were found between subjects in their 60s and those in their 70s (Tukey-Kramer test).
- No significant gender-related differences in ACD were found between subjects less than 30 years of age and those in their 30s (Tukey-Kramer test).
- No significant gender-related differences in ACD were found in subjects less than 30 years of age and those in their 30s (Mann-Whitney U test).
- Except for the above findings, significant differences in ACD were found.

Results 3: Anterior Chamber Volume (ACV, mm³)

- No significant differences in ACV were found between subjects less than 30 years of age and those in their 30s, or between subjects in their 60s and those in their 70s (Tukey-Kramer test).
- No significant gender-related differences in ACV were found in subjects less than 30 years of age and those in their 30s (Mann-Whitney U test).
- Except for the above findings, significant differences in ACV were found.

Results 4: Anterior Chamber Angle (ACA, degree)

- No significant differences in ACA were found between subjects less than 30 years of age and those in their 30s, or between subjects in their 60s and those in their 70s (Tukey-Kramer test).
- No significant gender-related differences in ACA were found in subjects less than 30 years of age and those in their 30s (Mann-Whitney U test).
- Except for the above findings, significant differences in ACA were found.

Discussion

Glucoma attacks often occur in elderly hyperopic women because of the hypothesis thinking of that decreasing of ACV and ACA due to aging more greater in women than in men.

- Difference of the eyeball volume from physique (men>women)
- Change of the hormone balance in menopause in women
- Percentage of women in the elderly (men<momen)
- and there could be the generation gap of physique and axial length through Japanese post-war economic miracle (1954-1973)

Conclusions

The findings of this study show that the anterior chamber angle morphology does not change rapidly in subjects over 40 years of age, however, the angle does gradually narrow due to aging.

References