Retinal venous pulsation: possible risk factor in normal tension glaucoma?

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BACKGROUNDD
- Non-IOP related risk factors¹
  - Arterial dysfunction: migraines, Raynaud phenomenon,……
  - Veins and Glaucoma:
    1. Glaucoma as risk for vein occlusion
    2. Optic Disc Hemorrhages may be distressed venules
- Spontaneous Venous Pulsation (SVP) phenomenon²
  - Prevalence markedly decreased in glaucoma patients
  - Venous pulse pressure associated with disease progression
  - Mechanisms and impact of SVP on glaucoma remains largely unknown
- Statistical analyses:
  - Software SAS 9.2
  - Healthy controls: 81

PURPOSE
(1) Characterization of the SVP phenomenon in glaucoma patients
(2) To identify hemodynamic patterns associated with the SVP phenomenon

METHODS
- Prospective analysis:
  - Primary open-angle glaucoma (POAG): 86
  - Normal-tensional glaucoma (NTG): 69
  - Healthy controls: 81
  - One eye per patient
  - worst eye in glaucoma patient; random in healthy control
- Clinical variables:
  - Intraocular Pressure (IOP)
  - Central Cornea Thickness (CCT)
- Mechanical dysfunction: migraines, Raynaud sympthoms,……

RESULTS

Table 1. Characteristics of the experimental groups according to SVP status

<table>
<thead>
<tr>
<th></th>
<th>Healthy POAG NTG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>65.8(14) 59.3(14) 67.6(13)</td>
</tr>
<tr>
<td>IOP (mmHg)</td>
<td>16.1(4.9) 15.3(4.8) 15.9(5.8)</td>
</tr>
<tr>
<td>CCT</td>
<td>583(55) 564(62) 558(32)</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>150(18) 154(28) 148(20)</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>81.3(10) 84.4(18) 83.5(12)</td>
</tr>
<tr>
<td>MOPP</td>
<td>54.9(8.6) 57.8(14) 54.5(8.6)</td>
</tr>
<tr>
<td>MD</td>
<td>-1.21(4.1) -0.48(2.6) -0.96(9.4)</td>
</tr>
<tr>
<td>RNFL thickness</td>
<td>0.23(0.1) 0.240(0.1) 0.16(0.1)</td>
</tr>
</tbody>
</table>

Table 2. CDI variables of the retrolubar vessels according to SVP status

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>PSV (cm/s)</td>
<td>12.1(4.4) 11.1(3.8) 10.2(3.6)</td>
</tr>
<tr>
<td>EDV</td>
<td>3.21(1.1) 3.14(1.4) 2.73(1.0)</td>
</tr>
<tr>
<td>RRI</td>
<td>0.72(0.1) 0.73(0.1) 0.72(0.1)</td>
</tr>
<tr>
<td>MFF</td>
<td>6.45(2.3) 6.23(2.5) 5.52(2.9)</td>
</tr>
<tr>
<td>Vmax</td>
<td>5.77(1.5) 6.54(1.9) 5.31(1.3)</td>
</tr>
<tr>
<td>Vmin</td>
<td>3.32(0.7) 3.84(1.1)* 3.07(0.6)</td>
</tr>
<tr>
<td>RRI</td>
<td>0.41(0.1) 0.40(0.1) 0.40(0.1)</td>
</tr>
</tbody>
</table>

DISCUSSION
- Subjects without visible SVP phenomenon:
  - Healthy: Lower minimal venous velocities
  - POAG: Higher diastolic BP
  - Lower venous velocities and resistivity index
  - NTG: Lower arterial and venous velocities
  - Worse functional damage

CONCLUSION
- SVP absence may imply higher venous pressure (consequently, lower perfusion pressure)
- Factors associated with SVP are not the same in POAG and NTG patients.
- SVP negative NTG patients also have different arterial hemodynamics, suggesting a wider vascular dysfunction

References

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