Introduction

• Lipoxins A₄ (LXA₄) and B₄ (LXB₄) are decreased in inner retinal injury models
• Supplementation of LXA₄ and LXB₄ conferred neuroprotection.
• Lipoxins have not yet been studied in clinical glaucoma.

Purpose

• To identify the aqueous humor (AH) profile of lipid mediators in primary open angle glaucoma (POAG) eyes compared to those without glaucoma
• Prospective comparative study

Methods

• AH samples from eyes with and without glaucoma underwent lipidomic analyses using liquid chromatography-mass spectrometry (LC-MS).
• Glaucoma samples: 60-80-year-old POAG patients undergoing a glaucoma surgery with or without cataract surgery.
• Control samples: Age-matched patients without glaucoma undergoing routine cataract surgery.
• Exclusion criteria: Diabetes mellitus, systemic inflammatory disease, uveitis, retinopathy, age-related macular degeneration and patients on Aspirin

• Sample collection:
  - 100 μL of AH
  - Collected using a 30 Gauge needle mounted on a 1-mL syringe, introduced into the anterior chamber anterior to the limbus, prior to any surgical intracocular entry.
  - The samples were immediately snap frozen on dry ice and stored at -80°C until analyses.
  - Lipidomic analyses of a panel of 40 polyunsaturated fatty acids (PUFA), metabolites and lipid mediators.

• All participating patients signed an informed consent form
• This study was approved by the University Health Network and Kensington Eye Institute Research and Ethics Boards.

Results

Table 1. Demographics and baseline characteristics.

<table>
<thead>
<tr>
<th></th>
<th>Glaucoma</th>
<th>Control</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>16</td>
<td>18</td>
<td>.25</td>
</tr>
<tr>
<td>Age</td>
<td>68.7 ± 6.4 years</td>
<td>71.0 ± 4.7 years</td>
<td>.028</td>
</tr>
<tr>
<td>IOP</td>
<td>14.1 ± 3.1 mmHg</td>
<td>15.2 ± 1.6 mmHg</td>
<td>.24</td>
</tr>
<tr>
<td>CDR</td>
<td>0.9 ± 0.1</td>
<td>0.3 ± 0.1</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

Figure 1. Schematic representation the study.

Figure 2. Overview of three substrates in the lipidic pathway.

Figure 3. Arachidonic acid pathway culminating in lipoxins.

Figure 4. Analysis that showed a significant difference between control and glaucoma samples.

Figure 5. Analysis that were within the detection threshold but did not show a significant difference.

Conclusions

• Increased levels of lipid mediators are present in glaucomatous eyes.
• Out of a total of 40 analytes, the arachidonic acid-lipoxin pathway was upregulated in glaucomatous eyes.
• Arachidonic acid metabolites may play a role in glaucoma pathogenesis.

References


Acknowledgments

• Sivak Lab members

No Disclosures