Measurement of Intraocular Pressures in Glaucomatous and Non-glaucomatous Kittens

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The Glaucomas

- Characterized by damage to optic nerve and retinas
- Observed in many species
- One of the leading causes of blindness in humans and dogs
- Incurable once vision is lost
- High intraocular pressure is a major risk factor
Feline Primary Congenital Glaucoma

- Inadequate number of intrascleral blood vessels
- Not typically considered to be a painful condition
- Ophthalmic drops prescribed

https://www.infovets.com/healthycatsinfo/F218.htm
Primary Congenital Glaucoma

- Elevated IOP
- Buphthalmos
- Corneal edema

http://quizlet.com/24831753/optho-flash-cards/
Experimental Objectives

1. Establish baseline neonatal IOP values
2. Define age of onset of elevated IOP
3. Determine mean age of eyelid opening
4. Determine clinical relevance of findings
Methods

• 10 unaffected, 10 PCG affected

• Affected vs. unaffected status determined by lineage analysis

• Measurements within 48-hour window at landmarks 10, 13, 17, 21, 28, 35, and 42 days postnatal

• IOP recorded using rebound tonometry
Methods

• IOP recorded twice daily
  • Data recorded in triplicates from each eye
  • Total of 6 values averaged for each measurement

• Morning (7-10am) measurements utilized in data analysis
Rebound Tonometry

- Tonovet® Tonometer utilized

- Non-sedated, lightly restrained kittens

- No topical (corneal) anesthesia needed

- Measurements recorded in mmHg

http://www.columbiarivervetspecialists.com/definitions/tonometry
Results: IOP Values

<table>
<thead>
<tr>
<th>Days Since Birth</th>
<th>Affected</th>
<th>Unaffected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 17</td>
<td>9.61</td>
<td>7.14</td>
</tr>
<tr>
<td>Day 21</td>
<td>9.27</td>
<td>6.99</td>
</tr>
<tr>
<td>Day 28</td>
<td>9.67</td>
<td>7.91</td>
</tr>
<tr>
<td>Day 35</td>
<td>10.45</td>
<td>8.07</td>
</tr>
<tr>
<td>Day 42</td>
<td>10.36</td>
<td>8.32</td>
</tr>
</tbody>
</table>

P-values:
- P = 0.02
- P = 0.005
- P = 0.002
- P = 0.002
- P = 0.08
## Results: Eyelid Opening

<table>
<thead>
<tr>
<th>Unaffected</th>
<th>Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.9 days postnatal</td>
<td>8.4 days postnatal</td>
</tr>
</tbody>
</table>
## Results: IOP Relative to Adults

<table>
<thead>
<tr>
<th></th>
<th>Adult</th>
<th>Neonatal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affected</strong></td>
<td>&gt;30 mm Hg</td>
<td>9-10 mm Hg</td>
</tr>
<tr>
<td><strong>Unaffected</strong></td>
<td>15-30 mm Hg</td>
<td>7-8 mm Hg</td>
</tr>
</tbody>
</table>
Conclusions

• Significantly ($p < 0.05$) higher IOP values for glaucomatous kittens on days 17, 21, 28, and 35 postnataally

• On average, glaucomatous kittens’ eyes opened earlier than normal kittens

• Both glaucomatous and non-glaucomatous kittens had IOPs markedly lower than those of glaucomatous adults
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