EVALUATION OF STEADY STATE PATTERN ELECTRORETINOGRAPHY (SSPERG) IN DISCRIMINATING NORMAL FROM GLAUCOMA SUSPECT AND GLAUCOMATOUS EYES

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BACKGROUND

- Electroretinography is a rapid noninvasive method of assessing retinal function. Its diagnostic accuracy for discriminating between healthy and glaucomatous eyes has been investigated for more than 25 years.
- The PERG response comes mainly from the electrical potentials of retinal ganglion cells, and is a direct indicator of ganglion cell function. Glaucoma is manifested by death of retinal ganglion cells, loss of retinal ganglion cell axons, and loss of vision, therefore PERG can be used to identify ganglion cells dysfunctions due to glaucoma.
- Key aspects of glaucoma management are early detection and measurement of ganglion cells dysfunctions due to glaucoma.

METHODS

Study population consisted of:

- 15 healthy individuals with normal visual fields.
- 15 glaucoma suspect eyes.
- At least one of the following optic nerve changes: a cup to disc ratio > 0.6; inter-eye cup to disc ratio asymmetry > 0.2; retinal nerve fiber layer defects; neuroretinal rim notching; disc hemorrhage.
- Abnormal nerve fiber layer by OCT and a normal SAP.
- 30 glaucomatous eyes with visual field (VF) loss.
- 15 Mild Glaucoma (mean deviation, MD better than -6.0 dB)
- 15 Moderate Glaucoma (mean deviation, MD worse than -6.0 dB)
- All subjects had VA better than 20/30.

RESULTS

Table 1. The area under the curve (AUC), sensitivity and specificity for discrimination of normal eyes against different groups of degree of glaucomatous eyes.

<table>
<thead>
<tr>
<th>NORMAL EYES FROM:</th>
<th>DISSCRIMINING:</th>
<th>SENSIVITY</th>
<th>SPECIFICITY</th>
<th>AUC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODERATE GLAUCOMATOUS EYES</td>
<td>0.93</td>
<td>1.00</td>
<td>0.96 (0.87-1.00)</td>
<td></td>
</tr>
<tr>
<td>MILD GLAUCOMATOUS EYES</td>
<td>0.87</td>
<td>0.93</td>
<td>0.91 (0.79-1.00)</td>
<td></td>
</tr>
<tr>
<td>GLAUCOMA SUSPECT EYES</td>
<td>0.54</td>
<td>0.80</td>
<td>0.70 (0.50-0.89)</td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSIONS

Steady State ERG is able to discriminate between healthy and glaucomatous eyes with visual field loss. This is a significant and important ability for the future development of this technology.

Further research and development are needed to determine the relationship between RNFL loss and PERG abnormality. Based on these results, this could be an interesting and productive line of research for this device.

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