Ganglion Cell Layer Volume by Optical Coherence Tomography in Multiple Sclerosis

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Outline

I. MS Vision Study
II. Optical Coherence Tomography (OCT)
III. Heidelberg Spectralis HRA+OCT
IV. Ganglion Cell Volume
V. Low-contrast Letter Acuity
VI. Conclusions
MS Vision Study

1. Visual Function

- High-contrast charts

- Low-contrast charts

http://img.diytrade.com

http://www.neurology.org
MS Vision Study

2. Physical and Cognitive Dexterity
   - Nine hole peg test
   - Paced Auditory Serial Addition Test (PASAT)
   - Timed 25-foot walk

Recording: 9,1,3
Patient Response: 10,4
MS Vision Study

3. Optical Coherence Tomography (OCT)
   - Use either near infrared light or medical laser to image the retina

http://www.ophmanagement.com
OCT and MS

- Early treatment of MS is associated with reduced future disease activity
- Acute optic neuritis is the first attack of MS in up to 25-50% of patients
- Need sensitive measure of visual function to identify MS damage and drug effects
- Retina unique model of neurodegeneration because it contains no myelin
- OCT is fast, non-invasive, and reproducible
Spectralis

- Class I Laser
- High resolution (4-6μm)
- Eye tracking technology
- Reference setting
- Signal noise reduction

http://www.heidelbergengineering.com/products/spectralis-hra-oct/
Ganglion Cell Layer Volume

8 Control eyes
13 MS Non-ON eyes
3 MS ON eyes
Low-contrast Letter Acuity

• Decrease in ganglion cell layer volume in MS patients correlated to decreased low-contrast visual acuity (r=0.60)
• Low-contrast letter acuity effective visual function measure
• Decrease in ganglion cell layer volume in MS patients not correlated to a decrease in high-contrast visual acuity (r=0.10)
Conclusions

- Direct observation of neuronal loss in MS patients through decrease in ganglion cell layer volume
- Ganglion cell layer volume correlated to low-contrast letter acuity
- Future research in temporal pattern of neuronal loss in MS and search for potential neuroprotective drugs
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