Effects of panretinal photococagulation on macular structure and function in patients with proliferative diabetic retinopathy
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BACKGROUND
- The effects of pan-retinal photocoagulation (PRP) for proliferative diabetic retinopathy (PDR) on macular structure and function are incompletely understood.1,3
- Recent studies comparing the safety of PRP versus anti-VEGF injections highlight the importance of understanding the effect of PRP on the macula.1,4

PURPOSE
- To evaluate macular structure and function before and at one year after PRP
- To determine whether the inner or outer macula is predominately affected by PRP

METHODS
- Fifteen adults with untreated PDR and visual acuity >20/32 underwent Farnsworth color vision testing, Minnesota Reading Test, Pelli-Robson contrast sensitivity, 2-4 Frequency Doubling Perimetry (FDP, Carl Zeiss Meditec, Dublin, CA), photostress testing, dark adaptation (Adaptrax, Maculac, Inc, Hummelstown, PA), 10-2 and 60-H Humphrey Visual Fields (Carl Zeiss Meditec), spectral domain Optical Coherence Tomography (SD-OCT, Heidelberg Engineering, Heidelberg, Germany), and color fundus photography (Optos, Dunfermline, United Kingdom) before and 10 months after PRP.
- Paired Wilcoxon signed-rank testing was used to compare performance before and after PRP.
- Significance threshold was adjusted to 0.05/68 = 0.00068 to account for multiple testing, according to the Bonferroni correction.

RESULTS
- Table 1: Subject characteristics
  - Abbreviations: SD, standard deviation; EVA, electronic visual acuity; IDP, intraocular pressure

- Table 2: Mean Performance on Visual Functional Tests Before and After PRP
  - Abbreviations: MD, mean deviation; PSD, pattern standard deviation; FDP, frequency doubling perimetry; HFA, Humphrey Field Analyzer; dB, decibels; SD, standard deviation.
  - 1 Mean percent change between pre- and post-PRP value.

- Figure 2: Heat map of test changes following PRP, divided by tests of inner and outer retina
  - Data are vertically arranged as pre-PRP score, (absolute change after PRP), and percentage change after PRP

- Table 3: Global Mean Retinal Thickness (μm) Before and After PRP
  - Abbreviations: NFL: nerve fiber layer; GCL+IPL: ganglion cell layer plus inner plexiform layer; INL: inner nuclear layer; OPL+ONL: outer plexiform layer plus outer nuclear layer; IS/OS: inner segment plus outer segment, RPE: retinal pigment epithelium
  - 1 Mean thickness change between pre- and post-PRP.

- Figure 3: Change in Retinal Thickness
  - Data are vertically arranged as pre-PRP score, change after PRP, and percentage change after PRP

DISCUSSION
- After the Bonferroni correction, we found mean macular function and structure to be preserved at one year after PRP.
- Individual results were heterogeneous, with patients having changes in different subsets of tests.
- Tests of outer retinal function appeared to be more affected than tests of inner retinal function.
- Mean performance on 60-4 peripheral visual fields were preserved at follow-up.
- The inner superior and inner nasal quadrants of the inner nuclear layer were statistically significantly thicker following PRP, but the difference was only by 3.3 μm.
- Further studies are needed to evaluate long-term impact of PRP on the retina.

REFERENCES

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