Optical Coherence Tomography Angiography of Progression of Type 1 Neovascularization in Age-Related Macular Degeneration

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November 9, 2017
FINANCIAL DISCLOSURES:

None
MY ROLE IN THIS RESEARCH:

Please answer which of the following portions of the research you participated in:

☑ Conception and design of the work/project
☑ Acquisition of data
☑ Analysis and interpretation of data
☑ Creation and/or critical review of the presentation
Morphology of Type 1 Neovascularization

Biomarkers of activity

- Seafan morphology
- Peripheral branching
- Peripheral anastomoses
- Peripheral loops
- Perilesional halo

COSCAS GJ, LUPIDI M, COSCAS F, CAGINI C, SOUIED EH. RETINA 2015
Analysis of Biomarkers in AMD

- OCT angiography in neovascular AMD
  - Type 1 neovascularization
  - Type 2
  - Type 3

- Short term
- Long term
Long Term OCTA Biomarkers Study

- OCT angiography cohort study of patients with type 1 NV
- SEI UCLA (Sarraf), Tufts (Waheed)
- Inclusion criteria: Type 1 NV, AMD
- All receiving treatment with anti-VEGF
- OCTA baseline, 1 year, last follow up
- Qualitative and quantitative biomarkers
- N = 37 patients (41 eyes)
Quantitative Measurement

1. Manual segmentation of CNV to calculate vessel area (2 graders)
2. Qualitative grading of CNV morphology (2 graders)

CNV Morphology
- Secondary branching
- Mature dilated core vessels
- Peripheral vascular arcades
- Anastomotic loops
- Peri-lesional halo
- Distinct vs indistinct
- Immature lesion vs mature lesion
- Capillary fringe
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<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Median age</td>
<td>83 (range 66-97)</td>
</tr>
<tr>
<td>Sex</td>
<td>18 male, 19 female</td>
</tr>
<tr>
<td>Median follow up</td>
<td>15 months (range 11-27)</td>
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<tr>
<td>Visual acuity</td>
<td></td>
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<tr>
<td>Baseline</td>
<td>20/55</td>
</tr>
<tr>
<td>1 year</td>
<td>20/56</td>
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<tr>
<td>Last follow up</td>
<td>20/59</td>
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<tr>
<td>Anti-VEGF injections</td>
<td></td>
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<tr>
<td>Prior to baseline</td>
<td>10 (range 0-30)</td>
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<tr>
<td>Baseline - 1 year</td>
<td>4 (range 0-8)</td>
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<tr>
<td>1 year - last follow up</td>
<td>1 (range 0-6)</td>
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Quantitative Analysis
Significant Increase in Size of CNV (27%)
Modest Increase in Size of CNV (46%)
Decreasing Size of CNV (15%)
CNV Morphology
Immature vs Mature Lesion

Immature Lesion
• Tangle of small, uniform branching capillaries or multi-lobulated rosette of small capillaries
Immature vs Mature Lesion

Mature

• Large dilated vessels in a medusa or sea fan pattern
Capillary Fringe

Peripheral mesh of indistinct capillaries
Growth of CNV

- Evolution of CNV area
  - Significant growth of lesion – doubling of CNV area (27%)
  - Modest growth - <50% increase in CNV area (46%)
  - Shrinkage (15%)

- Biomarkers associated with CNV growth
  - Immature lesion
  - Capillary fringe

- Biomarkers associated with CNV stability
  - Mature lesion
  - Absent capillary fringe
  - Dilated core vessels
Growth of CNV

- **Evolution of CNV area**
  - Significant growth of lesion – doubling of CNV area (27%)
  - Modest growth - <50% increase in CNV area (46%)
  - Shrinkage (15%)

- **Biomarkers associated with CNV growth**
  - Immature lesion (OR=4.2, p=0.015)
  - Capillary fringe (OR=5.3, p=0.036)

- **Biomarkers associated with CNV stability**
  - Mature lesion (OR=8.3, p=0.016)
  - Absent capillary fringe (OR=0.21, p=0.044)
  - Dilated core vessels (*trend, OR=9.1, p=0.09)
Conclusions

- Limitations
- Retrospective cohort
- Variable anti-VEGF regimen
- Lesions examined cross-sectionally
- No correlation with fluorescein angiography
- Sustained growth of CNV in majority of eyes (80%)
- A proportion of eyes show remarkable growth
- Immature morphology and capillary fringe were associated with significant growth of lesion
Acknowledgements

- Juan Pablo Davila, MD
- Mansour Rahimi, MD
- Carl B Rebhun, BA
- Yasin Alibhai, MD
- Nadia K Waheed, MD