OCT Anatomic and Temporal Biomarkers in Uveitic Macular Edema

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Background

• There is limited information on longitudinal structure-functional correlations in Uveitic Macular Edema.

• In clinical practice, physicians often base treatment decisions on both BCVA and OCT assessment.

• This study assessed these relationships, focusing on baseline anatomic features with potential prognostic value for visual response.

Methods

- Post hoc analysis of 198 eyes with NIU enrolled in two phase 3, 24 week clinical trials.
- Assessed relationships between BCVA and
  - Ellipsoid zone (EZ) integrity
  - Presence and location of cystoid spaces
  - Presence and location of subretinal fluid (SRF)
Methods

• Correlation analyses were performed to describe the relationship at baseline, and between change from baseline.

• A longitudinal treatment-response analysis modeled the temporal relationship between change in BCVA and CST.

• An early CST anatomic response was assessed for BCVA prognosis.
Moderate Relationships Between BCVA and CST

Baseline: BCVA v. CST

Change from Baseline: BCVA v. CST, At Week 24

PCC: -0.38 (-0.49, -0.26; p<0.001)  
PCC: -0.42 (-0.53, -0.29; p<0.001)

Relationship between Baseline BCVA and EZ, Cystoid Spaces, SRF at Baseline

**Baseline BCVA v. Baseline EZ:**
Mean BCVA statistically significantly worsened with each EZ grade ($p \leq 0.050$)

**Baseline BCVA v. Baseline Cystoid Spaces:**
Differences between grades and BCVA not statistically significant

**Baseline BCVA v. Baseline SRF:**
Differences between grades and BCVA not statistically significant

All pair-wise comparisons to ‘Definitely abnormal (absent)’ group were statistically significant ($p \leq 0.034$) after adjustment for multiple comparisons.
Change in BCVA (Wk 24) v. Baseline EZ Status

- Eyes with normal EZ at baseline experienced a greater improvement in BCVA versus eyes with EZ considered not normal
  - 11.9 letters vs. 9.4 letters, $P = 0.006$
Relationship between Change in BCVA and Cystoid Spaces at Baseline

- Eyes without center involved cystoid spaces at baseline showed less improvement at 24 weeks versus eyes with center-involvement
  - 5.5 letters vs 13.7 letters; \( P = 0.012 \)
Relationship between Change in BCVA and Sub-Retinal Fluid Status at Baseline

- Eyes without central SRF at baseline showed less improvement at 24 weeks versus eyes with center-involvement
  - 9.5 letters vs 17.2 letters; $P < 0.001$
Eyes showing any improvement in EZ status at week 24 experienced a mean change from baseline in BCVA that was numerically greater, versus eyes that did not show any change from baseline or who worsened.

- Not statistically significant (11.4 letters vs. 10.0 letters; \( P = 0.512 \)).
Relationship between Change in BCVA and Change in Cystoid Space & Sub-Retinal Fluid Status

Change in BCVA v. Change in Cystoid Spaces at Week 24

- Eyes that showed any improvement in cystoid spaces and/or SRF showed a significantly greater improvement in BCVA ($P < 0.001$ for both)
Longitudinal modeling showed more rapid response for CST.

Typical BCVA and CST Response from CLS-TA

Longitudinal modeling showed that the frame of response was more rapid for CST than BCVA.

- CST required approximately 3 weeks to reach over 90% of full response
- BCVA required approximately 9 weeks to reach the same magnitude of response.

Longitudinal non-linear mixed effects model based on methods according to the US FDA guidance for determining population pharmacokinetics and the EU guidance on reporting population pharmacokinetic analysis results.
Conclusion

• Clinically relevant relationships between BCVA and OCT anatomic and temporal features.
• Anatomic response may precede visual response in uveitic macular edema.
• Anatomic features described herein account for a minority of BCVA variation.