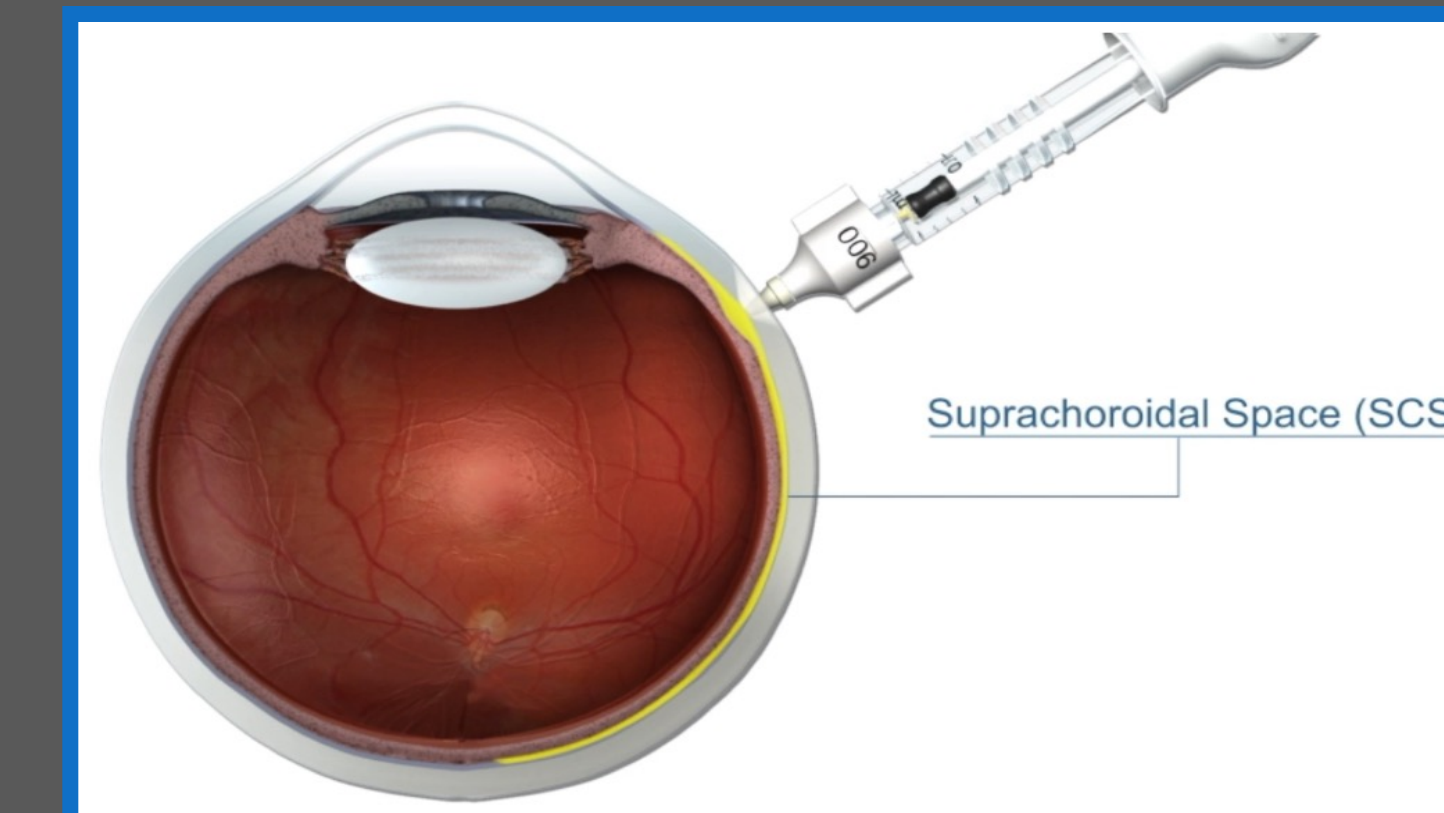# Uveitic Macular Edema: OCT Anatomic and Temporal Biomarkers

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Purpose

❖ To evaluate correlations between best corrected visual acuity (BCVA) and central subfield OCT anatomic and temporal features in macular edema (ME) associated with noninfectious uveitis (NIU).

Methods

❖ This post-hoc analysis evaluated relationships between BCVA and the presence of cystoid spaces, presence of subretinal fluid (SRF), and ellipsoid zone (EZ) integrity, based on standard OCT reading center gradings, from two Phase 3, 24-week clinical trials (AZALEA and PEACHTREE) of CLS-TA (suprachoroidal triamcinolone acetonide suspension) for NIU-associated ME.

❖ Correlation analyses evaluating baseline and change from baseline relationships were conducted, from all 198 patients, except those with ungradable images or who dropped out.

❖ A longitudinal treatment-response analysis was created to model the temporal relationship between change in BCVA and CST in patients treated with CLS-TA.

❖ In CLS-TA patients, early CST anatomic response, defined as a reduction in CST of 50 μm or greater at 4 weeks, was assessed for relationship to BCVA prognosis.

Results

Patient Characteristics:

❖ Of the 198 patient eyes:
  o 134 received suprachoroidal CLS-TA, of which 13 (9.7%) received rescue.
  o 64 eyes received a sham procedure as a control, of which 46 (72%) received rescue.
❖ Mean age: 50.6 years, 57% female
❖ Mean baseline BCVA: 57.0 letters
❖ Mean baseline CST: 468μm

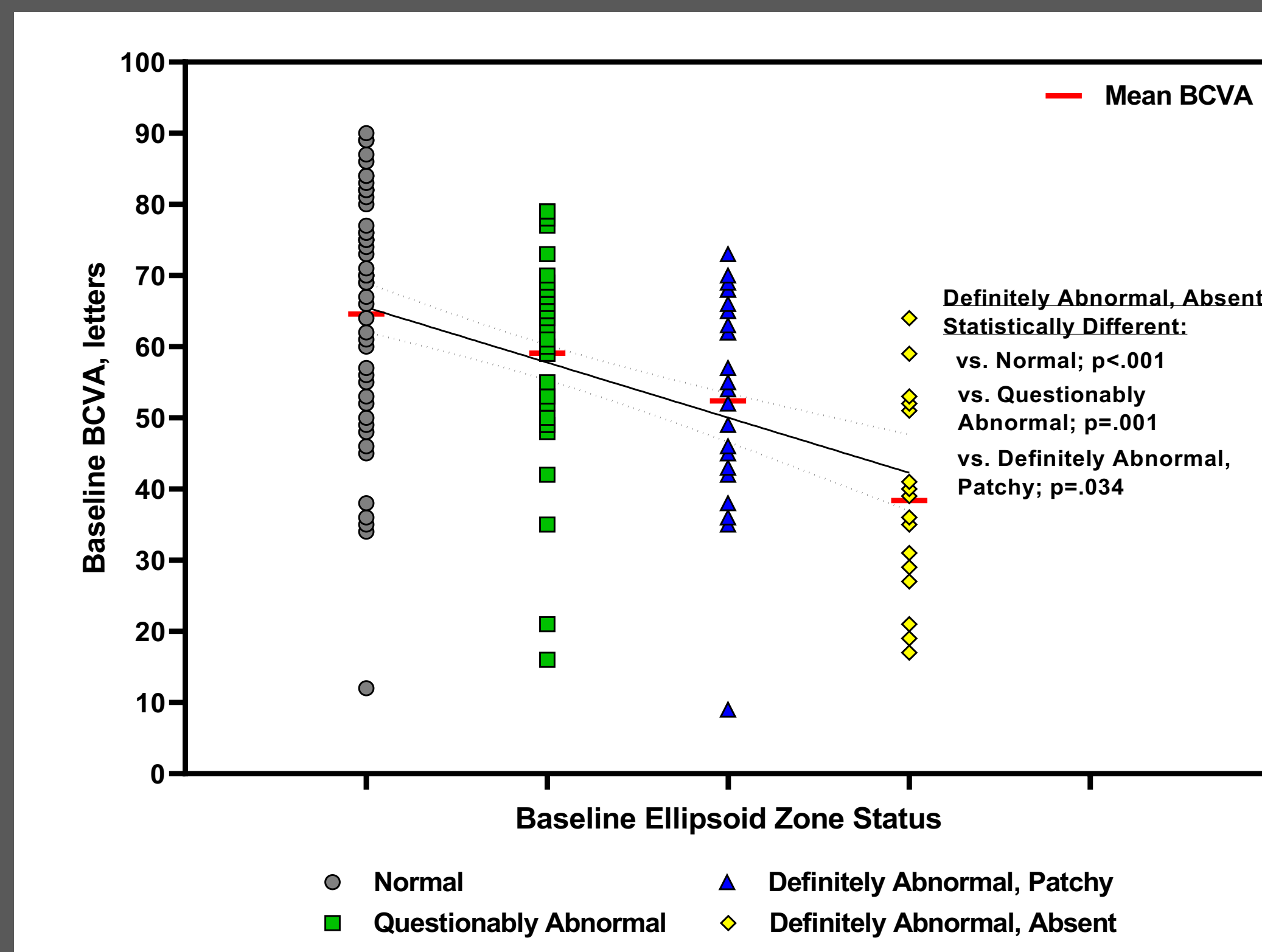**Figure 1: Ellipsoid Zone Status and BCVA at Baseline**

Definitely Abnormal, Absent Statistically Different:
vs. Normal; p<.001
vs. Questionably Abnormal; p=.001
vs. Definitely Abnormal, Patchy; p=.034

Baseline Ellipsoid Zone Status
Normal · Definitely Abnormal, Patchy · Questionably Abnormal · Definitely Abnormal, Absent · Mean BCVA

Figure 2: Presence and location of cystoid spaces and BCVA at Baseline

Baseline Cystoid Spaces Status
Absent · Definite, outside central subfield · Questionable · Definite, central subfield involved · Mean BCVA
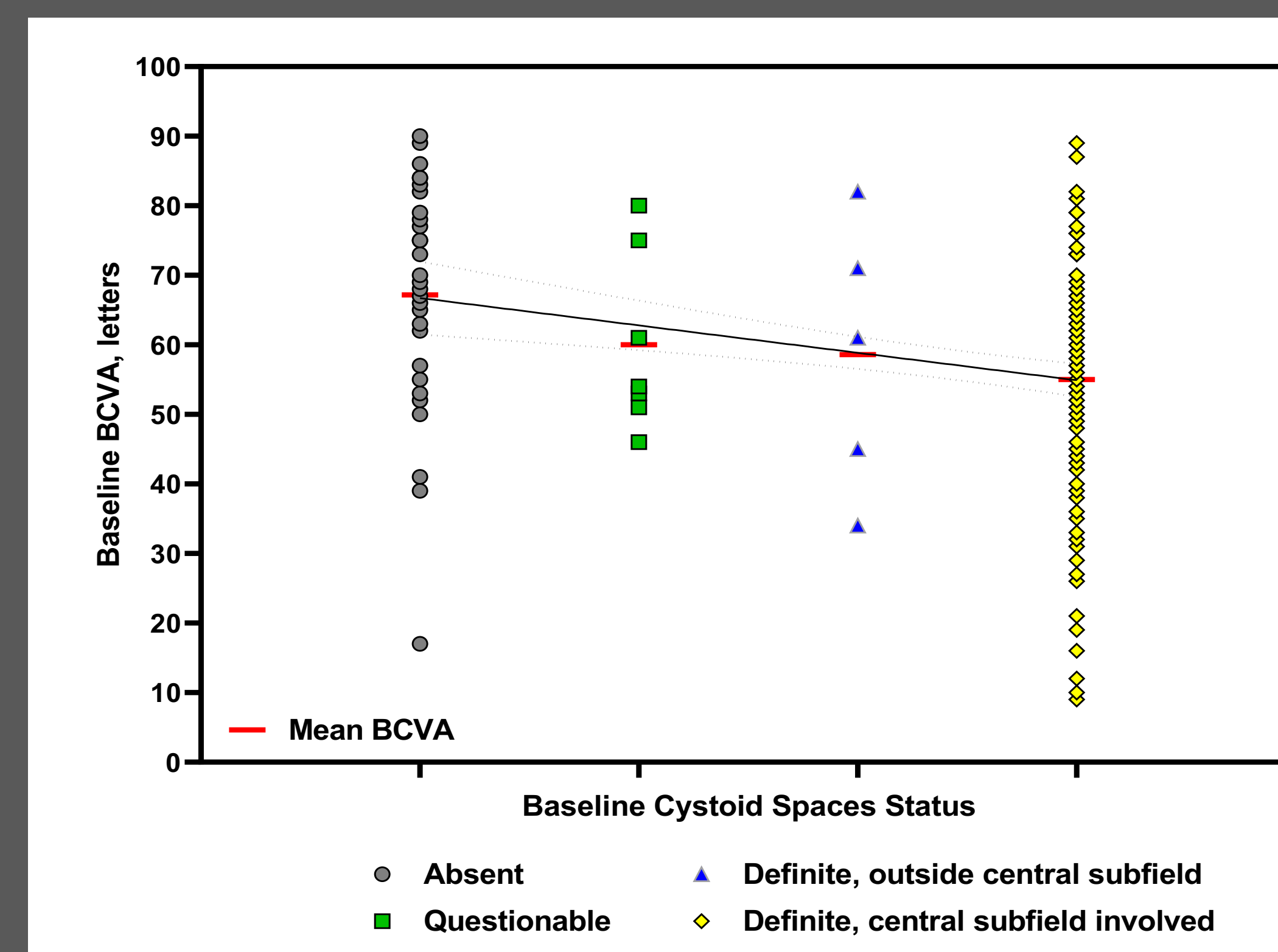
Figure 3: Presence and Location of Subretinal Fluid and BCVA at Baseline

Presence of Subretinal Fluid at Baseline
Absent · Questionable · Definite, Central Subfield Involved · Mean BCVA
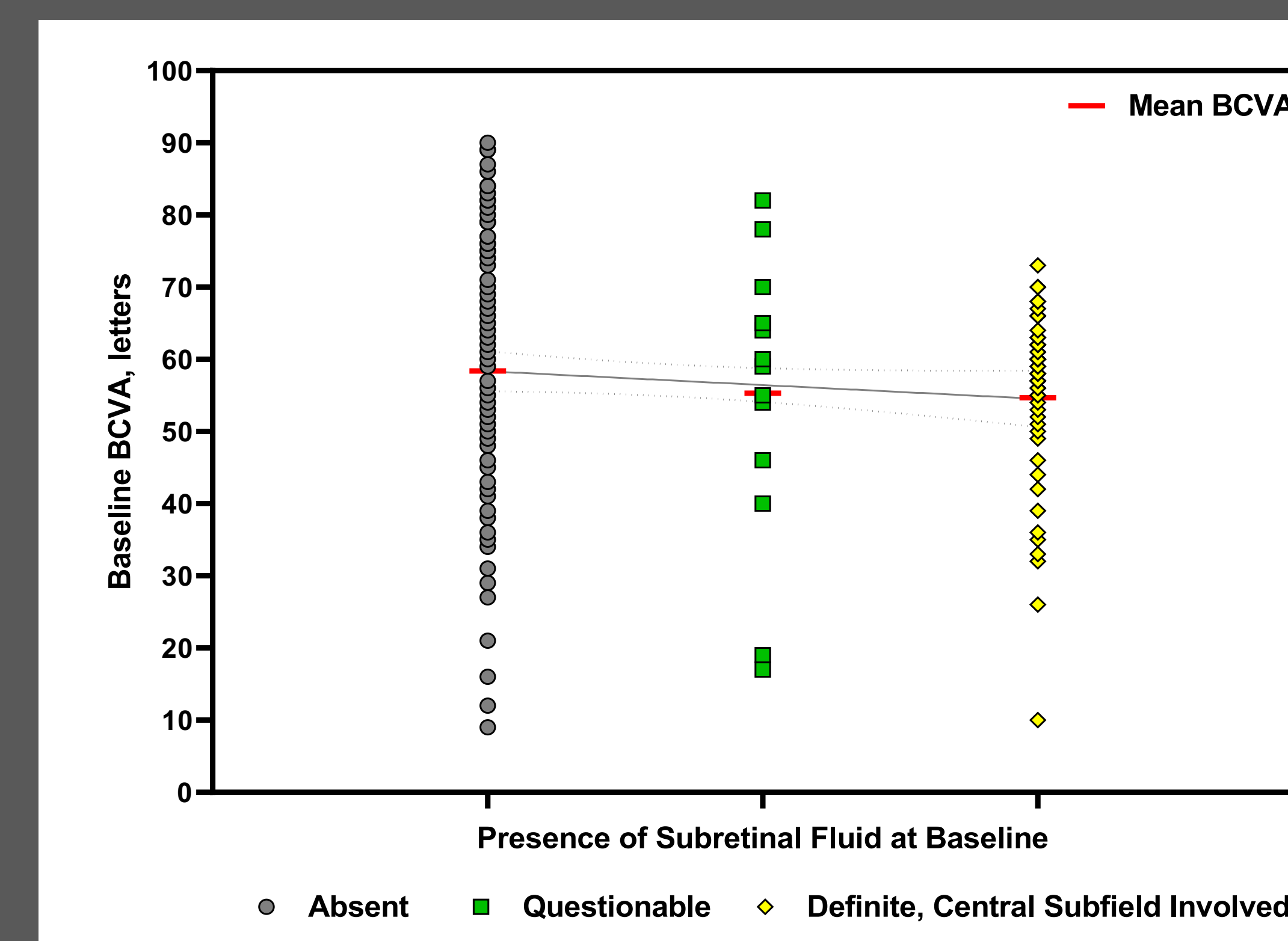
Figure 4: Ellipsoid Zone Status at Baseline and Change in BCVA at Week 24

Baseline Ellipsoid Zone Status
Normal · Not Normal · Mean BCVA
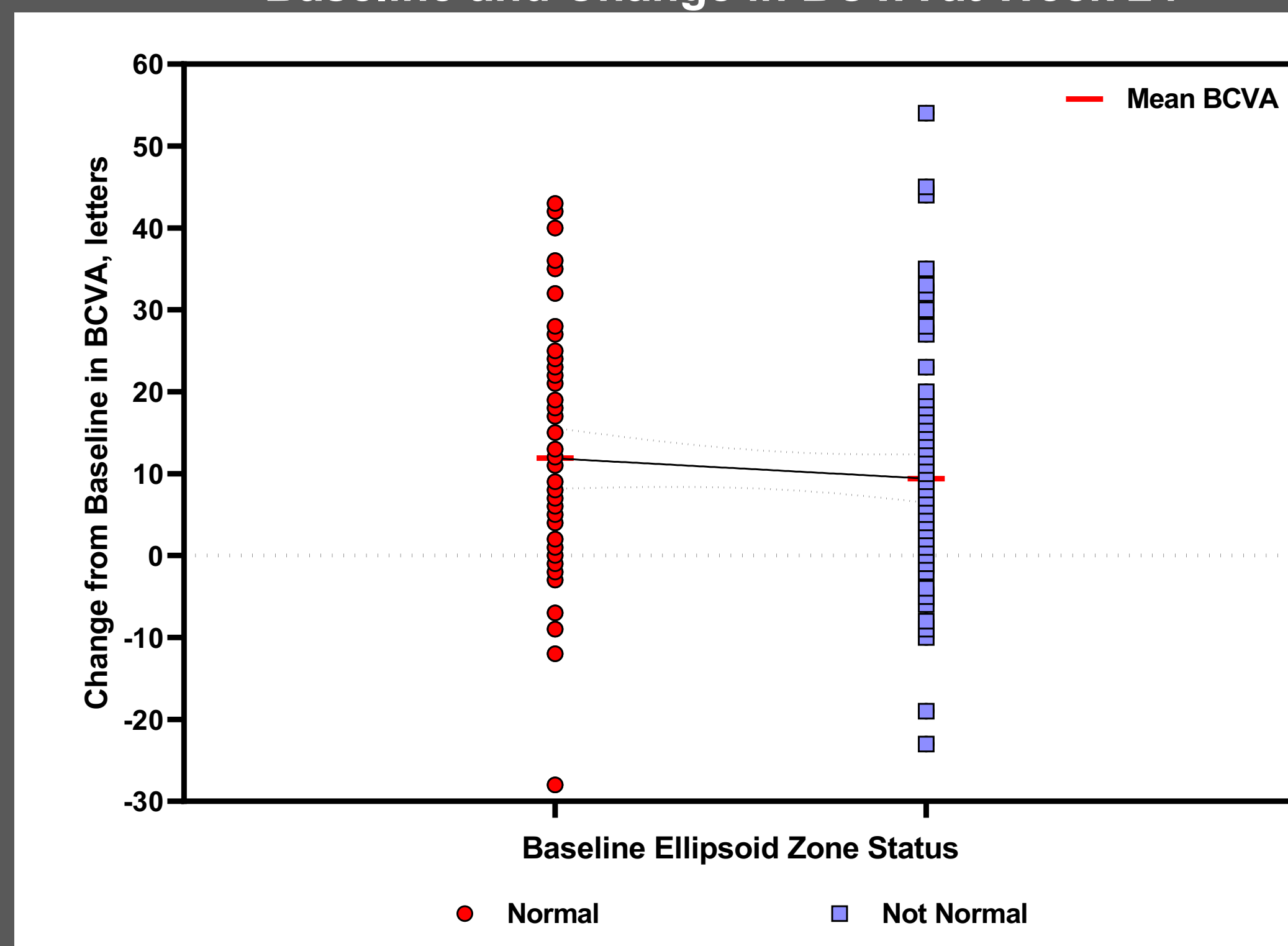
Figure 5: Presence and Location of Cystoid Spaces at Baseline and Change in BCVA at Week 24

Baseline Cystoid Spaces Status
Not Center Involed · Center Involved · Mean BCVA
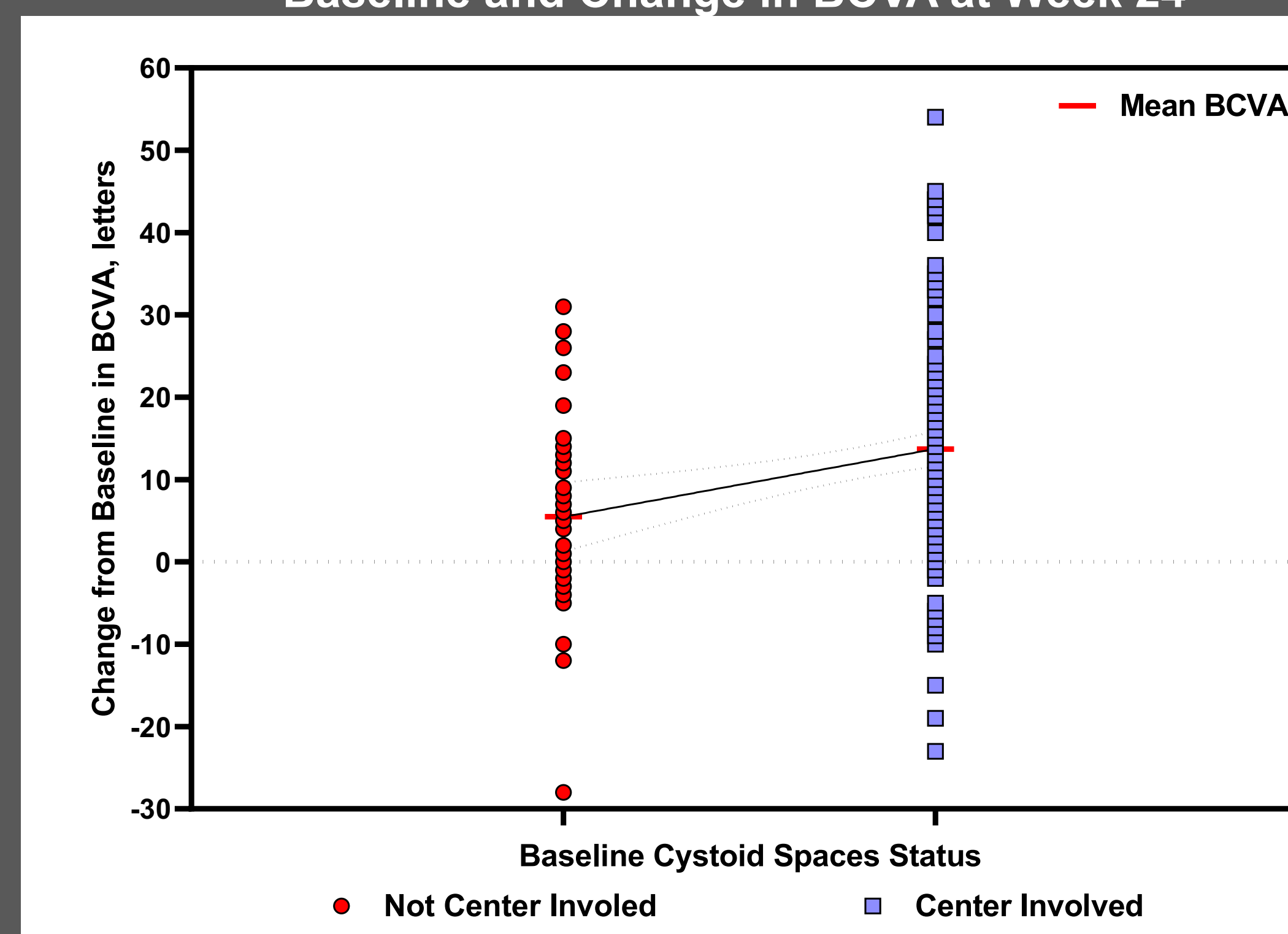
Figure 6: Presence and Location of Subretinal Fluid at Baseline and Change in BCVA at Week 24

Presence of Subretinal Fluid at Baseline
Not Center Involed · Center Involved · Mean BCVA
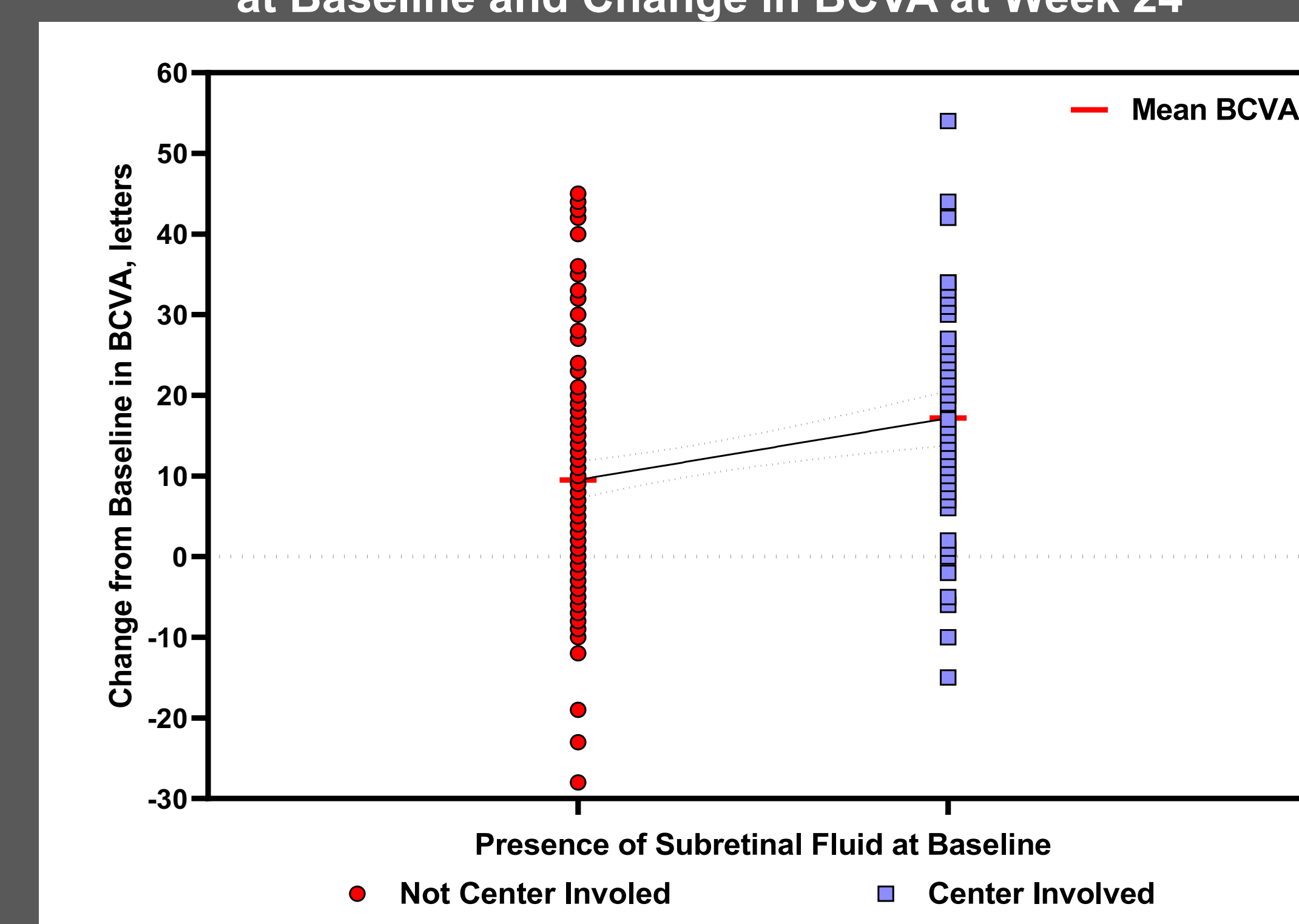
Figure 7: Typical Modeled BCVA and CST Responses from Active CLS-TA Therapy

$$BCVA\ from\ CLS-TA = Baseline\ BCVA + Max\ BCVA\ increase * (1 - e^{-0.230*Time})$$

$$Baseline\ BCVA = 53.2 * \left(\frac{Baseline\ CST}{463}\right)^{-0.143} * (1.297\ if\ AZALEA) * (1.097\ if\ AGE > 65)$$

$$Max\ BCVA\ increase = 11.34 * \left(\frac{Baseline\ BCVA}{58}\right)^{-1.09}$$

$$CST\ from\ CLS-TA = Baseline\ CST - Max\ CST\ Drop * (1 - e^{-0.603*Time})$$

$$Baseline\ CST = 480.0 * (0.739\ if\ AZALEA)$$

$$Max\ CST\ Drop = 114.9 * \left(\frac{Baseline\ CST}{441}\right)^{2.33}$$
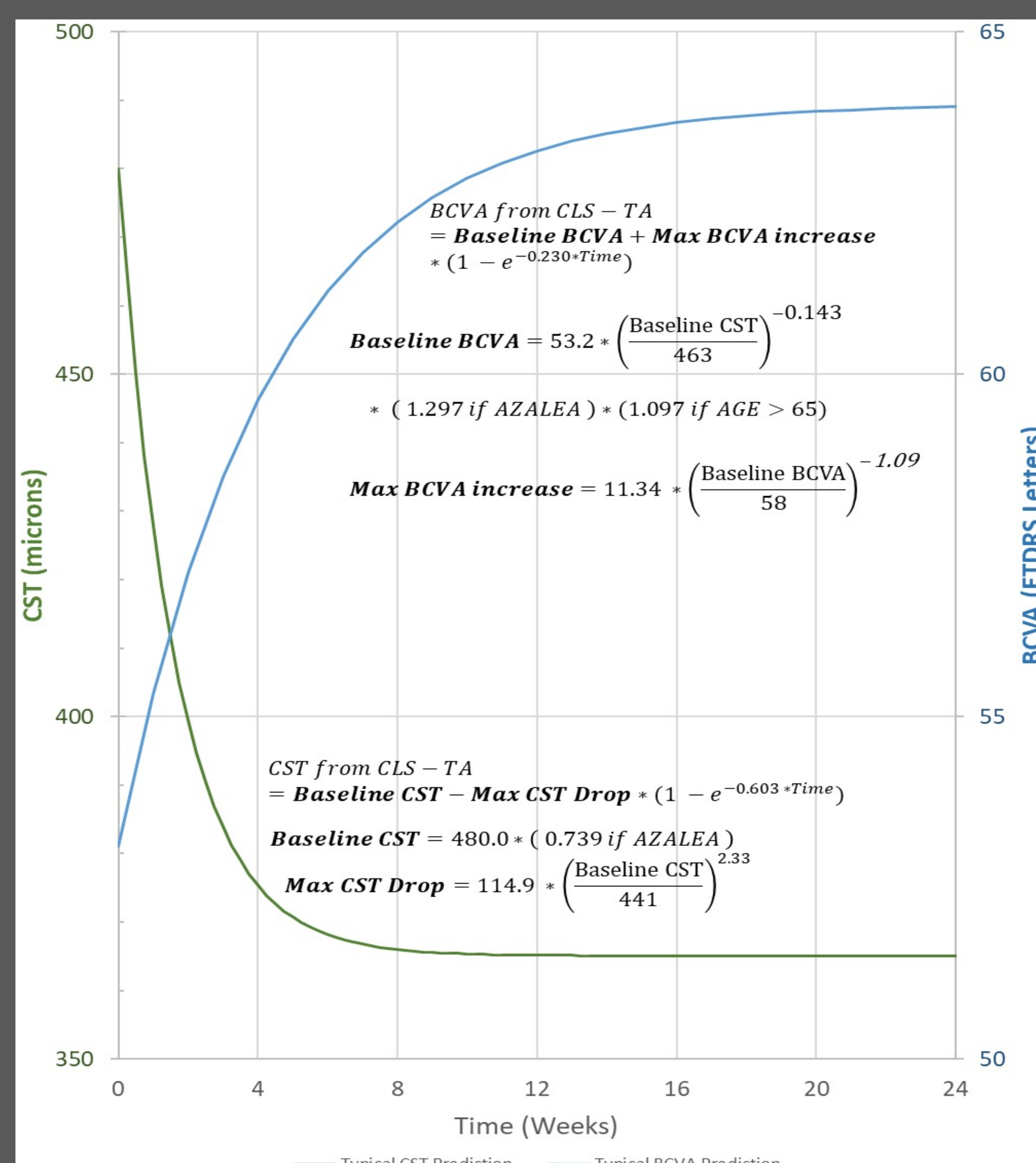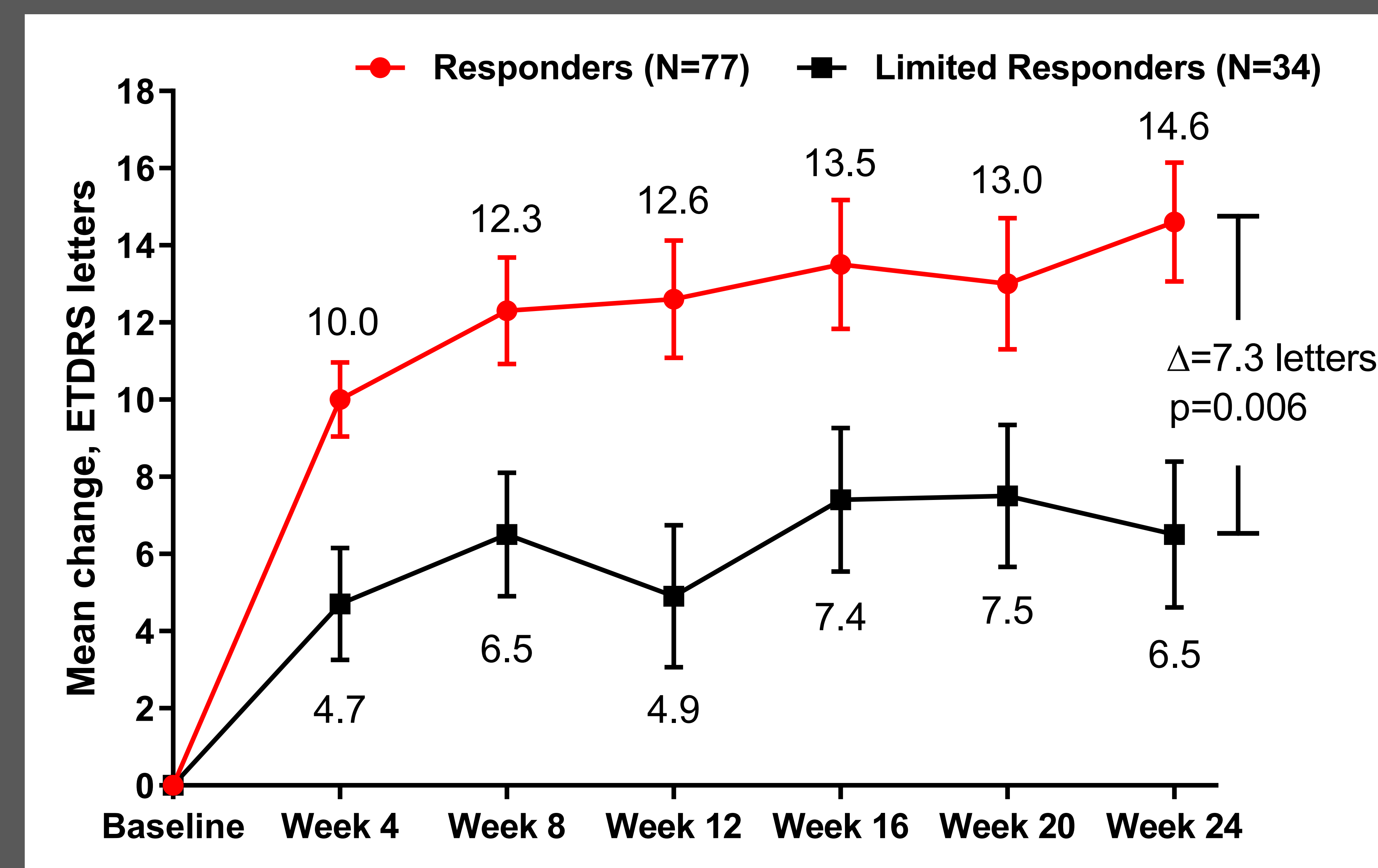
Typical CST Prediction · Typical BCVA Prediction

Figure 8: Association between Early Anatomic Response and BCVA Response:
Mean (± SEM) Change from Baseline in BCVA Letter Score by CST Response at Week 4
(CLS-TA treated patients with baseline CST ≧300 μm)

Responders (N=77) · Limited Responders (N=34)
Δ=7.3 letters p=0.006

Responder: a reduction from baseline in CST of 50 μm or greater at 4 weeks.
Limited Responder: less than a 50 μm reduction from baseline in CST at 4 weeks.

Results

Correlations:

❖ For EZ at baseline, mean BCVA progressively worsened with each EZ grade, trends which were not evident for cystoid space or SRF gradations.

❖ Eyes with normal EZ experienced greater 24-week change in BCVA than those with abnormal baseline EZ (11.9 vs 9.4 letters, p=0.006).

❖ In contrast, eyes without central cystoid spaces at baseline showed less improvement at 24 weeks, compared to those eyes with center-involvement (5.5 vs 13.7 letters, P=0.012); likewise, eyes without central SRF at baseline showed less improvement at 24 weeks, compared to those eyes with center-involvement (9.5 vs 17.2 letters, P<0.001).

❖ Longitudinal modeling showed CST required approximately 3 weeks to reach over 90% of full response and BCVA required approximately 9 weeks to reach the same magnitude of response.

❖ Eyes that showed an early anatomical response experienced a greater 24-week improvement in BCVA.

Conclusions

❖ Important and clinically meaningful relationships exist between BCVA and OCT anatomic and temporal features in eyes with uveitic macular edema, with anatomic improvement preceding BCVA improvement.