The Association Between Retinal Thickness Fluctuations and Visual Outcomes Following Anti-VEGF Therapy: A Systematic Review and Meta-Analysis

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Introduction: To examine the association between retinal thickness (RT) fluctuations and best-corrected visual acuity (BCVA) in eyes with neovascular AMD, macular edema secondary to RVO, and DME treated with anti-VEGF therapy.

Methods: A systematic search of Ovid MEDLINE, EMBASE, and the Cochrane Library was performed from January 2006 to December 2022. Studies comparing visual or anatomic outcomes of patients treated with anti-VEGF therapy, stratified by magnitudes of RT fluctuation, were included. ROBINS-I and Cochrane RoB 2 tools were used to assess risk of bias, and certainty of evidence was evaluated with GRADE criteria. Meta-analysis was performed with a random effects model. Primary outcomes were final BCVA and change in BCVA relative to baseline.

Results: 13900 articles were screened; 14 studies were identified in the systematic review and 4 studies were included in the meta-analysis. Final ETDRS VA was significantly worse in eyes with the highest level of RT fluctuation (weighted mean difference (WMD) = 6.83 letters; 95% CI, 4.41, 9.24; $p < 0.00001$; I^2 = 76%; 2995 eyes). RT at last observation was significantly greater in eyes with high RT fluctuations (WMD = 27.35 µm; 95% CI, –0.04, 54.75; $p = 0.05$; $I2$ = 88%; 962 eyes).

Conclusion: Final visual outcome is associated with magnitude of RT fluctuation over the course of therapy. Minimizing RT fluctuations is essential to optimizing visual outcomes in patients treated with anti-VEGF therapy. These findings are limited by a small set of studies, risk of bias, and considerable heterogeneity.