

Choroidal Thickness in Patients with Retinal Vein Occlusion Before and After Intravitreal Anti-VEGF: A Systematic Review and Meta-Analysis

Kareem Sadek¹, Philip Yu², Brendan K Tao², Fahad R Butt³, Peng Yan⁴

¹ Cumming School of Medicine, University of Calgary; ² Faculty of Medicine, University of British Columbia; ³ Schulich School of Medicine & Dentistry, University of Western Ontario; ⁴ Department of Ophthalmology and Vision Sciences, University of Toronto.

kareem.sadek@ucalgary.ca

Introduction

- Retinal vein occlusion (RVO)** is a common retinal vascular disorder that leads to significant vision loss primarily due to macular edema and ischemia¹.
- First-line treatments involve intravitreal **anti-VEGF** injections (e.g., bevacizumab, ranibizumab, aflibercept) that target VEGF-mediated vascular hyperpermeability².
- Intravitreal **corticosteroids** (such as dexamethasone implants) are used as second-line therapies to combat inflammation, despite their associated side effects³.
- Advanced OCT modalities (especially swept-source OCT) enable precise measurement of **choroidal thickness**, establishing it as a promising **biomarker** for disease activity and treatment response in RVO⁴.



Study Aim

- This systematic review evaluates changes in **subfoveal choroidal thickness (SFCT)** and **best-corrected visual acuity (BCVA)** following anti-VEGF and corticosteroid treatments.

Methods

- Databases Searched:** MEDLINE, Cochrane Central, Web of Science, and Embase.
- Primary Outcomes:** Changes in **SFCT** and **BCVA** at 1, 3, 6, and 12 months.
- Analysis:** Data extracted independently by reviewers. Fixed-effect meta-analysis performed using RevMan 5.3. Heterogeneity assessed using I^2 and Cochran's Q .

Inclusion Criteria

- Studies that recorded patient's pre and post-intravitreal injection choroidal thickness and visual outcomes
- Studies that examined patients with any of the following types of retinal vein occlusion: central, branch, hemiretinal, unspecified
- RCTs, non-randomized prospective studies, retrospective studies, and other clinical trials
- Case series and case reports published in the last 15 years

Exclusion Criteria

- Systematic review and meta-analyses
- Case series and case reports published more than 15 years ago

Results

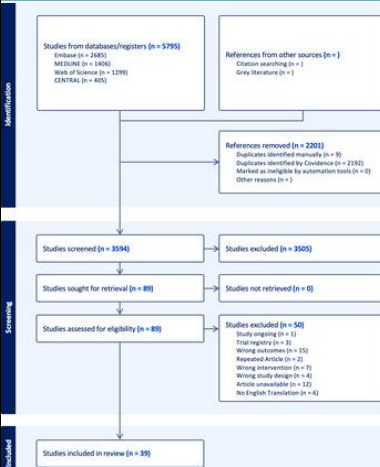


Figure 1. PRISMA Flow Diagram of the Study Selection Process

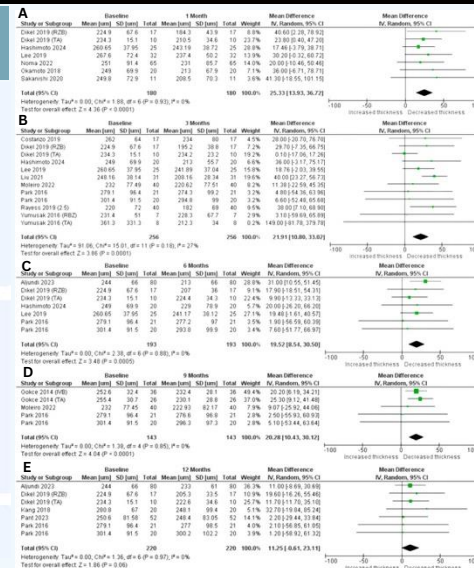


Figure 2. Forest Plots of Subfoveal Choroidal Thickness Change in BRVO Eyes at 1, 3, 6, 9, and 12 Months
Panels A-E show the mean difference (MD) in SFCT (μm) from baseline to each follow-up in eyes with BRVO. In each panel, individual studies are represented by squares (size $\propto$ study weight) with horizontal lines denoting their 95% confidence intervals. The diamond at the bottom of each panel depicts the pooled MD and its 95% CI.

Discussion

- Early SFCT reduction in BRVO and CRVO:**
 - Both BRVO and CRVO eyes show a statistically significant decrease in subfoveal choroidal thickness (SFCT) at **1 month post-anti-VEGF injection**.
- Sustainability of SFCT changes:**
 - In BRVO, SFCT reduction **persists at 6 months** and is still present though diminished at 9 months.
 - By **12 months**, however, the pooled effect is no longer statistically significant, suggesting a return toward baseline thickness—possibly reflecting natural disease progression or extended injection intervals.
- Prognostic Potential of Early SFCT:** The magnitude of SFCT decrease at 1 month correlates with sustained reductions at later timepoints, especially in CRVO.

Conclusions

- Intravitreal bevacizumab produces significant SFCT reductions in both BRVO and CRVO, with BRVO eyes demonstrating durable thinning up to 9 months and CRVO eyes exhibiting an even larger effect at 3 months.
- Early changes in SFCT, particularly at 1 month, may serve as an important biomarker for predicting future **visual outcomes in retinal vein occlusion**.

References

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