Residual retinal fluid following intravitreal anti-VEGF treatment for neovascular age-related macular degeneration: a systematic review and meta-analysis

Nikhil S. Patil MD(C),[1] Andrew Mihalache BMSC(C),[2] Arjan S. Dhoot BMSc MD(C),[3] Marko M. Popovic MD MPH(C),[4] Rajeev H. Muni MD MSc FRCSC,[4,5] Peter J. Kertes MD CM FRCSC[4,6*]

[1]Michael DeGroote School of Medicine, McMaster University, Hamilton, Ontario, Canada; [2]Faculty of Science, University of Western Ontario, London, Ontario, Canada; [3]Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada; [4]Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Ontario, Canada; [5]Department of Ophthalmology, St. Michael's Hospital/Unity Health Toronto, Toronto, Ontario, Canada; [6]John and Liz Tory Eye Centre, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada

Purpose

- The relationship between the presence of residual subretinal fluid (SRF) and residual intraretinal fluid (IRF) with visual acuity following anti-vascular endothelial growth factor (VEGF) treatment is not well understood.
- The objective of this meta-analysis is to analyze the association of residual retinal fluid, SRF, and IRF on visual acuity following anti-VEGF treatment for neovascular age-related macular degeneration (nAMD).

Methods

- A systematic literature search was performed from January 2005 to August 2021 on Ovid MEDLINE, EMBASE, and the Cochrane Library.
- Peer-reviewed articles reporting on visual acuity at last study observation stratified by the presence or absence of any residual SRF, IRF, and/or any retinal fluid after intravitreal injection of bevacizumab, ranibizumab, aflibercept, or brolucizumab in patients with nAMD were included.
- Studies that reported on other anti-VEGF agents, findings in fewer than 10 eyes, or were non-comparative, were excluded.
- Primary outcomes were BCVA at last study observation, change in BCVA from baseline, and retinal thickness at last study observation.
- Random-effects meta-analysis was conducted.

Results

- 11 studies and 3092 eyes were included in our analysis.
- At last study observation, the BCVA of eyes with residual SRF was better than eyes with no SRF (WMD=3.1 letters, 95% CI=[0.05,6.18], p=.05, GRADE=low certainty of evidence, 6 studies, n=1931 eyes).
- The BCVA of eyes with residual IRF at last study observation was worse than eyes with no IRF (WMD=-8.2 letters, 95% CI=[-11.79,-4.50], p<.001, GRADE=low, 7 studies, n=2114 eyes).
- In a leave-one-out sensitivity analysis, residual SRF was no longer associated with a better BCVA at last study observation relative to no residual SRF when Chatziralli et al. (p=.12), Dervenis et al. (p=.09), Holekamp et al. (p=.20), Khanani et al. (P=.07), or Saenz de Viteri et al. (p=.07) were excluded.

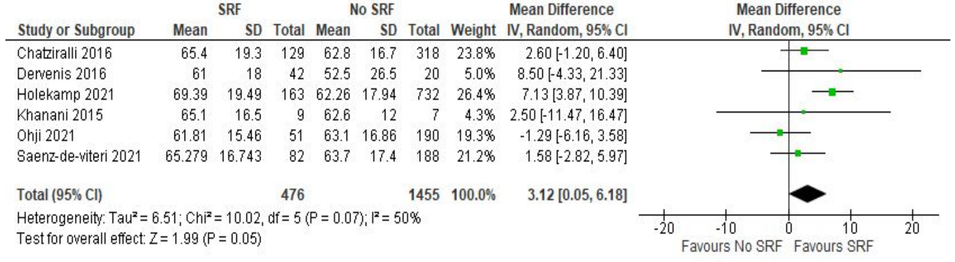

Figure 1. BCVA at final follow-up for eyes with residual SRF.

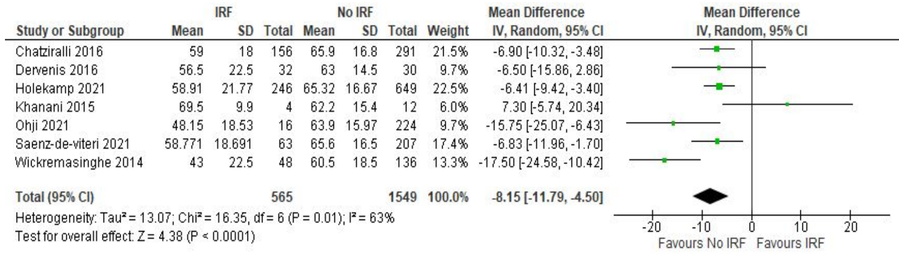

Figure 2. BCVA at final follow-up for eyes with residual) IRF.

Discussion

- The presence of residual SRF was associated with slightly better BCVA at last study observation, however, there was no significant difference between these two groups on leave-one-out sensitivity analysis and subgroup analysis based on study design.
- The presence of residual IRF was associated with substantially worse BCVA at last study observation and less improvement of BCVA from baseline.
- Our conclusions are limited by data from observational studies, heterogeneity, and a low certainty of evidence.
- While these findings support tolerance of residual SRF when treating nAMD, future clinical trials would be needed to confirm the association of residual SRF on BCVA outcomes.

Conflicts of Interest

N.P: None Declared, A.M: None Declared, A.H: None Declared, M.P: PSI Foundation, P.K: Bayer, Roche, Novartis, ArcticDx, R.M: Bayer, Novartis