

# “What should I inject next?” Challenging treatment decisions in the multiple anti-VEGF: a review of publications exploring anti-VEGF switching for nAMD

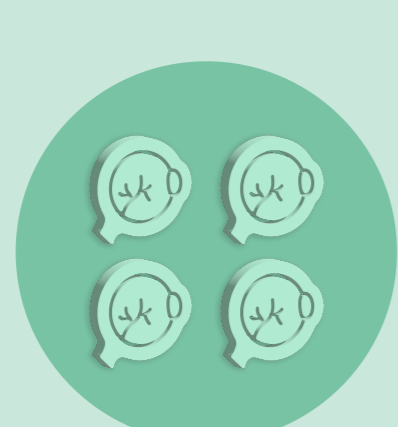
Pikkel J, Attas S. *Int Ophthalmol.* 2018;38(5):2031-2039.  
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The purpose of this work was to collate information from studies published to date focusing on switching anti-vascular endothelial growth factor (anti-VEGF) therapy and to describe the currently available data on anti-VEGF switching in neovascular age-related macular degeneration (nAMD).

A PubMed search of published articles from January 2010 to January 2017 was conducted.

Published studies were compared in parameters of sample size, reason for switch, duration of follow-up, and switch outcome (functional and anatomical).

The following data were collected from these publications:



Sample size (the number of eyes in the study)



Reason for switching the anti-VEGF agent



Duration of post-switch follow-up



Functional outcome (visual acuity improved, no change, or decreased)



Anatomical outcomes (Optical coherence tomography [OCT] outcomes improved, no change, or decreased)

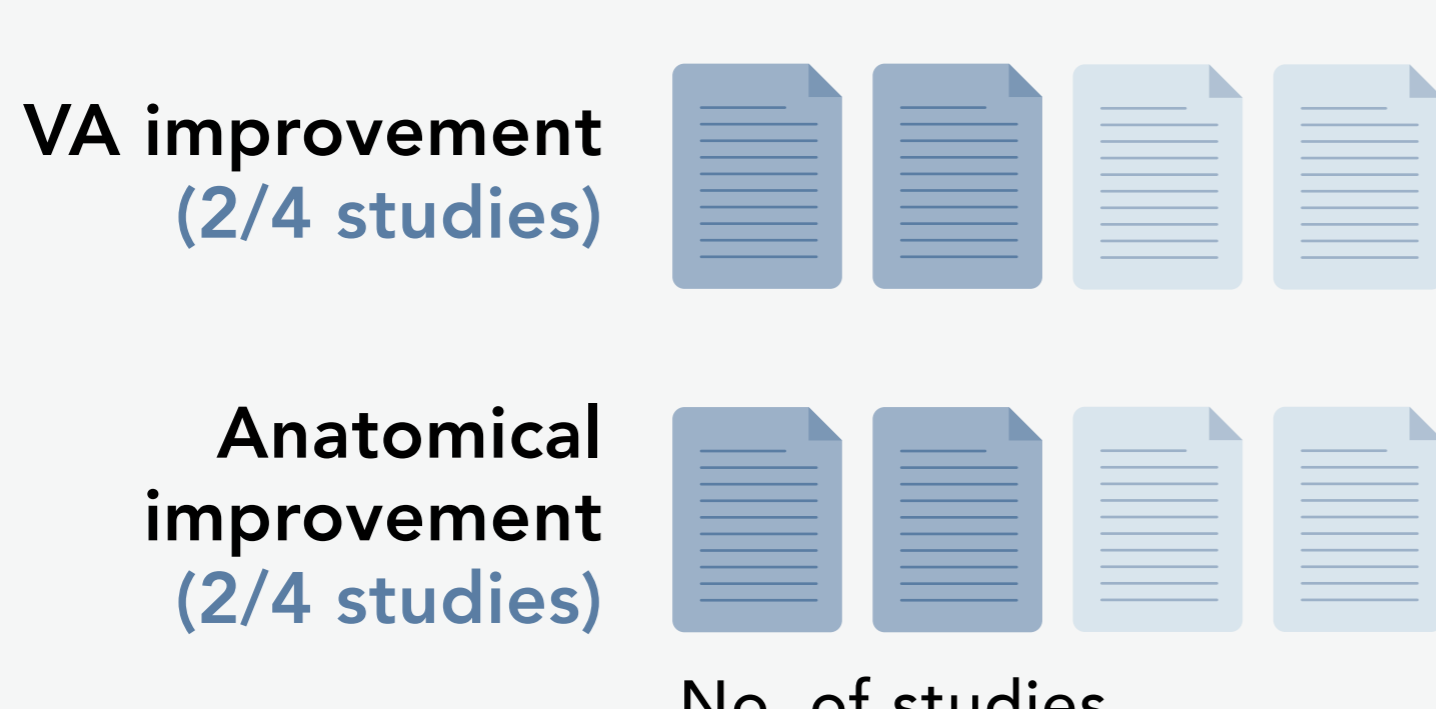
The studies were divided into four groups:

	Studies dealing with the switch from <b>bevacizumab</b> to <b>ranibizumab</b> injections	Total of <b>8</b> studies
	Studies dealing with the switch from <b>ranibizumab</b> to <b>bevacizumab</b> injections	Total of <b>4</b> studies
	Studies dealing with the switch from <b>bevacizumab</b> and/or <b>ranibizumab</b> to <b>aflibercept</b> injections	Total of <b>16</b> studies
	Studies dealing with the switch from <b>ranibizumab</b> to <b>aflibercept</b> injections	Total of <b>6</b> studies

Switching from bevacizumab to ranibizumab resulted in visual acuity (VA) and anatomical improvement in the majority of studies.



Switching from ranibizumab to bevacizumab was less effective.



Switching from either agent (bevacizumab and/or ranibizumab) to aflibercept rarely resulted in VA improvement but resulted in improvement of retina anatomy in most cases.



Despite the well-proven efficacy of anti-VEGF agents in treating nAMD, not all patients experience the desired extent of functional and anatomical improvement.



The literature review focused on analyzing the response of switching resistant nAMD patients from the initially chosen anti-VEGF (by the judgment of the treating retina specialist) to another anti-VEGF agent, but the researchers also concluded results of switching anti-VEGF agents due to other reasons, such as economic considerations or regulatory/insurance decisions.

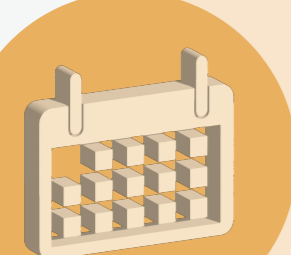


Similarly, a meta-analysis of **seven** retrospective and prospective studies indicated that following treatment switch from **ranibizumab** or **bevacizumab** to **aflibercept**, resistant nAMD patients may have a significant improvement in central retinal thickness (CRT), while the VA was mostly stabilized after 6-month follow-up.

Study limitations include the following:



A lack of uniform guidelines for switching treatment and also the pooling of data from heterogeneous patient cohorts that were treated by different retina specialists.



The timing of switch is not provided or is not uniform, making it difficult to draw conclusions on the optimal time for treatment switch, which could potentially be after 3 injections, 6 injections, or perhaps more.

Conclusions

**In conclusion, switching anti-VEGF agents from bevacizumab to ranibizumab may be of benefit for patients who fail to improve with intravitreal bevacizumab injections. Ranibizumab was shown in the various publications included in this analysis as a good alternative treatment in nAMD after bevacizumab failure. When switching from either bevacizumab or ranibizumab to aflibercept, anatomical improvement was seen in most cases, but only a minority of publications described improvement in functional outcomes. At the time this review was conducted, there were no data available on direct switch from bevacizumab to aflibercept.**