Treatments for Retinal Artery Occlusion: A Systematic Review and Meta-Analysis

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Introduction: Retinal artery occlusions (RAOs) lead to rapid-onset vision loss that is usually irreversible unless retinal circulation is recovered prior to ischemic damage. A 2020 scientific statement by the American Heart Association acknowledged that thrombolysis may be beneficial for RAO, although the literature remains inconclusive with considerable inconsistency across management approaches. The purpose of this systematic review and meta-analysis is to provide a comprehensive overview of the safety and efficacy of thrombolysis for RAO.

Methods: We performed a systematic literature search from January 2005 to July 2023 on Ovid MEDLINE, Embase, and the Cochrane Library to elicit relevant literature. We included comparative studies reporting on the efficacy and safety of thrombolysis versus conservative modalities for non-arteritic RAO. Outcomes were the change in best-corrected visual acuity (BCVA) from baseline and the incidence of adverse events. We conducted a meta-analysis using random effects models. Continuous and dichotomous outcomes were reported using weighted mean differences (WMDs) and risk ratios (RRs), respectively.

Results*:* Nine studies reporting on 641 eyes at baseline were included in our review, of which 314 received thrombolysis and 327 received conservative treatment. Six studies were observational and three were randomized trials. The mean duration from symptom onset to treatment varied across study arms, ranging from 3.4 to 36 hours. Five studies conducted intra-arterial thrombolysis and four studies used intravenous thrombolysis. Across four studies reporting on 275 eyes, the change in BCVA at last study observation was similar between the thrombolysis and conservative treatment groups (WMD=-0.05 logMAR, 95%CI=[-0.19, 0.09], p=0.47). The incidence of headache (p=0.20), tinnitus (p=0.80), hyperesthesia (p=0.41), intracranial hemorrhage (p=0.14) and intraocular pressure-related adverse events (p=0.29) were also similar between groups. Consistent findings were observed in subgroups of central RAO and studies that administered tissue plasminogen activator. Five included studies with outcomes not compatible with the meta-analysis were narratively reviewed, of which four found greater visual improvement in the thrombolysis group. All five studies reported similarly low rates of adverse events across groups. Of note, two studies each reported one case of symptomatic ischemic stroke in their thrombolysis groups.

Conclusion: Our investigation did not find significant evidence to support the routine use of thrombolysis for improving BCVA in patients with RAO; however, there remains some evidence in favour of the practice. Notably, most studies had an average duration from symptom onset to treatment that surpassed the recommended 4.5-hour window. Additional research into thrombolysis for RAO is warranted.