Efficacy of Intra-Arterial or Intravenous Thrombolytic Therapy Versus Conservative Standard Therapy for Central Retinal Artery Occlusion: an Individual Patient Data Meta-Analysis

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Introduction: There is a lack of high-quality data supporting thrombolytic treatment for non-arteritic central retinal artery occlusion (naCRAO). We performed an individual participant data meta-analysis to compare the efficacy of intra-arterial thrombolysis (IAT) and intravenous thrombolysis (IVT) with conservative standard therapy (CST).

Methods Embase, Medline, and CENTRAL were searched from inception to June 2023 and IPD were solicited from original investigations that reported treatment modality, time from onset of symptoms to treatment, and visual acuity (VA) data. Analysis was limited to studies with N=5, and eyes presenting with severe vision loss (SVL, VA < 20/200) that were treated within 24 hours. The percentage of eyes with moderate vision loss or worse (MVL, VA < 20/50) and change in logMAR visual acuity post-treatment was compared between the IAT, IVT, and CST groups. Chi-squared tests and Student's t-tests were used to compare categorial or continuous variables, respectively.

Results: Of 143 studies reporting 2956 patients with naCRAO, 65 studies provided IPD for 1104 eyes (37.3% capture rate). There were 808 eyes meeting inclusion criteria: 359/759 IAT, 191/367 IVT, and 258/1830 CST. The mean age of patients was 65.1 years (standard deviation [SD] 13.1), and 365 (33.1%) were female. At presentation, the logMAR visual acuity was 2.3 (SD 0.5) with slightly better VA in the CST group (2.2, p = 0.01). Among eyes that received treatment ≤6 hours from symptom onset, the likelihood of MVL was lower with IAT (76.8% vs. 90.2%, P=0.017, number needed to treat (NNT)=7.5) and IVT (78.5% vs. 90.2%, P=0.027, NNT=8.6) compared to CST. Similarly, greater improvements in mean logMAR VA were achieved with IAT (-0.788 vs. -0.453, P <- 0.01) and IVT (-0.728 vs. -0.453, P < 0.01) compared to CST. There were no differences in rate of MVL or logMAR changes between the IAT and IVT groups if administered within 6 hours of symptom onset. When administered between 6-24 hours, IAT improved the rate of MVL (84.2% vs. 92.8%, P=0.015) and logMAR change relative to CST (-0.576 vs. -0.301, P<0.01).

Conclusions: Compared to CST for naCRAO, early administration of IAT or IVT is associated with increased likelihood of favorable visual outcome. IVT appears to be non-inferior to IAT when administered within 6 hours. IAT has a small statistically significant benefit compared to CST when administered between 6 and 24 hours. These results should be confirmed in a randomized, placebo-controlled clinical trial.