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MECHANICAL DISPLACEMENT OF ARTERIAL EMBOLUS DURING VITRECTOMY: A SIMPLER SURGICAL APPROACH TO BRAO MANAGEMENT AND LITERATURE REVIEW

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The management of Branch retinal artery occlusion (BRAO) is still controversial and lacks standardised guidelines. We report a case of BRAO treated with pars plana vitrectomy (PPV) 22 h after onset and a possible simpler surgical approach for mechanical embolus displacement. We also provide a focused literature review of contemporary surgical techniques for a more evidence-based approach.

The case report and the novel technique for managing BRAO were presented according to "Journal of VitreoRetinal Diseases" guidelines. To offer the reader a concise overview of the vitrectomy techniques employed in the management of RAO, two investigators independently searched the PubMed database (E.P., A.G.). They utilized MeSH terms to identify relevant studies, including terms such ("Vitrectomy"[Mesh] OR vitrectomy OR "pars plana vitrectomy" OR PPV OR "surgical embolectomy" OR "arteriotomy" OR "neurotomy") AND ("Retinal Artery Occlusion"[Mesh] OR "retinal artery obstruction" OR "retinal artery thrombosis" OR "retinal artery embolism" OR "branch retinal artery occlusion" OR "central retinal artery occlusion" OR CRAO OR BRAO OR "retinal artery ischemia" OR "artery occlusive disease" OR "retinal arter* obstruct*" OR "retinal arter* occlu*" OR "retinal arter* thrombo*" OR "retinal arter* embol*"). In instances of discrepancy between the two investigators' selections, a third reviewer was consulted to make a final decision on the inclusion of the research (M.A.) . The search was confined to papers published in English, focusing exclusively on articles where the title or abstract was directly related to vitrectomy as a surgical intervention for CRAO and BRAO up to March 2025. The results of this comprehensive search were analysed qualitatively to provide a foundation for the surgical strategies.

Arterial perfusion was restored intra-operatively. Using a diamond duster and by using its bendable nature, the embolus was dislodged, restoring flow without the need of a double-hand technique or complications. Best-corrected visual acuity (BCVA) improved from counting-fingers to 6/9 at 1 week and 6/6 at 1 month, remaining stable at 6 months. OCT showed resolution of inner-retinal oedema with preservation of the ellipsoid zone; FA/OCTA confirmed complete reperfusion without recurrence. Across the 17 papers, we systematically compared key surgical features: type of PPV-based manoeuvre, degree of intraocular invasiveness, instruments used, time from onset to intervention and degree of visual improvements. In the literature review, PPV with embolus manipulation or removal produced ≥3-line visual gain in 59 % of eyes treated within 24 h and in 38 % treated after 24 h; major complications were transient vitreous haemorrhage (11 %) and neovascular glaucoma (3 %).

PPV with gentle, non-invasive thrombus manipulation provided by this technique can promptly reestablish retinal perfusion and meaningful visual recovery even beyond the traditional 4–6 h therapeutic window. We believe it also provides a possible simpler, cost-effective technique that can allow a novel vitreoretinal surgeon to manage this sight-threatening disease. Our experience and the reviewed evidence suggest that, in carefully selected patients, minimally invasive surgery with controlled IOP and purpose-built instruments is an effective and relatively safe option. Prospective multicenter randomised trials are needed to define the effectiveness of vitrectomy in managing retinal artery occlusion, optimal timing, technique, and patient selection criteria. Meanwhile, this paper can help a clinically tailored decision on these sight-treating conditions.

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