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New Approaches in the Management of Submacular Hemorrhages

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Submacular hemorrhage (SMH) is a severe and less common vision-threatening complication of neovascular age-related macular degeneration. Vision loss is caused by retinal atrophy and scarring of the retinal pigment epithelium (RPE) [1, 2]. Evidence from animal studies indicates that hemorrhage in the subretinal space can cause severe damage to photoreceptors within 24 h and continues to contribute to the degeneration of both photoreceptors and RPE within a week [1, 3]. This rapid progression necessitates timely and effective intervention to preserve visual function.

The management of SMH involves anti-vascular endothelial growth factor (VEGF) monotherapy, office-based nonsurgical interventions, and a range of surgical options. Intravitreal anti-VEGF injections have demonstrated efficacy in maintaining visual acuity [4]. Surgical methods aim to displace the hemorrhage and mitigate its toxic effects on the retina. Pars plana vitrectomy (PPV), pneumatic displacement, intravitreal or subretinal tissue plasminogen activator (tPA) injection, or a combination of those are in common use [5, 6]. Oncel et al. [4] provide a comprehensive review of these treatment modalities, highlighting that the choice of intervention often depends on the size and severity of the hemorrhage. The review underscores the need for individualized treatment plans, emphasizing that both office-based and complex surgical procedures can be effective depending on the specific clinical scenario. Still, the lack of standardized protocols and head-to-head randomized controlled trials leaves a gap in determining the optimal approach for different classifications of SRH. The ongoing TIGER study aims to address this issue by evaluating whether the benefits of PPV, subretinal tPA, intravitreal gas, and intravitreal aflibercept outweigh the risks compared to aflibercept monotherapy [7].

The integration of tPA with anti-VEGF therapies represents a significant advancement in the treatment of SMH. A recent meta-analysis by Veritti et al. [8] has highlighted the benefits of this combined approach. The study found that using both tPA and anti-VEGF therapies in the context of PPV – whether administered subretinally or intravitreally – significantly improves visual acuity and facilitates hemorrhage displacement. Importantly, the analysis revealed no significant differences in outcomes between the different methods of tPA or anti-VEGF delivery, reinforcing the efficacy of combined therapy. Lately, Nawrocka and Nowrocki [9] investigated this unsolved issue using fundus autofluorescence (FAF) imaging. Interestingly, FAF patterns were more influenced by the duration of SMH rather than the specific treatment regimen. This finding highlights the

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importance of early intervention, as delayed treatment can result in irreversible photoreceptor and RPE damage, reflected as hypo- and hyperautofluorescence. Additionally, the study found that subretinal needle application of tPA does not adversely impact retinal anatomy or visual outcome, a conclusion supported by FAF imaging. The study also emphasizes the necessity of continued anti-VEGF therapy post-surgery to maintain disease control and maintain visual outcomes.

Suprachoroidal hemorrhage (SCH) is a serious complication that can arise during ophthalmic procedures or as a spontaneous event. Mohan et al. [10] offer a detailed exploration of SCH, discussing its management challenges, including systemic risk factor control, intraocular pressure management, and surgical intervention. SCH management requires a multidisciplinary approach, including control of systemic risk factors and intraocular pressure. It is crucial to account for the size, location, and duration of the SCH. The review emphasizes that while observation may be sufficient for small SCH, surgical intervention may be necessary for larger or symptomatic cases, in which early recognition and intervention might lead to better outcomes. The ongoing TIGER study and other research initiatives are crucial in addressing the complexities of SMH management [7].

This editorial highlights the pressing need for randomized controlled trials to establish the best treatment protocols for various SMHs based on size, location, and classification. As we advance our understanding and treatment of SMH, integrating new findings into clinical practice will be essential for improving patient outcomes and minimizing the impact of this debilitating condition.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

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