

## Letters to the Editor: Analysis of Graft Detachments and Rebubbings After 450 Descemet Membrane Endothelial Keratoplasty Procedures

### To the Editor:

We read with great interest Massia Menkene et al's recent analysis of graft detachment and rebubbling after 450 Descemet membrane endothelial keratoplasty (DMEK) procedures, which represents a significant contribution to the understanding of postoperative complications in DMEK surgery.<sup>1</sup>

By focusing on key factors such as residual gas filling, detachment extension, and corneal thickness, the authors provide valuable insights into the dynamics of graft adherence. The study's emphasis on the inferotemporal quadrant as a vulnerable site and the central portion of the graft as a driver of rebubbling is particularly noteworthy.

The scope of the analysis could be broadened to include additional factors that have been highlighted in the literature as critical to understanding the full complexity of graft behavior postsurgery, as presence of posterior stromal ripples, a recently recognized biomarker for graft detachment risk.<sup>2-4</sup>

Studies have shown that moderate-to-severe ripples, which can be readily and easily identified through anterior segment optical coherence tomography, increase the likelihood of DMEK graft detachment.<sup>2,3</sup> The integration of this imaging biomarker in the study, to evaluate also any correlation with stromal ripples and residual gas filling, could have been helpful to predict detachment risks comprehensively and to provide clinicians with actionable metrics for early intervention.

In all of 450 procedures in Massia Menkene et al's study,<sup>1</sup> the main inci-

sion was temporal and sulfur hexafluoride at a concentration of 20% was used. Further analysis is warranted to investigate the impact of main incision localization, superior or temporal, as superior seems to show a trend toward higher rebubbling rate, and residual anterior chamber (AC) filling in the case of a different tamponades agents, such as ambient air.<sup>5</sup> This aspect could be particularly relevant as concerns emerge about the carbon footprint of fluorinated gases used in corneal surgery emerge and their role in routine, low-risk DMEK procedures, likely with no intraoperative complications.<sup>6</sup>

The authors also found that DMEK graft detachments tended to occur more frequently in the inferior region, particularly in the inferotemporal quadrant. This finding aligns with the mechanics of AC tamponade resorption and the varying effectiveness of postoperative posturing. Corneal surgeons might, therefore, benefit from a slightly superiorly decentering DMEK grafts to maximize the effect of the AC tamponade for a longer duration. This approach is supported by recent analysis showing that moderate DMEK decentration has no adverse effect on visual outcomes.<sup>7</sup>

Additional general consideration on relationship between DMEK and rebubbling, is the preparation method of DMEK grafts whether performed by the surgeon or the eye bank, introduces variability in adhesion properties and postoperative outcomes. Surgeon-prepared grafts have been demonstrated to possess superior elastic modulus and adhesion force compared with prestripped and preloaded tissues, suggesting that preparation method should be included as a critical variable in any predictive model of graft adherence.<sup>8</sup>

Time from graft preparation to surgery is another essential factor influencing graft integrity and detachment risk. Prolonged intervals, particularly in preloaded tissues, are associated with diminished endothelial viability and reduced adhesion potential.<sup>9</sup> Incorporating these temporal dimensions could further refine the predictive value of the study's conclusions.

By expanding the analytical framework to incorporate these elements, future research can better capture the multifaceted nature of graft behavior after DMEK.

The integration of posterior stromal ripples, preparation methodologies, temporal factors, and graft decentration into this and in the future studies design would significantly enhance clinical relevance, providing surgeons with a more comprehensive set of tools for managing graft detachment and rebubbling, contributing to further advancements in our collective understanding of DMEK surgery outcomes.

**Financial disclosures/conflicts of interest:** None reported.

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