

# Vitreoretinal Surgery in the Post-Lockdown Era: Making the Case for Combined Phacovitrectomy

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**Abstract:** The coronavirus disease (COVID-19) pandemic has significantly limited the capacity of healthcare systems to provide elective services like cataract surgery. Cataract formation is a frequent complication after pars plana vitrectomy. In this paper, we review the pros and cons of combined phacovitrectomy as opposed to sequential surgery in the post-pandemic era. In particular, we discuss the patient-level visual benefits and societal economic advantages of this procedure.

**Keywords:** COVID-19, phacovitrectomy, vitreoretinal surgery, retinal detachment, macular hole, epiretinal membrane, cataract

Over the last few months, ophthalmologists across the world have been navigating their way through the challenges brought forward by the coronavirus pandemic. Now, we face the challenge of reentering a normal practice of ophthalmology while planning for a possible second wave of the coronavirus disease 2019 (COVID-19). Pars plana vitrectomy is the most commonly performed surgery by vitreoretinal surgeons and is used to treat an increasing number of indications including retinal detachment (RD), macular hole (MH), epiretinal membrane (ERM) and vitreous hemorrhage.<sup>1</sup> Cataract formation is a frequent complication post-vitrectomy, developing during the first post-operative year and becoming visually significant in up to 80% of patients.<sup>1</sup>

Phacovitrectomy combines vitrectomy and phacoemulsification as part of a single procedure and has the potential of hastening visual recovery after retinal surgery. As opposed to sequential surgery, this one step procedure prevents patients from having to live with a visually-significant cataract as they wait for their cataract surgery. It also has the potential of lowering the risk of cross-infection as it reduces the number of visits required to the hospital. Already, the COVID-19 pandemic has significantly reduced the capacity of healthcare systems to provide elective services like cataract surgery.<sup>2,3</sup> Considering the possibility of a second wave and to reduce this surgical backlog, combined procedures like phacovitrectomy must be considered. In parallel, personal protective equipment (PPE) supply shortages have been a source of anxiety for vitreoretinal surgeons.<sup>4</sup> Phacovitrectomy addresses this issue because it decreases PPE use by 50% compared to sequential surgery.

Many studies have shown that phacovitrectomy offers more rapid visual recovery without affecting the long-term outcomes of vitrectomy in different diseases: RD, MH, and ERM.<sup>5-7</sup> Phacovitrectomy can be considered in eyes with or without lens opacities, and has been demonstrated to be a safe option for phakic and presbyopic eyes.<sup>5</sup> In our experience, phacovitrectomy is most suited for patients who are 50 years and older and

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in cases where gas endotamponade (sulfur hexafluoride [SF<sub>6</sub>] or perfluoropropane [C<sub>3</sub>F<sub>8</sub>]) is used. When considered in high ametropes with normal binocular vision, patients must be counselled about postoperative anisometropia and resultant aniseikonia. Discussions must include the need for contact lens correction, cataract extraction or refractive surgery in the fellow eye in the short term.

Intraoperatively, it offers several advantages. Performing phacoemulsification in a non-vitreotomized eye allows for increased anterior chamber stability and vitreous support, possibly leading to less posterior capsule rents and dropped nuclear fragments. It also provides surgeons with the ability to immediately address these complications if they occur. Other intraoperative advantages include the enhanced capacity to perform thorough shaving of the vitreous base without the risk of iatrogenic lenticular touch. It has been postulated that removing the vitreous base decreases the risk of anterior proliferative vitreoretinopathy and retinal detachment recurrence. However, recent studies have questioned this dogma.<sup>8</sup> Additionally, it allows for improved visualisation of the macula (for internal limiting membrane peeling) and the periphery (to detect small retinal breaks).<sup>9</sup> Of note, surgeons must be careful during the cataract portion of the surgery and must adapt the size of the capsulorhexis (around 5 mm) to avoid intraocular lens (IOL) optic prolapse.<sup>10</sup>

One of the main concerns with phacovitrectomy compared to solitary phacoemulsification is refractive outcomes. Some authors have reported a small myopic shift between aimed for and achieved refraction with phacovitrectomy.<sup>11</sup> Explanations, such as intraocular lens shift with gas pressure, axial length changes, and inaccuracies in axial length measurements, have been suggested.<sup>11</sup> In particular, the accuracy of IOL power estimation in eyes with macula-off RDs has been of particular concern. The analysis of both optical and ultrasound biometry and the comparison with the contralateral eye (axial length, corneal keratometry and refraction) have been suggested to improve the accuracy of IOL power calculation.<sup>12</sup> Despite those concerns, a review of the refractive outcomes in phakic and pseudophakic eyes after vitrectomy and phacovitrectomy for MH and ERM showed that a myopic shift was found in most studies, regardless of the sequence of the surgery.<sup>13</sup>

The benefits to the healthcare system should also be considered especially in a post-COVID-19 economy. Compared to a two-step procedure, phacovitrectomy was

shown to provide 17–20% savings per patient to Medicare – the national health insurance program in the United States.<sup>14</sup> We believe that healthcare systems elsewhere in the world might also profit from this cost saving. Additional economic benefits include reduced transportation time, cost for medications and absenteeism from work for patients and their families. Those benefits are magnified in a post-pandemic society and economy and cannot be overlooked. For its safety, patient and economic benefits, we strongly believe that now is the time for widespread adoption of phacovitrectomy. Evidently, we recognize that adopting phacovitrectomy might not be feasible at every time and place. Surgeons still have the responsibility of obtaining informed consent after discussing the pros and cons of this combined procedure. Ophthalmologists must carefully select eligible patients and should take into consideration individual patient preferences and wishes.

## Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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## References

1. Belin PJ, Parke DW 3rd. Complications of vitreoretinal surgery. *Curr Opin Ophthalmol*. 2020;31(3):167–173. doi:10.1097/ICU.0000000000000652
2. Urbach DR, Martin D. Confronting the COVID-19 surgery crisis: time for transformational change. *CMAJ*. 2020;192(21):E585–E586. (). doi:10.1503/cmaj.200791
3. Napoli PE, Nioi M, d'Aloja E, Fossarello M. Safety recommendations and medical liability in ocular surgery during the COVID-19 pandemic: an unsolved dilemma. *J Clin Med*. 2020;9:5. doi:10.3390/jcm9051403
4. Chandra A, Haynes R, Burdon M, et al. Personal protective equipment (PPE) for vitreoretinal surgery during COVID-19. *Eye (Lond)*. 2020;34(7):1196–1199. doi:10.1038/s41433-020-0948-3
5. Ling R, Simcock P, McCoombes J, Shaw S. Presbyopic phacovitrectomy. *Br J Ophthalmol*. 2003;87(11):1333–1335. doi:10.1136/bjo.87.11.1333

6. Madi HA, Masri I, Steel DH. Optimal management of idiopathic macular holes. *Clin Ophthalmol*. 2016;10:97–116. doi:10.2147/OPTH.S96090
7. Tan A, Bertrand-Boiche M, Angioi-Duprez K, Berrod JP, Conart JB. Outcomes of combined phacoemulsification and pars plana vitrectomy for rhegmatogenous retinal detachment: a comparative study. *Retina*. 2020. doi:10.1097/IAE.0000000000002803
8. Tabandeh H, London NJS, Boyer DS, Flynn HW Jr. Outcomes of small-gauge vitreoretinal surgery without scleral-depressed shaving of the vitreous base in the era of wide-angle viewing systems. *Br J Ophthalmol*. 2019;103(12):1765–1768. doi:10.1136/bjophthalmol-2018-313626
9. Steel DH. Phacovitrectomy: expanding indications. *J Cataract Refract Surg*. 2007;33(6):933–936. doi:10.1016/j.jcrs.2007.01.047
10. Tosi GM, Balestrazzi A, Baiocchi S, et al. Complex retinal detachment in phakic patients: previtrectomy phacoemulsification versus Combined Phacovitrectomy. *Retina*. 2017;37(4):630–636. doi:10.1097/IAE.0000000000001221
11. Suzuki Y, Sakuraba T, Mizutani H, Matsubashi H, Nakazawa M. Postoperative refractive error after simultaneous vitrectomy and cataract surgery. *Ophthalmic Surg Lasers*. 2000;31(4):271–275.
12. Rahman R, Bong CX, Stephenson J. Accuracy of intraocular lens power estimation in eyes having phacovitrectomy for rhegmatogenous retinal detachment. *Retina*. 2014;34(7):1415–1420. doi:10.1097/IAE.0000000000000072
13. Hamoudi H, La Cour M. Refractive changes after vitrectomy and phacovitrectomy for macular hole and epiretinal membrane. *J Cataract Refract Surg*. 2013;39(6):942–947. doi:10.1016/j.jcrs.2013.04.012
14. Seider MI, Michael Lahey J, Fellenbaum PS. Cost of phacovitrectomy versus vitrectomy and sequential phacoemulsification. *Retina*. 2014;34(6):1112–1115. doi:10.1097/IAE.0000000000000061

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