

THE BENEFITS OF 360° LASER RETINOPEXY AFTER VITRECTOMY



A few extra minutes of surgical time may be sufficient to prevent vision-threatening postoperative RD.

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Ideally, rhegmatogenous retinal detachment (RRD) can be repaired with a single surgery; however, despite excellent skills and use of cutting-edge technology, up to 10% of cases require additional intervention.¹ Recurrent RD may be attributable to surgical technique and be affected by the amount of peripheral vitreous that remains after vitrectomy. The presence of a gas bubble in an incompletely vitrectomized eye can induce traction on the peripheral retina, leading to the formation of peripheral breaks and RD.

Due to the vision-threatening nature of this complication, many attempts have been made to prevent postoperative RD, including careful peripheral retinal examination with scleral depression, properly treating retinal breaks at the end of the vitrectomy, and prophylactic scleral buckling or cryopexy.^{1,2} However, it would be beneficial if a less invasive management strategy was feasible.

We hypothesize that 360° laser retinopexy anterior to the equator can reduce the incidence of retinal breaks and RD by causing strong chorioretinal adhesion. It may also prevent the progression of an RD, similar to demarcation laser treatment. This procedure can easily be performed during the vitrectomy with an endolaser probe.

METHODS

We retrospectively reviewed patient records to identify those who underwent vitrectomy for RRD by a single surgeon in Mohammed VI University Hospital in Marrakech, Morocco, from January 2020 to December 2021.

The patients were part of a consecutive case series cohort. One group received intraoperative prophylactic 360° laser (n = 142, mean age 52 years), and a control group did not receive this treatment (n = 39, mean age 56.8 years).

Each patient underwent a detailed preoperative evaluation, and a complete ocular examination was performed on postoperative days 1 and 7; at 2, 4, and 8 weeks; and then

each month up to 6 months after surgery. BCVA was recorded at each visit and converted to logMAR for statistical analysis.

Exclusion criteria included previous ocular surgery, giant tears, retinal dialysis, trauma, proliferative vitreoretinopathy (grade C or higher), RD with macular hole (high myopia), or round retinal hole with no associated posterior vitreous detachment.

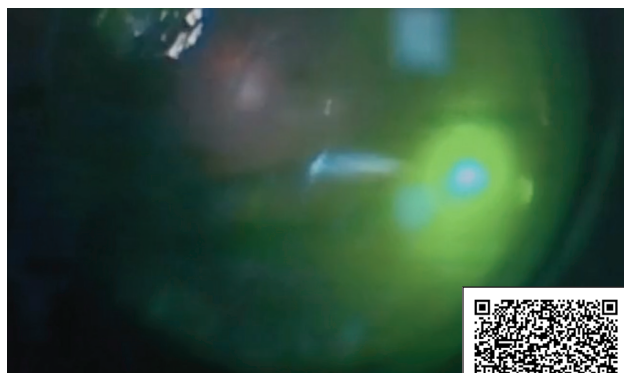
SURGICAL STEPS

1. General anesthesia was given, and cataract surgeries were performed for phakic patients.
2. Sclerotomies were created 3.5 mm from the limbus, and the posterior cortical vitreous was removed up to the vortex vein.
3. 360° scleral depression was performed to trim the vitreous at the base and confirm an absence of iatrogenic retinal breaks, and conventional 23-gauge vitrectomy was performed.
4. If a retinal break was found during the procedure in either group, it was treated with endolaser.
5. After fluid-air or gas exchange, the original retinal break was treated with an endolaser.
6. 360° laser retinopexy was performed by placing three rows of medium-white burns anteriorly from the level of vortex vein, toward and beyond the equator approximately one burn-width apart using the endolaser system (Video).
7. Sclerotomies were sutured with 8-0 vicryl.
8. Patients with superior retinal breaks were positioned upright, whereas those with nasal, temporal, or inferior breaks were positioned on the contralateral cheek.

RESULTS

The 360° laser group showed a significant reduction (12.6%, 13/103 eyes) in RD incidence after vitrectomy up to 6 months postoperatively compared with the control group (28.2%, 11/39 eyes; $P = .045$). There was

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Video. 360° Laser Retinopexy After PPV.



no significant difference in postoperative logMAR visual acuity (360° laser group: 0.10 ± 0.25 ; control group: 0.06 ± 0.28 ; $P = .193$). The proportion of epiretinal membrane (ERM) and development of macular hole, cystoid macular edema, and vitreous hemorrhage were not statistically different between the two groups. Two eyes experienced rupture of the posterior capsule as a complication of cataract surgery but had no other postoperative complications, including RD after surgery.

DISCUSSION

There are two main causes of iatrogenic retinal breaks associated with vitrectomy: 1) insertion of an instrument causes traction on the adjacent vitreous, resulting in an intraoperative retinal tear along the posterior border of the vitreous base, or 2) the vitreous becomes immobilized within the sclerotomy site during withdrawal of an instrument, causing postoperative traction along the posterior border of the vitreous base. Careful peripheral retinal examination with scleral depression should detect breaks induced in this manner.

Intraoperative 360° laser during vitrectomy can treat unseen breaks, prevent the formation of new breaks, and prevent recurrent RD after vitrectomy. This procedure takes only a few minutes to complete and can be performed while observing the peripheral retina during scleral depression. Using a tamponade at the end of the vitrectomy allows for sufficient time for chorioretinal adhesion to develop.^{3,4}

Intraoperative 360° laser, as well as cryopexy, may cause the breakdown of the blood-retina barrier with leakage of serum proteins into intraocular fluids.⁵ This could be the source of cellular migration and proliferation, resulting in ERM formation. However, in our study, the occurrence of ERM was not significantly different between groups.

The use of cannulated vitrectomy systems may protect the vitreous base by allowing easier entry of instruments, thus causing less frequent herniations of the vitreous into the scleral incision.⁶ In this study, 23-gauge vitrectomy was performed, but using smaller-gauge instruments may further

decrease trauma in and near the vitreous base adjacent to the sclerotomies. The use of trocars may protect the vitreous base from excessive traction to the adjacent retina.^{7,8}

Although the incidence of retinal breaks may decrease with small-gauge vitrectomy, postoperative recurrent RD is still possible; the presence of a gas bubble can induce traction on the peripheral retina, an inflammatory reaction, or vitreoretinal proliferation development, leading to the formation of peripheral breaks and RD.⁹

PREVENT TROUBLE DOWN THE ROAD

Given the vision-threatening nature of postoperative RD, adjunctive treatment with 360° laser retinopexy should be considered. A randomized, prospective clinical trial is necessary to confirm the efficacy of this prophylactic treatment. ■

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