

Ultrasonic fragmentation for removing thick organized clots during diabetic vitrectomy – A novel technique

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A 65-year-old male with proliferative diabetic retinopathy (PDR) and non-clearing vitreous hemorrhage underwent 25G pars plana vitrectomy (PPV). A large disk of thick organized blood of 5 disk diameter (DD) size was encountered in subhyaloid space. All attempts including lower cut rates to remove this disk using a 25G cutter turned futile. We used a 20G fragmatome to safely remove this hard clot from vitreous cavity in 50 s. Surgical time for removal of similar clot of 3 DD by 25G cutter in another eye was 5 min. Removal of thick clotted subhyaloid blood by ultrasonic fragmentation during diabetic vitrectomy is a safe, faster, and useful maneuver.

Key words: Clotted Disk, phacofragmentation, proliferative diabetic retinopathy, subhyaloid hemorrhage, vitreous hemorrhage

Proliferative diabetic retinopathy (PDR) is a leading cause of vision loss in patients with diabetes mellitus.^[1] Vitreous hemorrhage is not an infrequent complication in eyes with PDR and can be seen in up to 27% eyes treated with anti-vascular endothelial growth factor or 34% eyes treated with pan retinal photocoagulation at 2 years follow-up.^[2] Recent coronavirus disease 2019 (COVID-19) pandemic has affected the care of patients with retinal diseases, with some studies reporting decline of up to 60% in the rate of intravitreal injections for diabetics.^[3] This delay in treatment can put eyes with PDR at increased risk of developing chronic non-clearing vitreous hemorrhage. Thick organized subhyaloid blood can pose a challenge to surgeon during small gauge PPV. We describe a novel technique where ultrasonic fragmentation was successfully utilized to remove a large disk of organized blood clot in an eye with PDR.

We examined a 65-year-old male Asian patient with diabetes mellitus. He presented with history of recurrent episodes of blurred vision followed by gradual loss of vision in right eye. He has not undergone an ophthalmic exam in last 2 years. Best corrected visual acuity (BCVA) in right eye was reduced to light perception only. Anterior segment examination was unremarkable in both eyes, except early cataract. Fundus

examination for right eye revealed dense organized vitreous hemorrhage obscuring all details. Ultrasound B scan for right eye revealed vitreous hemorrhage with no retinal detachment. Fundus examination for left eye revealed PDR. With informed consent, 25G PPV was planned for right eye.

Surgical Technique

A standard three-port PPV was performed using Constellation 25G vitrectomy system (Alcon Laboratories Inc, Fort Worth, TX, USA). Core vitrectomy with dissection of posterior hyaloid and removal of liquefied subhyaloid hemorrhage was performed, following which a large (5 disk diameter [DD]) disk constituted by thick organized blood was encountered [Fig. 1a]. This disk was freely mobile and could not be engaged or dissected by 25G cutter despite repeated attempts. Switching to core vitrectomy mode with vacuum raised to 600 mm and a reduced cut rate (2000 cuts per minute) also could not allow the cutter to remove this large disk. The 25G port was then enlarged to 20G and the phaco fragmatome was carefully introduced avoiding lens injury [Fig. 1a–c]. The infusion pressure was raised to 55 mmHg. The circular disk of clotted blood could now easily be engaged and completely removed by fragmatome in 50 s [Fig. 1d–f]. The clot removal was followed by Internal

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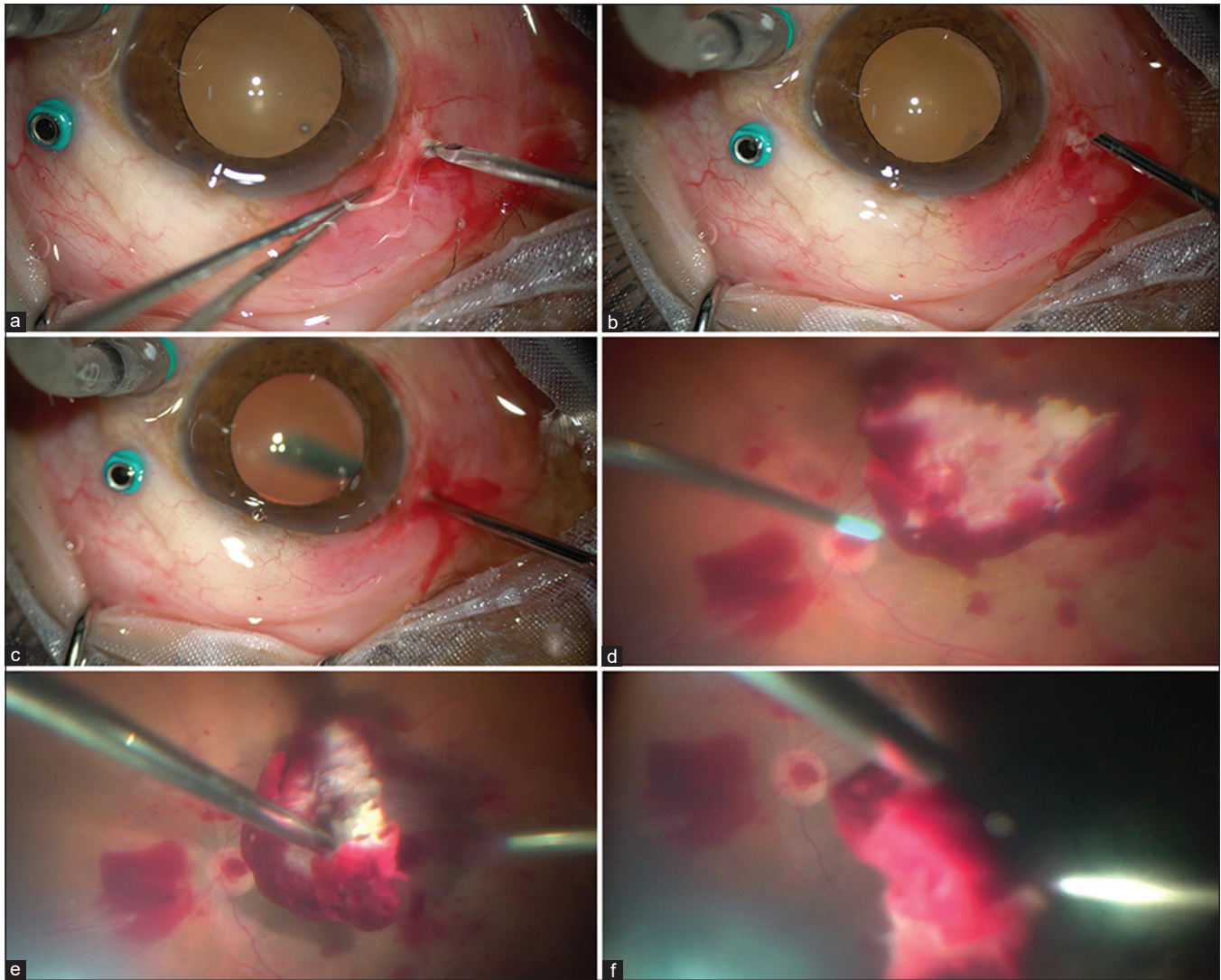


Figure 1: (a) Intraoperative photograph showing a 25G port being enlarged to 20G. (b and c) Intraoperative photograph showing phaco fragmatome being introduced carefully. (d) Intraoperative photograph showing a thick disk of clotted blood with 5 disk diameter. (e and f) Intraoperative photograph showing fragmatome engaging the disk of clotted blot and cracking it

Limiting Membrane (ILM) peeling, endolaser PRP, and fluid–air exchange. The 20G port was closed with a single 8-0 Vicryl suture. The associated supplemental digital content 1 Video 1: <https://vimeo.com/600419846/232c7f7f9d> demonstrates the key steps of the surgical procedure. There were no complications noted, and postoperative recovery was uneventful. BCVA at 6 weeks follow-up improved to 20/40. We also reviewed the surgical time during another vitrectomy surgery for an eye with PDR harboring a similar, but smaller (2 DD) disk of thick organized clotted blood that was removed with 25G cutter. The surgical time for removing this smaller disk by cutter was 5 min. The associated supplemental digital content 2 Video 2, <https://vimeo.com/600417694/362917cdf8> shows the removal of smaller disk with cutter.

Discussion

The techniques for diabetic vitrectomy are constantly evolving with newer indications like epiretinal membrane, macular edema, and vitreomacular traction becoming more frequent

than non-clearing vitreous hemorrhage and tractional retinal detachment.^[4,5] Lot of advancements in surgical techniques, like “lift and shave technique” and 27G cutter-assisted dissections, have been reported recently.^[6,7]

Although early intervention by vitrectomy, laser, or injections is likely to reduce the incidence of non-clearing thick organized hemorrhage in eyes with PDR, it can still pose a challenge for management by small-gauge cutters. An effective technique to remove such big clots has not been described in literature. Besides lens fragments, ultrasonic fragmentation has been successfully utilized to remove other materials like Miragel’s implant from the vitreous cavity.^[8] Since vitreous surgeons are accustomed and familiar with the technique and fluid dynamics of converting one of the 25G ports to 20G for using fragmatome to remove the lens fragments, the technique can easily be adopted with minimal learning curve. The precautions like raising the infusion pressure to avoid globe collapse or intraoperative hemorrhage, using fragmatome after clearing cortical vitreous and careful inspection of sclerotomy

sites before closing, are similar in both situations. We could successfully and safely remove this thick clotted blood with fragmatome, so we intend to share feasibility and efficiency of this novel technique with vitreous surgeons dealing with PDR eyes.

Conclusion

Thick organized subhyaloid clot in eyes with proliferative diabetic retinopathy and long-standing vitreous hemorrhage poses a challenge during 25G pars plana vitrectomy. We have described a novel technique utilizing ultrasonic fragmentation to address this challenge.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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