The presence of emulsified silicone oil in the eye can lead to many complications, glaucoma being one of the most common. Adequate IOP control is difficult to achieve with medical management alone; surgical intervention is often required. Glaucoma drainage device implantation is often the preferred line of surgical intervention in such cases due to trabeculectomy failure from emulsified silicone oil droplets and associated conjunctival scarring. However, the silicone tube of Ahmed glaucoma valve (AGV) may attract the silicone oil droplets, causing blockade of the tube with persistent raised IOP postoperatively. We report one such case where post-AGV silicone oil tube occlusion was treated with semi-conservative surgical management instead of revising the entire surgery or implantation of another drainage device. Our surgical technique of intracameral “vent and flush” offers rapid and effective IOP control in such cases. Postoperatively, normal IOP was achieved. Patency of tube continued to be maintained along with normalization of IOP on subsequent follow-ups.

**Key words:** Ahmed glaucoma valve, complications of silicone oil, secondary glaucoma

The role of silicone oil for tamponade in surgically vitrectomized eyes is very well established. However, a rise in intraocular pressure (IOP) and subsequent development of secondary glaucoma post silicone oil implantation is quite common.[1] It is proposed that silicone oil alone can be responsible for high intraocular pressure in approximately 70% of cases.[2] Multiple risk factors have been described in association with silicone oil injection, including corneal decompensation, oil infiltration into the retinal tissue, and rise in IOP. Raised IOP can be either acute and transient owing to pupillary block or delayed and persistent due to infiltration of trabecular meshwork, direct infiltration of angle structures secondary to migration of silicone oil in the anterior chamber or due to oil emulsification over time leading to multiple complications, glaucoma being the most common of all.[3]

Emulsified oil causes intermediate to late-onset glaucoma by migrating into the anterior chamber and causing inflammation of trabecular meshwork, subsequently leading to inadequate drainage of aqueous humor. Clinically, emulsified silicone oil droplets can be seen occluding the angle on gonioscopy. In such patients, initial management is medical treatment but eventually, surgical intervention is often required. Silicone oil removal is the most common and effective surgical intervention in such patients to control intraocular pressure, but it has been seen that approximately 26% may still require glaucoma surgery even after silicone oil removal.[4] Trabeculectomy with mitomycin C offers poor prognosis in such patients due to conjunctival scarring secondary to encirclage placement or from emulsified oil droplets.[5]

Glaucoma drainage devices play a key role in this group of patients. Ahmed glaucoma valve (AGV) offers certain advantages such as having a wide filtration area, prevention of hypotony, higher success rate, and fewer complications.[6] AGV implantation has many complications as well, such as bleb encapsulation, tube exposure, corneal complications such as corneal decompensation, corneal edema, and blockade of the tube. Blockade of AGV tube with silicone oil is one of the few complications that has been observed in vitrectomized eyes with silicone oil and even in eyes after silicone oil removal due to persisting emulsified droplets.[7]

We describe a novel surgical technique to deal with blockade of AGV tube secondary to emulsified silicone oil droplets in vitrectomized eyes.

**Surgical Technique**

**Case**

A 36-year-old female, a known case of pathological myopia (having lost RE from failed vitreoretinal (VR) surgery for retinal detachment) presented to us after having...
undergone VR surgery followed by silicone oil removal and subsequent raised IOP in LE. Baseline IOP was 40 mm Hg in LE. Best-corrected visual acuity LE was 6/24 while RE was no perception of light. Fundus evaluation revealed a vertical cup to disc ratio of 0.9:1 in LE. Despite using maximum glaucoma medications, the IOPs were constantly high (30–36 mm Hg). Thus, the patient underwent AGV implantation (FP7, New World Medical Inc, Rancho Cucamonga, California) superonasally for control of IOP.

Post AGV implantation, the IOP in the operated eye remained high at 30 mm Hg. Maximum medical therapy was not effective in controlling the IOP. On slit-lamp examination, there was presence of emulsified silicone oil in and around the silicone tube, thus confirming tube blockade and sustained high postoperative IOP despite maximum medications [Fig. 1]. Thus, surgical intervention was planned to remove the occlusion of the tube and ensure its patency.

Surgery
The surgery was performed (SG) under topical anesthesia using proparacaine hydrochloride 0.5% drops (Paracaine, Ajanta Pharma Ltd). The eye was cleaned and draped in a sterile manner for ocular surgery. A speculum was placed to separate the eyelids. Two stab incisions were made with a 20-G surgical knife (MVR, Alcon Laboratories, India) at 10′o clock and 2′o clock and emulsified oil was thoroughly washed out using basic salt solution (BSS). Following this, anterior chamber was filled with viscoelastic [Fig. 2a]. Subsequently, a micro vitreoretinal forceps (ILM Forceps, Alcon Laboratories, India) was introduced in the anterior chamber to grasp the tube. With the help of a 20-G straight blade, two venting incisions were made laterally in the AGV tube [Figs. 2b and 3a], leading to partial egress of silicone oil from the tube [Video 1]. Despite the slit vents, oil droplets stuck to form the candle wax drippings alongside the slits and continued to block the tube which was attempted to remove by irrigation and aspiration around the tube [Fig. 2c and Video 1]. Thus, the tube was then flushed with BSS by holding and bending the tube with the help of micro vitreoretinal forceps held in the left hand while the right hand facilitated BSS-assisted irrigation of the tube via a cannula injecting 10 mL of BSS [Figs. 2d and 3b, Video 1]. The irrigation was terminated when no further silicone oil was noted within the tube following irrigation. The corneal stab entries were hydrated with BSS [Video 1].

Next postoperative day, IOP had come down to 16 mm Hg. On follow-up after 1 month, IOP continued to stay at 16–18 mm Hg with maintained tube patency.

Discussion
AGV implantation surgery is fairly common in surgically vitrectomized eyes with secondary glaucoma. However, successful surgery might be marred by subsequent blockade of the tube due to blood or silicone oil. Some amount of emulsified drops may remain despite silicone oil removal. Possibly, surgical aphakia favors anterior migration of emulsified oil in the anterior chamber due to affinity of silicone oil to silicone tube facilitating its adhesion onto the tube and subsequent obstruction, visible as meniscus inside the tube [Fig. 1]. Many authors have reported the presence of silicone oil droplets on the Molteno tube.[9] Morales first described the presence of silicone oil in and around the tube of AGV similar to our case.[7]

Minckler described the adhesion of oil to the anterior chamber portion of the drainage tube without lumen obstruction as candle wax appearance in his report.[9] It has been hypothesized that inferior placement of tube would not attract the silicone oil and would help in the prevention of blockade of the tube. However, several reports have shown that inferior placement maybe associated with more complications as compared to superior placement as blockade of the tube with silicone oil is more with the inferior placement of the tube.[7]
Such cases should be managed promptly, especially those who fail medical management. Our technique involves the creation of venting incisions in the silicone tube, which not only provides an alternate path for silicone oil egress but also offers IOP control. It has been described that venting incisions in the implant tube offers IOP control over a wide range and vents remain sealed till a high IOP range of up to 35 mm Hg. However, they may not work alone as larger silicone oil droplets may persist to occlude the vents too. Our technique combines venting with intracameral irrigation of tube to remove the emulsified silicone oil column. The advantage of irrigation is the rapid removal of silicone oil out of the tube. High-volume irrigation with 10 mL or more fluid ensures that the oil droplets are irrigated out across the entire length of the tube. Irrigation may facilitate faster egress of the oil from the proximal end of the tube and plate as well, which otherwise may be a slow process. The normalization of IOP in our patient post this intervention suggests that the intracameral flushing of oil droplets helps in faster and an easy remedy for oil egress through the tube and the plate and can be performed for IOP control in cases with oil-tube blockade.

**Conclusion**

We believe that this novel technique is relatively non-invasive, effective in controlling IOP, and decreases the need for any major surgical intervention for IOP control.

**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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