



INTRACTABLE GLAUCOMA- AN OVERVIEW

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ABSTRACT

Complicated glaucomas are always associated with diagnostic and treatment challenges. The purpose of this article is to discuss the causes and management of intractable glaucoma. The criteria that best defines intractable glaucoma is the inability to control the intra ocular pressure and optic neuropathy progression with the maximum tolerated medical therapy, filtering surgery or combination of both. The more the risk factors, there is greater likelihood that the glaucoma will evolve rapidly to refractory glaucoma. Traditional filtering surgery becomes obsolete in most of these cases. Surgical outcome can be enhanced with the use of antimetabolites but they have increased rates of post operative complications. Glaucoma drainage devices can be a better choice in the initial phases of refractory glaucoma but long term results are unrewarding. Non penetrating surgery gives better outcome. Sub conjunctival implantation of XEN gel stent gives a better scope in the management of refractory glaucoma.

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INTRODUCTION

Glaucoma is the second leading cause of blindness for people over 60 years (WHO). More than one million cases are reported in India every year. Glaucoma is a group of eye diseases which result in damage to the optic nerve and irreversible vision loss. Intractable glaucoma also called as refractory glaucoma is defined as the condition with intra ocular pressure greater than 21 mm Hg with maximally tolerated glaucoma medications, failed surgeries or both.

Common causes for intractable glaucoma: It includes NVG, uveitic glaucoma, traumatic glaucoma, aphakic and pseudophakic glaucoma, congenital glaucoma, glaucoma after PKP, ICE syndrome, Sturge Weber syndrome, glaucoma in aniridia, excessive wound healing response and bleb cicatrization.

Management: Treatment of refractory glaucoma is always challenging and the results are unpredictable because usually they are secondary and also associated with multiple mechanisms. Success rate can be maximised if the cause is known and it is treatable.

Medical Management: Treatment with anti glaucoma drugs will usually be unsuccessful in cases with pre and post trabecular pathology causing raised intra ocular pressure. Medical management becomes ineffective in ICE syndrome and 88% require Trabeculectomy¹. It fails in glaucoma associated with Sturge Weber syndrome also^{2,3}. Treatment with anti VEGF often shows a promising result in NVG by

reducing new vessel formation, preventing the PAS formation and also by lowering the intra ocular pressure^{4,5,6}.

Laser Trabeculoplasty: This has a minimal role in patients with pigmentary glaucoma, pseudo exfoliation glaucoma and steroid induced glaucoma.

Trabeculectomy: Commonly done filtering surgery become ineffective in patients with refractory glaucoma due to the following factors.

External factors for bleb failure include Fibrosis and scarring, Tenon's cyst formation because of externalisation of anterior chamber due to non communication with sub conjunctival space, thick sclera flap, chronic medication, ALT, tight suture, secondary glaucoma.

Internal factors include inadequate osteum, occlusion of osteum (with debris, iris, vitreous, blood clot, cortex and ciliary process), incomplete iridectomy and scleral flap overlap.

Wound Modulators: Overall result of the filtering surgery can be enhanced by using wound modulators. Pharmacological modulation can be done with steroids, collagen inhibitors and anti metabolites. They act by inhibiting the fibroblast and delay wound healing. Corticosteroids act by inhibiting collagen synthesis. Collagen inhibitors act at the trabecular meshwork level enhancing the aqueous outflow. Antimetabolites include 5 Fluro uracil, Mitomycin C, Bleomycin, Daunorubicin, and cytosine arabinoside. They act

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by inhibiting the fibroblast proliferation. Surgical outcome will be better with the use of antimetabolites in complicated cases^{7,8}. Trabeculectomy augmented with antimetabolites in NVG showed higher rate(88%) of hyphema^{9,10}. Other complications of anti metabolites include scleral thinning and necrosis, conjunctival and corneal toxicity, hypotonic maculopathy by damaging ciliary epithelium, late bleb leaks and endophthalmitis, overhanging blebs, excessive filtration and choroidal detachment.

Aqueous drainage devices: These include the following items.

Non valved: Molteno implant, Baeveldt and shocket band
Valved ones include Krupin disc, Krupin band, Joseph hitchings, Optimed and Ahmed glaucoma valve.

Valve: Permits uni directional flow from the anterior chamber to the sub conjunctival space with the minimum opening pressure.

Molteno implant: Commonly used one. It has a 13 mm polypropelene episcleral plate with silicon tube.

Baeveldt implant: is kidney shaped, porous made of silicon rubber.

Ahmed implant: is an American glaucoma valve 13X 16X 1.9 polypropelene explants which has a pressure sensitive valve and venturian effect on aqueous flow. Advantages are immediate reduction in intra ocular pressure, unique non obstructive valve system to prevent excessive drainage and chamber collapse. The intra ocular pressure lowering benefit of Glaucoma Drainage Devices in complicated glaucoma is comparable with that of Trabeculectomy alone but with the lower rate of surgical failure and re surgery^{11,12}.

Seton: Non hollow linear shaft like structure.

Shunt: Tubular structure, allows bidirectional flow. Prognosis of Shunt Devices depends on the patency of tube, good bleb formation around the plate and porosity.

Complications of tube shunt: Intra operative complications are Conjunctival laceration, Scleral perforation, muscle disinsertion, decemets stripping, AC tube damage, bleeding, lens damage and vitreous loss. Early postoperative complications are hyphema, inflammation and increased IOP, malignant glaucoma and late postoperative complications include corneal erosion, implant erosion, tube migration, cataract and hypotony.

Cyclo destructive procedures: YAG laser (contact method with probe and non contact by slitlamp delivery), Argon laser (Transpupillary or Endolaser) or Diode laser cyclo photo coagulation can be done but Intra ocular pressure reduction is unpredictable. Diode ablation of ciliary body proves safest with lower incidence of post operative hypotony¹³; but vision drop is a common problem^{13,14}.

Complications of cyclo photo coagulation include scleral thinning, corneal epithelial defect. Iritis, hyphema, hypopyon. Late complications are cataract, sympathetic ophthalmia, supra choroidal haemorrhage, choroidal detachment, retinal detachment and phthisis bulbi.

Non penetrating surgery: Visco canalostomy augmented with MMC reported a success rate of 85% in patients with failed Trabeculectomy¹⁵.

XEN gel stent is an established, latest treatment option for refractory glaucoma. It is tiny, about the length of an eyelash

when implanted under the conjunctiva becomes a soft and flexible material that will not dissolve over time and designed to reduce the intra ocular pressure by creating a small channel to drain the aqueous humor. This is a minimally invasive procedure that by passes trabecular and scleral resistance to create the outflow, reducing the risk of outflow obstruction and also avoiding the complications like over filtration and flat anterior chamber¹⁶.

CONCLUSION

Treatment of refractory glaucoma requires an understanding of underlying pathology and mechanisms to choose an appropriate option. Ab interno approach for the placement of XEN gel stent provides the ophthalmologists a better scope to achieve the target IOP in these patients.

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