

Challenging complications of valve implantation

by

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PREDISPOSING FACTORS

It is important to consider the case mix for these devices on dealing with their complications

Most of the eyes receiving tube shunts have already had

- multiple previous operations including cataract extraction and trabeculectomy
- Subjected also to chronic use of medications
- Most of these eyes have advanced optic nerve damage

Intra-operative complications

A) Oversized anterior chamber entry incision: Which predisposes to leakage around the tube with creation of a limbal bleb (which predisposed to further hypotony). To prevent this problem, a 23 gauge needle is used to produce an adequate entry for the tube without leakage. However if leakage occurs, a phimosi stitch (10/0 nylon) can be used to close this too large entry incision

B) Improper direction of entry incision: An anterior chamber entry incision must be parallel to the iris. When this incision is directed posteriorly, occlusion of the tube by the iris occurs. When directed anteriorly endothelial touch occur

c) Scleral Perforation: May occur during suture fixation of the episclera plate. Retinal cry-therapy must be done at the puncture site, while other steps of surgery is completed within the same quadrant.

d) tube damage: The tube may be damaged if grasped with toothed forceps. Another implant should be used

e) obstructed tube : as manufacture fault that discover on priming of the implant so another spare implant of appropriate size should be available.

f) Hyphema : with incidence ranging from 10%to20% usually from iris vessels usually mild and resolve spontaneously

Early postoperative complications (< 2 weeks)

A) Hypotony: Hypotony & associated complications such as shallow anterior chamber, choroidal detachment & choroidal hemorrhage. This complication is less likely to occur with valved implants with incidence of (7-10%) in valved implants as AGV (15-20% in non valved)

B) choroidal detachment: occurred as a results of hypotony with incidence as hypotony usually serous and mild sometimes massive and hemorrhagic

Choroidal detachment

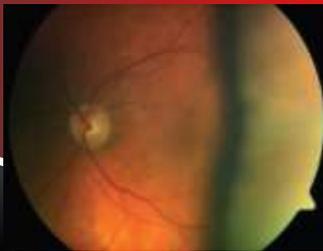
Causes: marked hypotony, prolonged hypotony specially with the use of antimetabolite

Venous changes, Inflammation

Choroidal detachment lead to increase hypotony by decrease aqueous production and possibly by increase uveoscleral out flow

Management: mild to moderate spontaneous resolution give systemic steroid and atropine and stop aqueous suppressant to the other eye

Massive; (KISSING) surgical drainage and AC reformation preferably by NA halourinate



Hemorrhagic effusion;

Unlike painless serous choroidal effusions, hemorrhagic choroidals generally have an abrupt onset with severe pain and marked reduction in visual acuity. When hemorrhagic choroidals are associated with high IOP, hyperosmotic agents and aqueous suppressants are recommended. The visual outcomes and overall prognosis are worse..

Risk factors: eye with reduced structural rigidity as prior vitrectomy ,advanced buphthalmos with thin sclera

Prevention ; avoid large surface implants that create large bleb, healon injection in ant chamber

Management ; drainage is more effective when clot liquefied typically after 7-10 days but if effusion is massive do drainage. Full thickness sclerostomy 3-4 mm posterior to limbus ideally over the meridian of highest effusion simultaneous ant .ch infusion with BS S

We have a case of

male child 6th years old single eye ,

his eye had **advanced recurrent buphthalmos** dated since birth operated

4 times trabeculectomies and one cataract operation were done at different ages,

vision was 2/60 BCVA,

IOP was 38 mmHG with max tolerated medical topical ttt,

corneal diameter exceed 14 mm

Planned for Ahmed glaucoma valve implantation 4 months ago

The surgery was classic with No intraoperative complications

In the 1st post-operative day, examination revealed: lost ant ch with high IOP, US was done that revealed a large hemorrhagic choroidal detachment with kissing choroids

Beside medical ttt drainage was done by vitroretinal surgeon, during drainage

Large hemorrhagic fluid exit from sclerostomy, after operation choroid settled (by US) but there were hyphema and vitreous HGE and the vision become pL



Hypotony maculopathy

occur after glaucoma implant surgery with a reported incidence of 1.3% to 18%. , the risk increases with the use of antifibrosis agents.

characterized by a low IOP associated with fundus abnormalities, including chorioretinal folds, optic nerve head edema in the acute setting , and vascular tortuosity.

Risk Factors

Male gender

Myopia

Young Age

multiple glaucoma filtration Surgeries

Use of Antifibrosis agents (Mitomycin C >> 5-Fluorouracil)

Elevated Pre-Operative IOP

Symptoms : diminution of vision and or distorted vision

On examination :

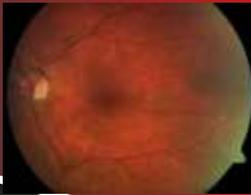
Intraocular pressure less than 6.5mm Hg

Painless, decreased vision

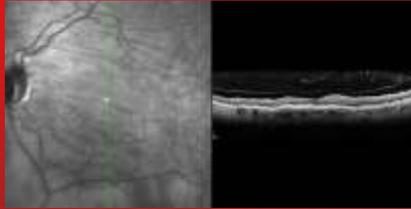
Hyperopic shift in refraction

Characteristic fundus changes: chorioretinal folds, vascular tortuosity, and optic disc swelling

Diagnosis



Fundus photography



OCT

Implant tube erosion

occur if the tube converge which are the scleral flap or graft and the conjunctiva and Tenon all are melt

predispose factors :

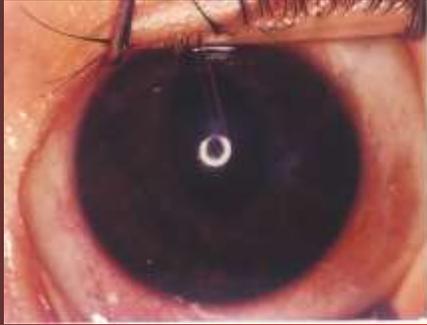
anti-fibrotic use especially MMC

pt with thin of sclera (as advanced buphthalmos)

This complication is often serious if not recognized early as this erosion gives the conjunctival microbes direct access to anterior ch around tube giving rise to late onset endophthalmitis

Incidence :2-5%

Management : this require placement of donor graft over this site (sclera, facia lata, dura matter, pericardial patch)



Too large tube touching the cornea



Tube erosion

Late endophthalmitis

It is rare complication (less than 1%). It occurs mostly following tube or plate erosion. The paediatric age group was five times higher than in adults. It requires removal of the implant as it might serve as a reservoir for the infectious organism.

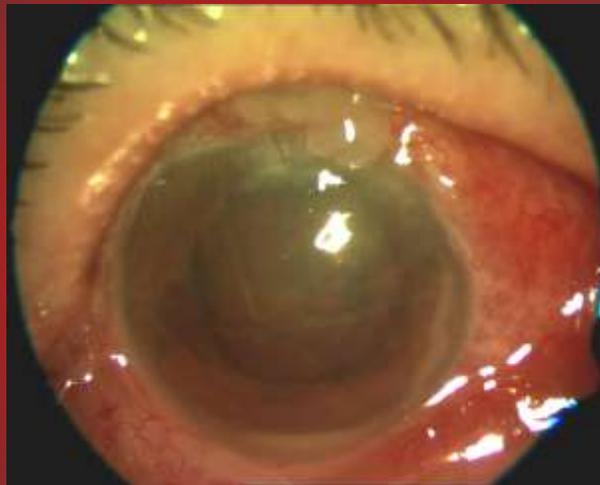
Hemophilus influenzae and *Streptococcus pneumoniae* mostly isolated from the culture sites in children. In adults, organisms causing AGV related endophthalmitis included *Streptococcus* species and *Pseudomonas aeruginosa*.

Intra-vitreous antibiotics must be administered during the vitreous tap. Intra-vitreous dexamethasone may also be beneficial.

The intraocular antibiotic regimen should consist of vancomycin and either an aminoglycoside or ceftazidime.

A female infant aged 9 months presented with bilateral recurrent congenital glaucoma with advanced corneal opacity, corneal diameter 15 mm and had 2 trabeculectomies with MMC done before, but IOP was still high bilaterally.

AGV was done for each eye at 2 separate sessions, IOP was controlled for 2 months then the patient was lost to follow-up for 4 months. After that, the patient came with marked redness and discharge. Examination under GA revealed erosion of the valve tube covering and hypopyon. The valve was removed and a fortified antibiotic eye drops, intra-cameral, intravitreal and subconjunctival antibiotic (vancomycin -moxifloxacin) was given. Immediately, inflammation subsided, but unfortunately, the eye became atrophic.



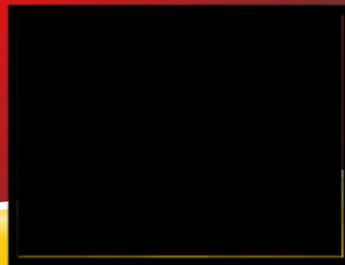
Encysted valve

An encapsulated cyst (also called Tenon's cyst) develops when Tenon's capsule adheres to the episclera forming a high, domed, smooth, two-layered bleb. The encapsulated cyst is impermeable to aqueous, which results in persistent IOP elevation with excessive fibrosis. It is the commonest complication that leads to valve failure. The incidence ranges from 2.5% to 29% with various types of glaucoma being higher with younger age and with multiple surgeries in the same quadrant of the eye; its incidence increases with longer follow-up.

Prevention: Effort has been made to delay the formation of these cysts and hence increase the survival of valves including the use of MMC (0.4mg/ml/3min) & AMM under the valve body with comparable results.



The treatment options of encysted valves include:
 A- needling and 5FU usage but with limited success,
 B- surgical excision of the cystic wall with application of mitomycin
 C- valve removal and re-implantation in another site.

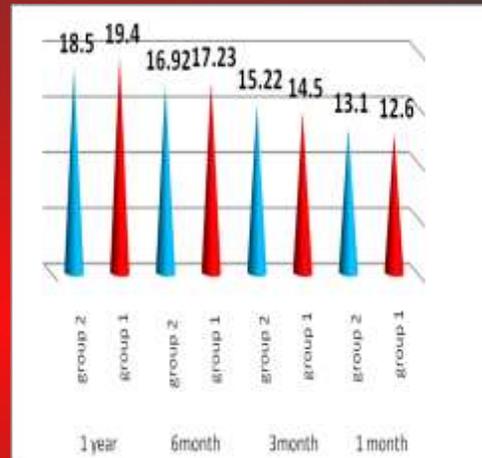


We conducted a study included 25 eyes with encysted AGV in Zagazig University (12 eyes) that were treated by surgical decapsulation and (13 eyes) were treated by removal of the valve and re-implantation in another quadrant of the eye.

Surgical results of the two studied groups.

Item	Group (I) (no= 12)	Group (II) (no =13)	Chi square	P
Mean op. time (in min)	30 ±12	45 ± 13.5	7.13*	0.023 #
Surgical success				
Complete	9 (75%)	10 (77 %)	0.71	0.66
Partial	2(16.6%)	1 (7.6 %)	0.65	0.12
Failed	1 (8.3 %)	2 (15.4%)	0.63	0.15

The study revealed that both surgical techniques were effective in controlling IOP yet the decapsulation technique was simpler with shorter operation time and no chance for tube related complications. valve re-implantation had longer operation time and more tube related complications but it is associated with less incidence of re-encapsulation.



Other complications

Tube cornea! Touch : occur by too long tube or anterior migration of the implant this is usually lead to progressive loss of endothelial cells, localized opacification, rarely corneal decomposition, treated by repositioning of the tube and body

Cataract ; tube lens touch occurs with too posterior tube entry usually lead to localized lens opacities

Implant calcification:
very rare complication require valve removal .

Muscle imbalance :

and diplopia It is usually transient however
persistent diplopia occur due to :

Large Implant size and height

Large bleb size so it is more with encysted implant

Post operative adhesions and scar formation

Muscle ischemia especially with anti-fibrotic used

Fat adherence syndrome

Incidence up to 15 % ,more in implant that placed under EOM
(**Baerveldt and Schocket**) so it is less with AGV especially S3

Prevention : avoid placing the implant in inferior or nasal quadrant

Management : if mild use prisms

If there is encysted valve, decapsulation or implant removal and other smaller one in other quadrant implantation should be done

Strabismus muscle surgery if scarring is expected to be the cause

Even though these large e number of complications that represent a real challenge facing the glaucoma specialists , sometimes these devices are the only treatment option for these difficult cases of glaucoma and the prevention and management of its complications become the **golden target** in front of us

