

Descemet's Membrane Detachment Repair with Sodium Hyaluronate after Phacoemulsification

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Pak J Ophthalmol 2013, Vol. 29 No. 2

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Purpose: To evaluate the use of sodium hyaluronate in reattachment of detached Descemet's membrane after phacoemulsification.

Material and Methods: Five eyes of five patients with non planar Descemet's membrane detachment (DMD) during phacoemulsification from 2006 till 2012 are included in this interventional case series. Planar DMD cases were excluded from the study. This study was conducted at DHQ Hospital Vehari. There were four females and one male with the age range of 65 to 75 years with mean age of 70 years.

Results: All eyes got reattachment of non planar DMD with intracameral injection of Sodium Hyaluronate. Descemet's membrane remained attached in all the subsequent visits till 12 months post-operatively. The average time for the corneal decompensation to resolve was 24 to 48 hours. All the patients had raised intra ocular pressure (average 31-35 mm Hg) within the first 24 hours which was managed with a single Mannitol injection and topical beta blockers for one week. In one of the patients intracameral Sodium Hyaluronate (Provisc) had to be repeated after 21 days. Post-operative BCVA of 6/9 to 6/6 was achieved at 6 weeks postoperatively.

Conclusion: If Non planar extensive Descemet's membrane detachment is noted during phacoemulsification then limited manipulation helps in preventing aggravation of the problem. After surgery identifying the degree of DMD and intracameral injection of Sodium Hyaluronate re-attaches the DMD.

Small Descemet's membrane detachment is not an uncommon occurrence during cataract surgery,¹ but large detachment is uncommon.² It was diagnosed by Weve in 1927. Descemet's Membrane Detachment (DMD) has been classified as Planar Descemet's membrane detachment if separation is <1mm and non Planar if separation is > 1mm from stroma. Each one is further classified in to central and combined (central & peripheral). There are non-surgical factors which are traumatic, congenital glaucoma, corneal ectasia and surgical like cataract surgery, cyclodialysis, penetrating keratoplasty, Trabeculectomy, Irridectomy, lamellar keratoplasty,³ viscocanalostomy and inadvertently while excessively manipulating the incision, injecting viscoelastic /

injections.⁴⁻⁷ DMD can be localized, extensive (Fig 1) or total and can cause corneal edema and permanent corneal decompensation. The incidence is 2.6% in ECCE and 0.5% in phacoemulsification⁸⁻¹⁰. Time interval is important and it is one day to one year¹¹. Vastine et al suggest surgical intervention for large planar and scrolled detachments.¹² In extensive DMD, early surgical treatment is recommended to achieve good results.¹³

Treatment options include topical treatment with steroids and hyper osmotic agents. In spontaneous resolution although, rare,¹⁴⁻¹⁸ endothelial cells hypertrophy, migrate and redistribute to reverse the corneal edema. The other options are intracameral air injection,^{11,19-21} supra Descemet fluid drainage with

intra-cameral air,²² Viscoelastic injection,^{23,24} Transcorneal suturing,^{9,11} Intracameral expandable gases, 14% C₃F₈^{18,25} or 20% SF₆.^{13,26,27,28} If all the above management fails then keratoplasty is the treatment.³ In the last few years gas injection has gained increased acceptance however I report 5 cases of scrolled DMD managed with Sodium Hyaluronate (cohesive viscoelastic) with good results.

MATERIAL AND METHODS

It was an interventional case series of five patients, one male and four females of age range 65 – 75, with mean age 70 years. Only the non Planar DMD cases during phacoemulsification cataract surgery were included in this study and the planar were excluded. All the females were operated for cataract surgery at DHQ Hospital Vehari while the male was referred from elsewhere.

CASES 1, 2

First patient who underwent cataract surgery with phacoemulsification had pre op Visual acuity of CF in both eyes. Torn sleeve of the tip caused ripping of the Descemet's membrane and cellophane reflex was noticed during chopping of the nucleus. The rest of the procedure was completed with repeated use of HPMC viscoelastic and foldable IOL was implanted in the bag. Careful irrigation and aspiration was performed

to remove the viscoelastic and air was injected in the anterior chamber at the end.

In the second case Pre op Visual acuity was 6/60 and 3/60 in right and left eye. During cracking nucleus the sleeve was torn which detached the Descemet's membrane. The case was managed same way. The next day vision was only hand movement in both cases. Intensive topical prednisolone eye drops were used along with ofloxacin eye drops qid post operatively but there was no improvement till 5th post op. day. I applied transcorneal 10/0 nylon sutures at 4 places in case A.

The case B was followed as such for spontaneous reattachment. Slight improvement was noticed in the repaired cornea but no improvement in the case B. After examination of case on the slit lamp, DMD was identified. Under local anesthesia Sodium Hyaluronate (Healon) was injected in the AC under the Descemet's membrane and left there. With the tamponade effect of the viscoelastic, Descemet's membrane reattached to stroma. Next day rise in IOP was managed with Inj. Mannitol once and topical beta blockers for one week. Examination showed vision in affected eye 6/9p, 1-2+ cells, clear cornea and 12 mm of Hg IOP. The patient A was called and the same procedure was done with her and the transcorneal sutures were removed at the same time. The next day she was examined with good vision and attached Descemet's' membrane with two small wrinkles but clear cornea.

Case	Pre-op VA	Location of DMD	Cause of DMD	Degree of Detachment in mm	Trial with Air or Sutures		Sodium Hyaluronate	Reattachment of DMD	Pre-op in mmHg	Post-op IOP	BCVA 6 wks
1	CF	Combined, Central and Peripheral	Torn Sleeve	More than 1 mm	4 Trans Corneal Sutures	Air	Healon 7 th day	24 Hours	10	31	6/6
2	6/60	Combined, Central and Peripheral	Torn Sleeve	More than 1 mm	×	Air	Healon 9 th day	24 Hours	13	34	6/9 p
3	3/60	Combined, Central and Peripheral	Excessive Manipulation of Second port, Shallow AC	More than 1 mm	×	Air	Provisc 6 th day	24 Hours 48 Hours	10	32	6/9
4	HM	Combined, Central and Peripheral	Unknown (Ref. Pt)	More than 1 mm	×	×	Provisc 10 th day	24 Hours	×	35	6/9
5	2/60	Combined, Central and Peripheral	Blunt Keratome	More than 1 mm	×	Air	Provisc 9 th day	24 Hours	16	34	6/9+

CASES 3, 4

In July 2007, a 70 years lady was admitted, she had bullous keratopathy in the right eye due to trauma and VAR was CF at 6 inches. In the left eye she had moderately dense cataract with 3/60 vision. Intraocular pressure was 10 mm Hg in each eye. She was obese, hypertensive, apprehensive and non-diabetic. She was operated under peribulbar anesthesia.

During her surgery she was very irritable, moved and did valsalva maneuvers. Despite all the precautions, AC went shallow during phacoemulsification and non-Planar combined separation of Descemet's membrane occurred. The procedure was completed with repeated use of viscoat. Air was injected at the end of surgery.

On first post Op day vision was CF at 6 inches and stromal edema was noted. On 6th post op day Sodium Hyaluronate was injected under L/A under the detached Descemet's and the eye was made firm. The next morning patient had pain due to raised IOP of 34 mm Hg which was treated with 20% inj. Mannitol and topical beta blocker. After 48 hours she was able to see 6/12p unaided. She had one wrinkle on the attached membrane and BCVA 6/9 at 6th week.

An old gentleman of 68 years was referred to us with Non Planar extensive DMD during phaco two weeks back was also treated the same way.

CASE 5

An only eyed old lady of 74 years with loss of vision due to trauma following surgery of the right eye presented to us in May 2012. Previous notes showed right ECCE with IOL with Descemet's membrane detachment in 2000. She had VAL 2/60 with cataract and cornea guttata. Phacoemulsification was started under cover of viscoat (Alcon, Fortworth Texas) but a small rhexis of the Descemet's was noted at the wound edge after entering the phaco probe in the eye. While dividing the nucleus and chopping it, cellophane like reflex (non Planar Descemet's detachment) was noted. A second side port at 5 O'C was made and the surgery was completed with repeated use of viscoelastic and intracameral air at the end.

The next day there was stromal edema with perception of light vision. She was treated with topical steroid, antibiotics and hyper osmotic agent. The edema was not settling and non-Planar DMD was noted on slit lamp examination when I decided to

inject Provisc on 9th post Op day. Next morning the patient complained of pain due to raised IOP 30 mm Hg and inj. Mannitol was made. The following day the pt had 6/24 BCVA. Cornea was clear with no wrinkles and it remained clear till 21st post-operative day when she complained of haziness of vision again. On examination she had again DMD in the nasal half of the cornea (Fig. 3 and 4). Sodium Hyaluronate was re-injected from the 5 O'C side port and the eye was made firm. Next morning the cornea was clear (Fig. 5 & 6) and IOP was 12 mm Hg. Patient was sent home on topical treatment. Cornea remained clear with BCVA 6/9+ on subsequent follow up (Fig. 7 and 8).

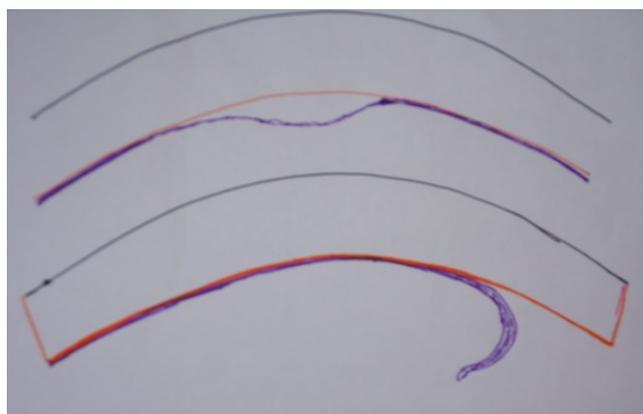


Fig 1. Schematic diagram of DMD



Fig 2. Schematic diagram of mechanism of action of Sodium Hyaluronate.

RESULTS

Four out of the five patients got reattachment of Descemet's membrane with first injection and one got second injection of sodium hyaluronate. All eyes had raised IOP on first post-operative day. Cornea became



Fig 3. Showing only eyed patient



Fig 7. Ten days after 2nd Inj. of Sodium Hyaluronate.

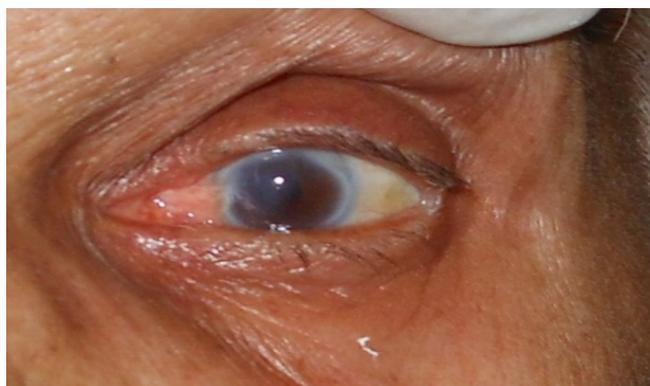


Fig 4. Redetached DMD

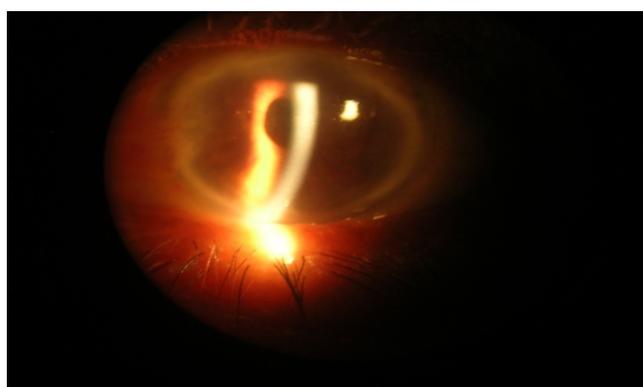


Fig 8. Slit lamp shows clear cornea

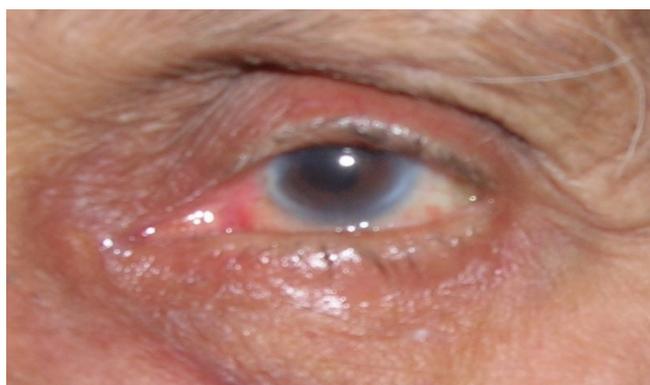


Fig 5. After re injection of sodium hyaluronate



Fig 6. Post inj. Sodium Hyaluronate

clear and vision was restored (BCVA 6/9 to 6/6) in all the cases. Descemet's membrane remained attached till last follow up. The corneal decompensation resolved in 24 to 48 hours. All cases were tried to be managed with air at the end of procedure. In one case 4 trans-corneal sutures were also applied but unsuccessful. All cases were managed within 10 post operative days.

DISCUSSION

Air in the anterior chamber at the end of surgery helps to re-attach planar DMD near the wound edge. Intra cameral air with exchange to viscoelastic which remains in the anterior chamber for a few days is not enough to achieve good reattachment of the Descemet's membrane in many cases,¹⁸⁻²¹ although one case is reported to have spontaneous resolution after 10 months.¹⁴⁻¹⁷ Surgical Descemet's membrane detachment is a complication that has serious impact on sight, if not treated adequately and at proper time. During surgery use of blunt knife^{8, 28}, shallow anterior chamber, small pupil, ragged large opening of the

wound, irritable, moving patient and excessive manipulation of the wound / side port leads to this complication.

However in the presence of iatrogenic causes there may be underlying suspicion of anatomical predisposing factors, as in my last case both eyes had detachment of Descemet's membrane. Its early detection and management of not further damaging / removal is a good achievement till the end of the procedure. The cataract can be emulsified in the posterior chamber with frequent use of viscoelastic and low vacuum. The degree of DMD should be identified on slit lamp and sodium Hyaluronate should be injected in the anterior chamber. With the temponate effect of Sodium Hyaluronate DMD attaches to the stroma of the cornea (Fig 2). I filled the viscoelastic after seeing the patient on slit lamp and evaluating the position of Descemet's membrane on 6th to 10th post Op day in all of my cases of non-Planar extensive DM.

In transcorneal sutures combined with Sodium Hyaluronate, the DM reattached but with some wrinkles, however the cornea remained clear. Repair of DMD by putting gas with two needles at slit lamp is a new technique²⁷. Gases have problems of availability, are expensive, in some cases toxic and also its need removal for preventing the raised IOP. Using Sodium Hyaluronate is beneficial. Anterior segment optical coherent tomography can be helpful in identifying the location of detachment in the presence of corneal oedema²⁹. (Table 1)

CONCLUSION

Sharp and proper instrumentation with maintained anterior chamber during surgery are helpful in preventing the Descemet's membrane detachment. If detachment is Non Planar extensive then early detection and limited manipulation helps in preventing aggravation of the problem. After surgery identifying and injecting intra cameral sodium Hyaluronate is very useful in reattachment of DMD and prevention of corneal decompensation.

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