

Management of Descemet's Membrane Detachment by Intra Cameral Air Injection.

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ABSTRACT

Background: Descemet's membrane detachment (DMD) is an uncommon but serious complication of intraocular surgery. It requires prompt intervention to prevent corneal decompensation. Intracameral injection of air is the most commonly practiced and most successful modality of management in such circumstances. **Aim and Objective:** To analyze the possible causes of Descemet's membrane detachment (DMD), evaluate the efficacy of intracameral air injection in its management, analyze when to do other interventions & to evaluate the outcome of patients after successful management. **Methods:** After Ethical committee approval, clinical data of 50 eyes of 50 patients during the period April 2014 to April 2016, who developed DM detachment after cataract surgery were noted. Study area: - IGIMS, Patna, Bihar, India. Study population: - 50 eyes of 50 post cataract surgery patients developing intra-operative DMD in the period of April 2014 to April 2016. **Results:** Patients were within the age group 54 to 82 years, mean was 65.38 ± 7.11 . Sex distribution was 24 male and 26 female patients. Majority of the patients (n=37, 74%), had severe corneal edema. 8% had mild and 18% had moderate corneal edema. Descemet's membrane detachment as noted from the ASOCT was, Range 10% to 95%, Mean 46.20, SD 24.065. Only air was sufficient to re-attach DMD ranged from 10% to 55%, mean = 36.50 and SD = 14.815. Visual acuity of patients on Post-Op (Day 1) versus Post-Op (1 week), $\chi^2 = 22.1$ and $P = 0.00019144$, which was a significant improvement. **Conclusion:** Intra Cameral injection of air is demonstrated as a safe and efficacious option for the repair of Descemet's membrane detachment. Use of Isoexpansile 14% C3F8 is an effective and promising alternative for cases not resolving with repeated intra cameral air injection.

Keywords: Intracameral air, Descemet's membrane, Detachment, Prospective study.

INTRODUCTION

Descemet's membrane detachment (DMD) is an uncommon but serious complication of intraocular surgery. In 1928, soon after the advent of slit-lamp biomicroscopy, the first systematic description of DMD was made by Bernard Samuels. Samuels reported three patients with DMD after iridectomy, but he failed to realize its significance. The subsequent literature reflected little interest in this entity until 1964, when Scheie^[2] realized the potentially serious nature of this surgical complication in his report of three patients who did poorly with DMD after cataract extraction.

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Although reports of spontaneous reattachment of large DMDs are scattered throughout the literature,^[3,13,16] recent reports have favoured early

surgical intervention to reattach a DMD.^[11,15,17] I present a prospective noncomparative interventional study of 50 eyes of 50 patients with DMD due to cataract surgery and their management and outcome.

Aims & Objectives of the Study:

- i. To analyze the possible causes of Descemet's membrane detachment.
- ii. To evaluate the efficacy of intra-cameral injection of air in the management of the various degrees and configurations of DMDs.
- iii. To analyze when to do other possible interventions (intra-cameral injection of C3F8, trans-corneal suturing of DM and penetrating keratoplasty) in DMDs.
- iv. To evaluate the outcome of patients after successful management

MATERIALS AND METHODS

Ethical committee approval was obtained. Clinical data were noted of 50 eyes of 50 patients during the

period April 2014 to April 2016, who developed DM detachment after uncomplicated cataract surgery.

Study area: - This study was done at Indira Gandhi Institute of Medical Sciences, Patna. Here cataract surgery is done under strict aseptic precautions and any complication occurred is managed by senior surgeons.

Study population: - The data was collected from the cases (adult patients) who underwent elective cataract surgery and developed DM detachment intra-operatively. There was no gender restriction. The patients were from the urban population.

Sample size & Sample technique: - The sample had 50 eyes of 50 patients who underwent uneventful standard Phacoemulsification and developed descemet's membrane detachment. The sample was taken by random selection from those who got operated in the period of April 2014 to April 2016.

Data collection technique & tools: After entering the demographic data, patients were followed up by ASOCT, Visual acuity and other suitable instruments for the resolution of DMD.

Data analysis: Data was stored in the Microsoft Excel sheet for evaluation. Statistical analysis was done using SPSS software version 11.5 (Statistical Package for Social Sciences). Comparison between the pre-management and post-management parameters was analyzed using one of the applicable tests: Student's Paired t-test and Chi-square test.

RESULTS

Salient findings:

Age and Sex distribution: All the patients were within the age group between 54 to 82 years, mean was 65.38 ± 7.11 . Their sex distribution was 24 male and 26 female patients.

Corneal edema: Majority of the patients (n=37, 74%), had severe corneal edema who were taken for the treatment. Only 8% of the subjects had mild corneal edema, and 18% had moderate corneal edema.

Descemet's membrane detachment: The approximate amount of descemet's membrane detachment as noted from the ASOCT was, Range 10% to 95%, Mean 46.20, SD 24.065.

Patients for whom only air was sufficient to re-attach, the percentage of DMD ranged from 10% to 55%, mean = 36.50 and SD = 14.815

Visual Acuity: The mean Post-Op (Day 1) visual acuity among the patients was 0.139, SD = 0.177.

The mean Post-Op (Day 49) visual acuity among the patients was 0.911, SD = 0.250.

Visual acuity of patients on Post-Op (Day 1) versus Post-Op (1 week), $\chi^2 = 22.1$ and $P = 0.00019144$, which was a significant improvement.

Visual acuity of patients on Post-Op (1 week) versus 49th day Post-Op, $\chi^2 = 56.475$ and $P = 0$, which was significant.

Visual acuity of patients on Post-Op (Day 1) versus 49th day Post-Op, $\chi^2 = 85.5$ and $P = 0$, which was significant.

DISCUSSION

Several mechanisms of surgically induced DMD have been proposed. The most common cause is a localized detachment occurring during instrumentation in cataract surgery higher incidence being observed in clear corneal procedures. It is also seen following uncomplicated clear corneal phacoemulsification. It may occur following inadvertent intra-corneal injection of fluids like viscoelastics and is also possible with other fluids like balanced salt solution, adrenaline and antibiotics.

Samuels^[1] alluded to a shallow chamber as a risk factor and stated that complicated or repeated operations were at particular risk. The inadvertent insertion of instruments between the corneal stroma and Descemet's membrane was first suggested by Scheie^[2] as a risk factor. Anterior (clear corneal) incisions, shelved incisions and the use of blunt blades^[2] have been implicated as risk factors. It has also been reported that DMDs results from freezing Descemet's membrane with the cryoprobe^[5] or from heat-induced contraction of Descemet's membrane during holmium laser sclerostomy.

Engaging Descemet's membrane during intraocular lens implantation^[2,3] or with the irrigation/aspiration device (when mistaken as an anterior capsular remnant) can also lead to extensive DMDs. The inadvertent injection of viscoelastic by inserting the cannula between Descemet's membrane and the corneal stroma may be the most common cause of DMD with current surgical techniques.^[15,23] Small and localized DMDs are insignificant and resolve spontaneously with medical management.

Some types of DMD, such as those with large flaps or scrolls, are less likely to spontaneously reattach, although even these can reattach spontaneously on occasion.^[13] A controlled, randomized, prospective study of early repair vs. conservative treatment of DMDs would be a very difficult study to design and perform, given the rarity of the condition and the various degrees and configurations of detachments that can occur. My study, along with previous reports, shows that most of the DMDs will often spontaneously reattach by intracameral injection of air only, if given enough time to do so. Also, it has

been shown that iso-expansile C3F8 gas injection into the AC can be a successful alternative approach to conservative treatment in cases not responding to repeated air injection.

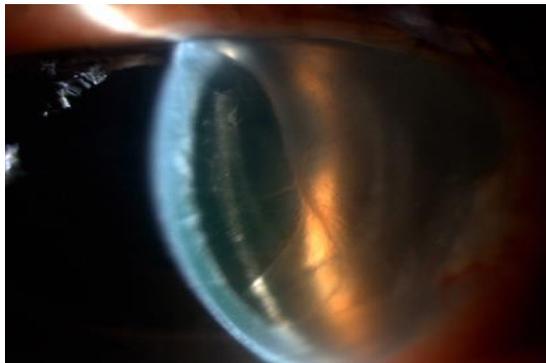


Figure 1: Shows anterior segment slit lamp photograph of patient number - 26, showing DMD, it got managed with intracameral injection of air only.

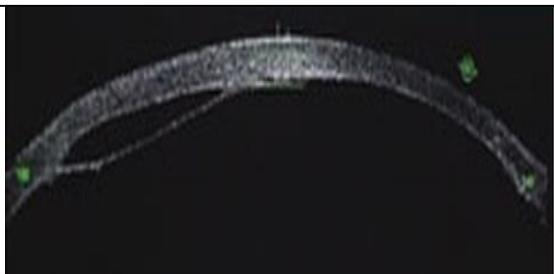


Figure 2: ASOCT of the same patient showing that DMD involves approximately 50% of cornea.

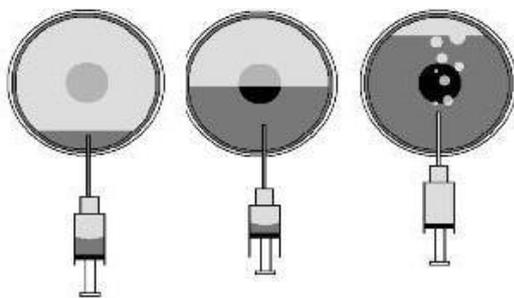


Figure 3: ASOCT of the same patient showing that DMD involves approximately 50% of cornea.

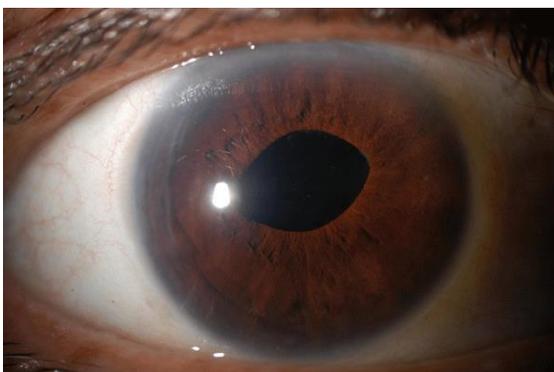


Figure 4: Showing the 7 Days Post Op anterior segment photograph of the same patient Cornea is clear, DM is attached.

It has also been shown in my study that DMDs do not require urgent surgical repair by suturing etc. and that waiting several months with repeated injection of intracameral air (and C3F8 in larger DMDs or non-resolving cases) before attempting surgical repair is acceptable. The decision on when to intervene in DMDs must be made on a case-by-case basis after evaluating the configuration of the detachment, the risks of additional intervention, and the need for rapid rehabilitation of vision

CONCLUSION

Early recognition and repair of Descemet's membrane detachments may prevent complications, such as corneal decompensation, corneal opacities and edema, and an overall decline in visual acuity. Intra Cameral injection of air is demonstrated as a safe and efficacious option for the repair of Descemet's membrane detachment. Use of Isoexpansile 14% C3F8 is an effective and promising alternative for cases not resolving with repeated intra cameral air injection.

Recommendations:

- Proper handling of instruments during cataract surgery may prevent the occurrence of Descemet's membrane detachment by beginners.
- Descemet's membrane detachment involving upto 55% of cornea should be first managed with intra-cameral injection of air.
- Intra-cameral C3F8 injection should be considered for larger DMD (65 – 95%) where air is not helpful in keeping the Descemet's membrane in apposition with the stroma for longer duration of time or in cases which do not resolve even after repeated injection of air.
- Surgical interventions should be reserved for cases not responding to repeated air or C3F8 injection and after waiting for 7 weeks.
- Patients should be called for follow-up in 2 weeks interval and should be carefully looked for any spontaneous re-detachment of the descemet's membrane.

Limitations of the study

- A case control study could not due to the risk of corneal decompensation /opacification in the control group if we would have waited for spontaneous resolution, so why in the interest of patients we actively managed all the DMDs. However, a case control study would have proved whether intracameral injection of air is really required or spontaneous resolution is

possible by waiting for several months without any intervention.

- Exact days of individual resolution of DMD is not known as patients were called on fixed days for follow-up and hence daily monitoring of the DMDs by ASOCT could not be done.

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