

Rebubbling of Detached Descemet Membrane Endothelial Grafts at the Slit Lamp with 50% Air Fill after PI-less DMEK During COVID-19 Era

Mustafa Franka, Meera Mistry, Mohanad Moustafa, Ore-oluwa Erikitola, Douglas Lyall
University Hospital Hairmyres, East Kilbride, Scotland, UK

Introduction

Descemet Membrane Endothelial Keratoplasty (DMEK) is an effective surgical technique for the treatment of corneal endothelial failure.(1) It is standard practice to create a peripheral iridotomy (PI) pre-operatively, so to avoid pupil block as a result of the anterior chamber being filled with either air or SF6 gas to attach the graft at the time of surgery.(2) However, performing DMEK without a PI has also been described and has been shown to be a safe and effective modification.(3) In cases of early DMEK graft detachment, it had been standard practice in our centre to perform 100% air fill with the patient supine in the operating theatre. However, a result of the COVID-19 crisis, operating theatre access was restricted.(4)

Aims

To describe the effective use of only 50% air fill of the anterior chamber for rebubbling partially detached Descemet Membrane Endothelial Keratoplasty (DMEK) grafts at the slit lamp at a time of restricted operating theatre access during the COVID-19 pandemic.

Methods

Two patients underwent DMEK surgery with a 9.0mm graft. No PI's had been performed pre-operatively. Patients developed early partial graft detachment. Anterior segment OCT (AS-OCT) was used for confirmation and planning of rebubbling (*Figure 1b,1e*). Patients underwent rebubbling at the slit lamp. Rebubbling was performed using a 27g needle attached to a 1ml syringe, the needle was inserted at the corneal limbus, directed towards the pupil and away from the detached DMEK graft in order to avoid iatrogenic trauma. Air was injected into the anterior chamber until 50% air fill of the anterior chamber was achieved (*Figure 2*). As the needle was withdrawn the posterior lip of the injection site was depressed to release some fluid from the anterior chamber in order to avoid a spike in intraocular pressure (IOP). Patients were then asked to wait in a different room, supine, face up, for 30 minutes and re-examined, including post procedure IOP. Patients were instructed to go home and lie flat, face up, as much as possible. To avoid unnecessary, attendance patients were contacted by phone the following day to ensure there was no excessive pain to suggest pupil block and raised intraocular pressure.

Results

50% air fills were achieved without any complications. At three days post-procedure, the air bubble had resolved and the graft appeared attached centrally and at day 14 post-procedure the two patients had a clear and attached corneal graft with corrected visual acuity of 6/7.5 and 6/9 respectively (*Figure 1c and 1f*).

Table of results	Patient 1	Patient 2
Indication for surgery	Endothelial failure secondary to herpetic endothelitis	Corneal decompensation secondary to Fuchs corneal endothelial dystrophy
Initial follow up	7 days post-op centrally clear and attached graft.	1 day post-op centrally clear and attached graft.
Detachment diagnosis	21 days post-op	19 days post-op
VA pre-rebubbling	HM	HM
VA post-rebubbling	6/7.5	6/9

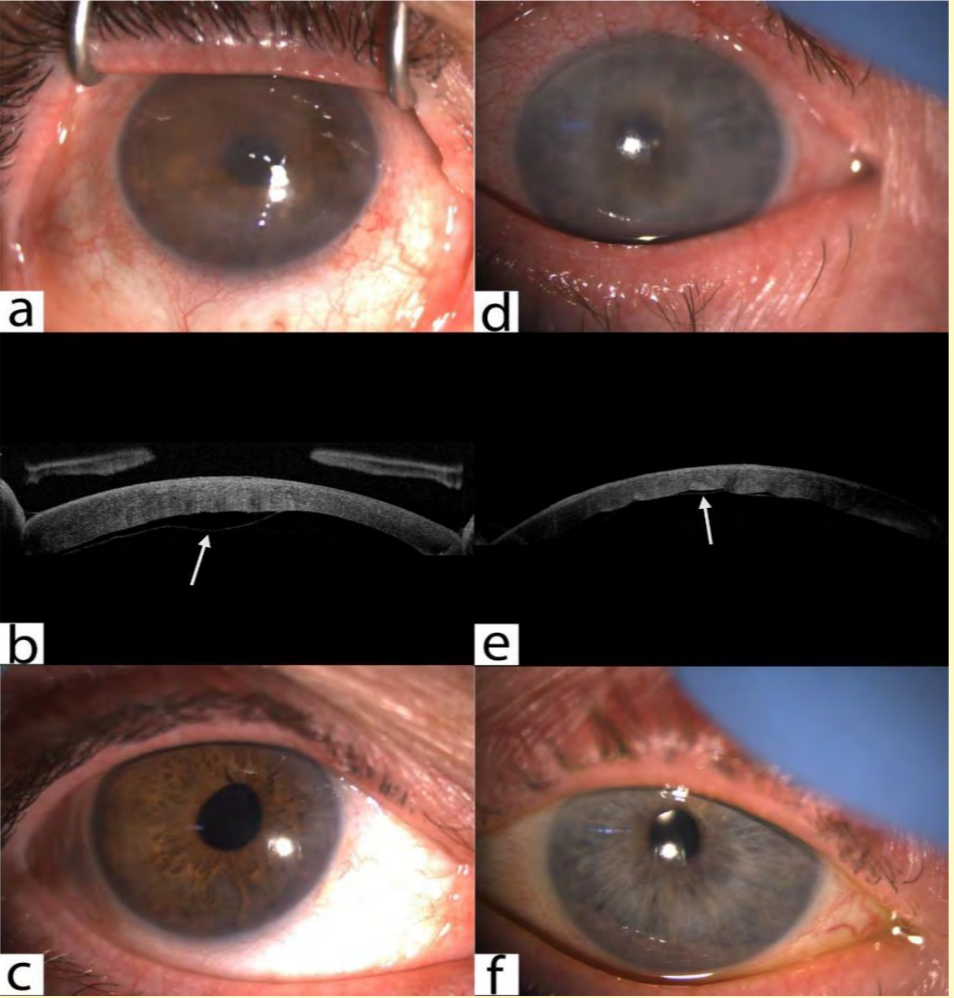


Figure 1: Clinical Images of patients 1 and 2

Patient 1. Clinical photo with detachment at presentation in the right eye (RE)

(a), demonstrated by AS-OCT (arrow) (b). Clinical photo following

reattachment after air re-bubbling at slit lamp (c). Patient 2: Clinical photo with

detachment at presentation in the left eye (LE) (d), demonstrated by AS- OCT

(arrow) (e). Clinical photo following reattachment after air re-bubbling at slit

lamp in LE (f).

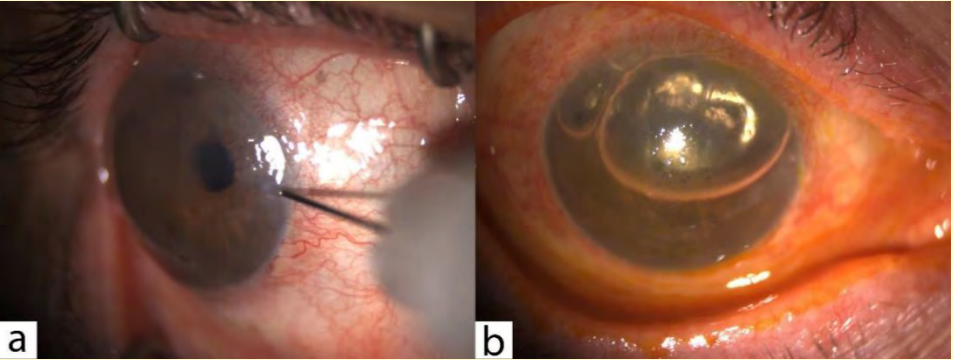


Figure 2: Photo of technique

Needle being inserted into the anterior chamber nasally at the corneal limbus of patient 1 (a). 50% air bubble in the anterior chamber following successful re-bubbling (b).

Conclusion

Our cases demonstrate that successful re-attachment of a DMEK graft can be achieved with the use of only 50% air in the anterior chamber. We suggest that rebubbling must be performed within four weeks of surgery when the graft is still mobile and only a small volume of air is required to aid re-positioning. The use of a smaller volume of air reduced the risk of inducing pupil block, particularly in patients who have had “PI-less” DMEK surgery.

Different methods for performing rebubbling of DMEK grafts at the slit lamp have been previously described.(5) We feel our technique is a relatively simple procedure that can be performed at the slit lamp, and in the era of COVID-19 avoids the necessity to take the patient to the operating theatre, which had been our standard practice.

References

1. Ham L, Dapena I, Van Luijk C, Van Der Wees J, Melles GRJ. Descemet membrane endothelial keratoplasty (DMEK) for fuchs endothelial dystrophy: Review of the first 50 consecutive cases. In: Eye [Internet]. Nature Publishing Group; 2009 [cited 2020 May 18]. p. 1990–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19182768>
2. Gonzalez A, Price FW, Price MO, Feng MT. Prevention and Management of Pupil Block after Descemet Membrane Endothelial Keratoplasty. Cornea. 2016 Aug 31;35(11):1391–5.
3. Livny E, Bahar I, Levy I, Mimouni M, Nahum Y. “PI-less DMEK”: results of Descemet’s membrane endothelial keratoplasty (DMEK) without a peripheral iridotomy. Eye. 2019 Apr 1;33(4):653–8.
4. RCOphth: Management of Ophthalmology Services during the Covid pandemic Guiding principles [Internet]. [cited 2020 May 10]. Available from: <https://www.gov.uk/government/collections/coronavirus-covid-19-list-of-guidanceandtheRCOphthwebsiteforupdatedinformationhttps://rcophth.ac.uk/2020/03/covid-19-update-and-resources-for-ophthalmologists/>
5. Sáles CS, Straiko MD, Terry MA. Novel technique for rebubbling DMEK grafts at the slit lamp using intravenous extension tubing. Cornea. 2016 Mar 4;35(4):582–5.