Incidence of Steroid Response in Low Risk Patients who Underwent DMEK for Fuchs Endothelial Dystrophy between 2014 to 2020 at Moorfields Eye Hospital.

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Introduction

Descemet's membrane endothelial keratoplasty (DMEK) was first introduced in 2006 and has since overtaken DSAEK (Descemet's Stripping Automated Endothelial Keratoplasty) and other types of corneal grafts becoming the most popular transplantation performed in 2021-2022 in the UK.

The advantages of DMEK are faster visual recovery, better visual and refractive outcomes, and, most importantly, lower risks of graft rejection compared to DSAEK.

Topical steroids are used post operatively to reduce inflammatory response, promote graft attachment and lower rejection rates following DMEK surgery. However, exposure to them can induce significant changes to TM microstructure with formation of cross-linked actin networks and alteration of its cytoskeleton architecture. Increased expression of fibronectin and extracellular matrix deposition in the TM contribute to aqueous outflow resistance and can lead a steroid induced intraocular pressure spike – steroid response.

The purpose of this retrospective cohort review was to identify the incidence and risk factors for steroid response in low-risk patients with Fuchs' Endothelial Dystrophy who underwent routine DMEK or combined phaco-DMEK surgery at Moorfields between 2014 and 2020.

Methods

Retrospective cohort review - 993 eyes with Fuchs' Endothelial Dystrophy included for analysis.

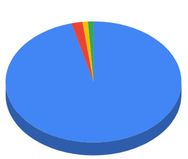
Excluded: eyes with pre-existing OHT, glaucoma or post-op pupillary block and eyes with raised IOP within 2 weeks post operatively.

Incidence and time to detected steroid response was determined.

Association with surgical and post-op risk factors i.e. agents for graft tamponade (air vs SF6), steroid type & frequency and re-bubbling assessed.

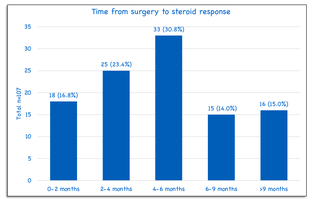
Treatment outcomes following steroid response examined.

Topical steroids used prior steroid response



97% of patient were using topical Dexamethasone at the time steroid response was detected.

Time to steroid response

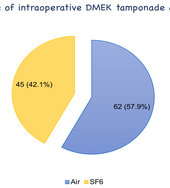


Median time from DMEK surgery to steroid response was 4.5 months.

This signifies 3rd post op visit is crucial for detection of elevated IOP.

Time to steroid response in DMEK seems to differ from the usual pattern of onset within 3-6 weeks.

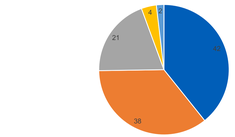
Does the choice of Air / SF6 matter?



No statistically significant difference between air and SF6 in the rate of steroid response; p>0.05.

Topical steroids used after steroid response

Change in topical steroid management after steroid response



No reported rejection episode after switching topical dexamethasone to lower potency formulation.

Does re-bubbling increase the risk of steroid response?

Procedure	Steroid response	No steroid response
Re-bubbling	17	82
No re-bubbling	90	804

Odds Ratio = 1.85 (CI 0.87-3.46, p<0.01)

DMEK eyes which underwent re-bubbling need to be monitored more closely for steroid response.

Procedure	Steroid response (n)	Incidence rate (n/993)
DMEK	67	11.7%
Phaco-DMEK	40	9.6%
Total	126	10.8%

Condition	Number (%)
Resolved	85 (79.4%)
Ocular hypertension	6 (5.6%)
Glaucoma	16 (15.0%)

Results

Median time of steroid response diagnosis following DMEK surgery was 4.5 months. In 85 % of total cases the steroid response occurred within the first 9 months.

In 75% of cases with onset after 9 months steroid response was observed shortly after another intraocular surgery either on the same or contralateral eye, or after an increase in topical steroids for other causes.

In 80% of total cases steroid induced ocular hypertension resolved with switching or discontinuing steroids without further ongoing IOP lowering treatment, 20 % of cases with steroid response required ongoing treatment or monitoring in Glaucoma Service and less than 1% required glaucoma surgery.

Conclusion

- Incidence of steroid response is higher than expected for low-risk DMEK patients with Fuchs' Endothelial Dystrophy.
- Onset of steroid response is observed to be more delayed in post DMEK patients in our cohort compared to other cases of steroid response.
- Steroid induced ocular hypertension resolved in most patients with topical IOP lowering treatment, tapering of topical steroid or switching to a lower potency steroid formulation.
- Switching to a lower potency steroid formulation should be considered at around 4-months postoperatively in DMEK surgeries.
- Patients requiring DMEK re-bubbling or an increased course of topical steroids (i.e. after another surgery) even in contralateral eye should be monitored more closely for steroid response.

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