Clinical outcomes after Ultrathin Descemet's stripping automated endothelial keratoplasty versus Descemet's membrane endothelial keratoplasty for Fuchs Endothelial Corneal Dystrophy . A Systemic Review and Meta-analysis.

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BACKGROUND

The corneal endothelial cells are responsible for maintaining a healthy balance of fluid entering the corneal layer and maintaining its clarity. In Fuchs' endothelial corneal dystrophy (FECD) the endothelial cell layer undergoes degenerative changes, and the cells are reduced in number. By 2050, the number of people affected by FECD is expected to grow by 41.7%. {1} Endothelial Keratoplasty, applying new techniques for segmental endothelial transplantation in order to enhance postoperative visual acuity outcomes and reduce complications. {2} Descement Membrane Endothelial Keratoplasty (DMEK) and Ultra-Thin Descemet
Stripping Automated Endothelial Keratoplasty (UT-DSAEK) were two evolutionary surgical techniques both are indicated for the treatment of patients with FECD. {3} {4}

OBJECTIVESS

1. To conduct a systemic review based on PRISMA guidelines {5}
2. To perform a meta-analysis of all randomized clinical trials (RCTs) and selected non- randomized comparable studies (NRSs) which follow our established inclusion criteria. Using ROBINS-I {6}, we ranked the bias risk of non-randomized studies (NRSs).
3. To determine whether UT-DSAEK or DMEK show better clinical outcomes postoperatively for FECD patients, comparing: Best Corrected Visual Acuity (BCVA), the rate of Endothelial Cell Loss (ECL), complications.

METHODS

We conducted a literature search through peer-reviewed electronic databases such as **PubMed (MEDLINE)**, **Cochrane Library**, **Embase**, and **Google Scholar**, last run in October 1, 2022 in accordance with the PRISMA standards. {5} The search strategy combined the keywords "DMEK" AND "UT-DSAEK". Additionally, a manual detection of the possible studies was performed using the obtained articles' reference lists.

2111 studies found

89 were of relevance and assessed for eligibility.
Selection criteria: We included RCTs and NSRs with a paired contralateral-eye design in any setting where DMEK was compared with UT-DSAEK to treat people with FECD

3 RCTs and **2 NSRs** were identified

Dunker et al. (2020)

Mencucci et al. (2020)

Chamberlain et al. (2018)

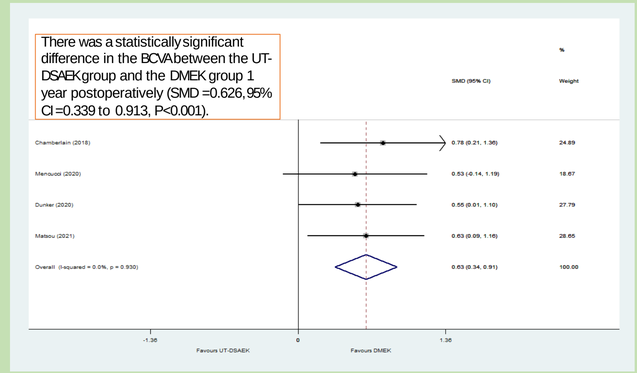
Torres-Sanvicens et al. (2021)

Matsou et al. (2021)

Studies were pooled and analysed using **STATA software package** (version 13.0; StataCorp LP, College Station, TX, USA) In order to measure effects, **odds ratios** or **standardized mean differences** were used.

RESULTS

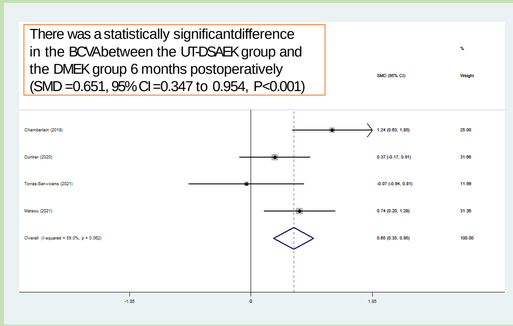
There was a statistically significant difference in the BCVA between the UT-DSAEK group and the DMEK group 1 year postoperatively (SMD =0.626, 95% CI =0.339 to 0.913, P<0.001).



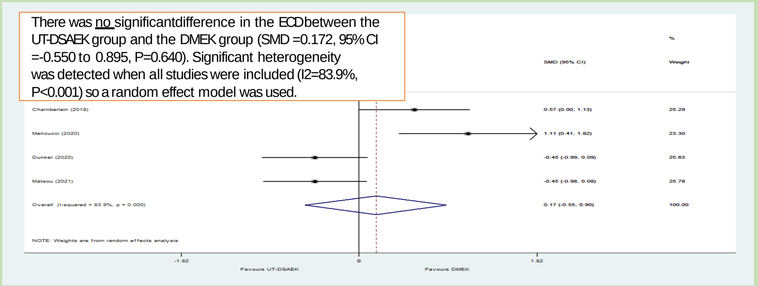
BCVA{logMAR} 12m

BCVA{logMAR} 6m

There was a statistically significant difference in the BCVA between the UT-DSAEK group and the DMEK group 6 months postoperatively (SMD =0.651, 95% CI =0.347 to 0.954, P<0.001)



There was no significant difference in the ECD between the UT-DSAEK group and the DMEK group (SMD =0.172, 95% CI =-0.550 to 0.895, P=0.640). Significant heterogeneity was detected when all studies were included (I2=83.9%, P<0.001) so a random effect model was used.



ECD{cells\mm2} 12m

DISCUSSION

- Compared to UT-DSAEK, DMEK showed better visual outcomes in terms of overall visual acuity, although had increased rates of total complications and graft detachment necessitating re-bubbling.
- Both techniques are still great options for a cornea surgeon regarding FECD patients.
- To better understand the differences between the two surgical techniques, additional large multicenter randomized controlled trials (RCTs) are needed, to provide results in term of BCVA, endothelial cell loss, complication rates, and graft survival for patients with FED .

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