



## Review of Data was Collected on 16 Consecutive Eyes of 16 Patients

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### Description

The present study adhered to the tenets of the Declaration of Helsinki. All the required approval were taken from the three institutions enrolled (no reference number were provided for the present study). Written informed consent in accordance with the institutional guidelines was obtained from all 30 patients.

The clinical charts of 30 consecutive, symptomatic eyes of 27 patients (out of 124 diabetic patient charts reviewed) were included who met the following criteria: 18 years or older, being a controlled diabetic, progressive loss of vision of less than 12 weeks due to macula-off tractional retinal detachment (TRD), (Figure 1 images a-h) confirmed by SS-OCT or B-mode ultrasonography, an axial length of < 26.5 mm, with no evidence of vascular macular pathology other than PDR, at least 6 months of follow-up after surgery, had undergone successful vitrectomy techniques with clear media at the end of follow-up, evidence of macular TRD resolution with the macula attached in the last follow-up visit, at least two serial SS-OCT or SD-OCT assessments, one OCT angiography at the end of follow-up, and a postoperative functional evaluation with microperimetry and multifocal electroretinography when possible on the last follow up visit. The exclusion criteria were as follow: loss of follow-up, TRD from other vascular etiology, postoperative complications with opaque media at the last follow-up visit, developing neovascular glaucoma with no light perception during follow-up.

A retrospective review of data was collected on 16 consecutive eyes of 16 patients who underwent DMEK surgery under a failed PK graft between 2018-2019 at Hadassah Medical Centre in Jerusalem, Israel. The study was conducted in accordance with the tenets of the Declaration of Helsinki and was approved by the ethics committee of the Hebrew University of Jerusalem, Israel.

All surgeries were performed by a single surgeon (I.L) or directly supervised by him. Collected data included demographic characteristics, number of previous corneal transplants, donor corneal endothelial cell density (ECD), intraoperative and postoperative complications including DMEK graft detachment, number of rebubbling procedures, rejection episodes, graft failure, visual acuity in Snellen (VA), central pachymetry and postoperative ECD.

### Diabetes Mellitus

Diabetes Mellitus (DM) is a worldwide problem specially in developing countries due to poor medical care. Among the main

causes of potentially treated severe visual loss are diabetic macular edema (DME) and chronic cystic macular edema (CME) and complications related to proliferative diabetic retinopathy (PDR) such as recurrent vitreous hemorrhages (VH), tractional retinal detachment (TRD), refractory macular edema associated with posterior hyaloid traction, combined traction/rhegmatogenous retinal detachment and epiretinal membrane (ERM) proliferation are the most common indications of surgical vitrectomy.

Anti-VEGF is a very useful method in the management of diabetic retinopathy (DR). In selected patients the applications of adjuvants as steroids in paraocular injections or by intravitreal extended-release devices have gained popularity for their practicality effectiveness in maintaining long-term vision. It has left the panretinal photocoagulation (PRP) as a second-line treatment in developed countries.

### Results of the Diabetic Retinopathy

The results of the diabetic retinopathy clinical research network protocol and the clarity trials has been used as guidelines for the surveillance and management of patients with macular edema and complications related to proliferative diabetic retinopathy. These results are found to be better over classical PRP treatment.

In patients with DR, OCTA demonstrates retinal foveal avascular zone (FAZ) enlargement, and microaneurysms. The ability to separately examine the superficial and deep capillary plexuses with OCTA helps users delineate retinal involvement in various diabetic lesions. AngioVue imaging showing superficial and deep plexuses with vessel density quantification of proliferative DR shows areas of nonperfusion, microaneurysms, and clear enlargement of the FAZ.

The surgical steps for basic standardized DMEK surgical technique has been already described. However, variability in the posterior corneal surface of the recipient due to the presence of the PK graft, as well as the potential restrictions of the PK graft-host junction, required some adjustments and particular manipulations.

Posterior bulging of graft-host interface scarring prevents proper graft attachment while anterior synechiae mainly impede intraoperative unfolding DMEK graft and its proper positioning. Therefore, in cases with posterior bulging and no intraoperative plan to dissect the extra tissue, it is important to plan for undersized DMEK graft to reduce the chances of positioning it underneath the PK-host interface and enhance DMEK graft attachment postoperatively.

Preoperative sub-tenon Triamcinolone 40 mg was injected at the beginning of the surgery after sub-tenon local anaesthesia. The 2.4-mm wide corneal incision was performed in the host peripheral corneal rim without penetrating the PK graft. Descemetorhexis was started from the center of the PK graft and was completed in a curvilinear pattern along the PK wound in a manner resembling capsulorhexis. It was performed under air or fluid maintainer using a reversed Sinsky hook.

Postoperative medications included broad-spectrum antibiotics for 1 week and steroids; initially dexamethasone 4 times daily for 4 weeks, followed by Fluorometholone 4 times daily. Fluorometholone was gradually tapered to once daily after 9 months.

Postoperative visual acuity was measured using the Snellen visual acuity chart in decimals, postoperative AS-OCT was done to evaluate

graft attachment and to measure central pachymetry (Figure 2). In case of DMEK graft detachment of more than a third of the graft surface area or central detachment affecting the visual axis, a rebubbling procedure was indicated. The main outcome measures were visual acuity, central pachymetry, rebubbling rate and complications after surgery.

Furthermore, glaucoma filtering surgeries, which are probably more prevalent in post-PKP eyes, are considered a significant risk factor for late graft failure, probably as a result of altering the microenvironment in the aqueous humor which accelerates endothelial cell loss.