Surgical Outcomes of Sequential versus Concomitant Glaucoma Drainage Implant and Boston Keratoprosthesis Type 1

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Background

The Boston Keratoprosthesis Type 1 (KPro) is a surgical device used in patients who have failed traditional corneal transplant treatment or are poor candidates for it.[1] Candidates for KPro often have advanced anterior segment disease that predisposes them to developing glaucoma.[2] As a result, these patients may require both a KPro, to treat their corneal pathology, and a glaucoma drainage implant (GDI), to treat their glaucoma. To date, there have been no long-term studies comparing the order of GDI placement with KPro surgery and how it affects surgical outcomes.

Specific Aim

This study aimed to evaluate the outcomes of patients undergoing both GDI placement and KPro surgery.

Methods

This was a multicenter retrospective study of patients receiving GDI and KPro in the same eye. Patients were divided into 2 groups: GDI placement prior to KPro surgery (sequential group) or GDI placement concomitant with KPro surgery (concomitant group). Outcome measures included intraocular pressure (IOP), best-corrected visual acuity (BCVA), glaucoma medications, surgical complications, and failure, which was defined as the following:

1. IOP > 21, less than a 20% reduction from baseline IOP, or IOP < 5 for 2 consecutive follow-up visits
2. Any glaucoma reoperation
3. Loss of light perception

References
1. Huh ES, Aref AA, Vajaranant TS, de la Cruz J, Chau FY, Cortina MS. Outcomes of pars plana glaucoma drainage implant in Boston type 1 keratoprosthesis surgery. *J Glaucoma* 2014;23(1):39-44.
2. Dohlman CH, Grosskreutz CL, Chen TC, et al. Shunts to divert aqueous humor to distant epithelialized cavities after keratoprosthesis surgery. *J Glaucoma* 2010;19(2):111-115.

Results

Thirty-five eyes were included in the study, 17 in the sequential group and 18 in the concomitant group. The mean follow-up time was 50.5 ± 20.8 months in the sequential group and 30.8 ± 19.7 months in the concomitant group (P=0.007). The overall failure rates were 23.5% (n=4/17) in the sequential group and 27.8%, (n=5/18) in the concomitant group (P=0.486). The most frequent complication was GDI erosion, which occurred in 23.5% (n=4/17) in the sequential group and in 27.8% (n=5/18) in the concomitant group (P=1.000). BCVA was better in the concomitant group after 1 year (P=0.020) and at the last follow-up visit (P=0.001).

Figure 1: Boston Keratoprosthesis Type 1

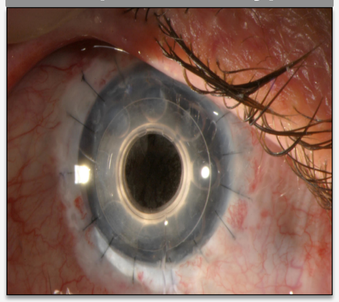

Figure 2: Distribution of Intraocular Pressure at Baseline and Follow-Up

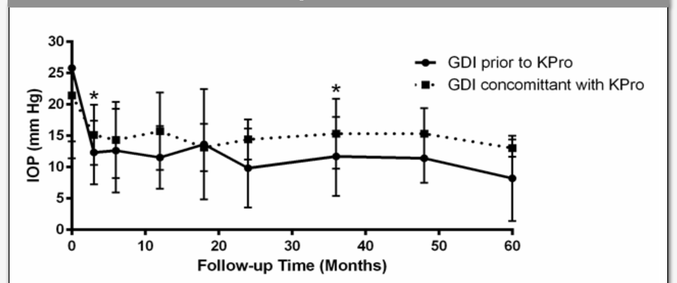

Figure 3: Distribution of Best-Corrected Visual Acuity at Baseline and Follow-Up

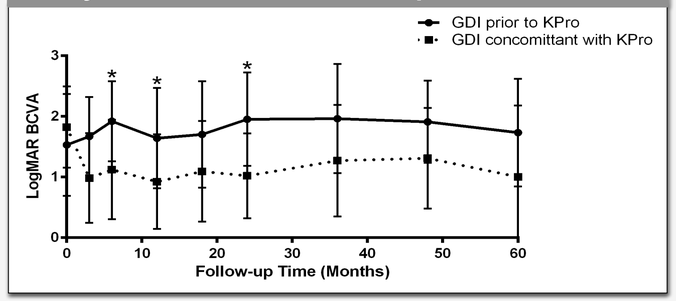

Figure 4: Kaplan-Meier Plots of the Cumulative Failure Rate

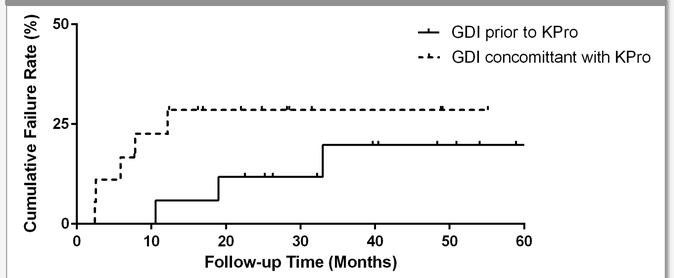

Table 1: Best-Corrected Visual Acuity at Time of Boston Keratoprosthesis and at Last Visit

Follow-Up Visit	Sequential (n=17)	Concomitant (n=18)	P-Value
At Time of KPro			
logMAR BCVA, mean (CI) (n)	2.1 (1.9, 2.3) (17)	1.8 (1.5, 2.1) (18)	0.126
Snellen	20/2518	20/1262	N/A
Last Visit			
logMAR BCVA, mean (CI) (n)	2.1 (1.7, 2.5) (17)	1.1 (0.7, 1.5) (18)	0.001
Snellen	20/2518	20/252	N/A

Discussion

The results demonstrate that GDI placement at the time of KPro surgery had similar failure rates, but significantly favorable visual outcomes compared to sequential surgeries.

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