



MANAGEMENT OF GLAUCOMA WITH THE BOSTON KERATOPROSTHESIS

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INTRODUCTION

- The Boston type I Keratoprosthesis is more frequently being used in patients with a poor prognosis for penetrating keratoplasty:
 - Repeated graft failure
 - Limbal stem cell deficiency
 - Extensive corneal neovascularization
- Historically, Keratoprosthesis use has been associated with development of Glaucoma
- The need for a Tube Shunt to control intraocular pressure (IOP) with the Boston type I keratoprosthesis remains debatable.

PURPOSE

To evaluate the need for glaucoma tube shunts to control intraocular pressure in patients receiving the Boston type I keratoprosthesis

METHODS

- Fifteen patients received a Boston type I Keratoprosthesis between January 2003 and November 2005.
- Pre-operatively, eleven patients had glaucoma, four eyes had normal IOP on no medications.
- Tube Shunts were placed before or at the time of keratoprosthesis surgery in all eyes with glaucoma (11) and in two eyes with normal IOP.
- Intraocular pressure was measured by finger palpation at 1 day, 1 week, 1 month and then at 3 month intervals.

Boston K-Pro Characteristics

- front part: contains optical element
- donor corneal graft: healthy tissue decreases melts
- back plate: fenestrations facilitate nutrition to cornea
- titanium locking ring: avoids unscrewing of posterior plate
- bandage contact lens: decreases evaporative forces

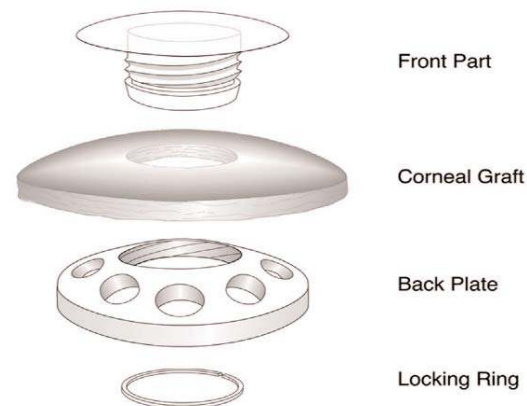


Figure 3: Boston Keratoprosthesis type I (schematic assembly)



Figure 1: Boston Keratoprosthesis type I assembled



Figure 2: Ahmed Tube Shunt

RESULTS

- All patients receiving a tube shunt before or at the time of surgery maintained good intraocular pressure during follow-up.
- The two patients without a tube shunt developed glaucoma and required a tube shunt at 9 and 12 months post-op.
- Keratoprosthesis retention rate: 100%
- No infections
- Post-op VA \approx posterior segment potential in all cases 20/20 - LP (30% with VA \geq 20/40)

Table 1: Characteristics of the Study Population

No. of Eyes	15
Follow-Up (months, mean \pm SD)	115 \pm 7.2
Age (years, mean \pm SD)	66.8 \pm 20.6
Indication for K-Pro surgery	
Multiple graft failure	10
Limbal Stem Cell Deficiency	2
Severe vascularized corneal opacity	2
Ocular Cicatricial Pemphigoid	1
Co-existing Glaucoma	
Tube Shunt ¹ pre - KPro	9
Tube Shunt ² with - KPro	4
Tube shunt ² post - KPro	2

¹ 4 Baerveldt, 2 Ahmed, 3 unknown ² Ahmed

DISCUSSION

- Boston Keratoprosthesis has many advantages:
 - fast visual rehabilitation
 - relative ease of surgical procedure
 - low incidence of complications
- Repeat penetrating keratoplasty is associated with reduced graft survival
- Multiple graft failure is becoming the most common indication for Boston Keratoprosthesis
- Monitoring of IOP after Boston Keratoprosthesis placement is imprecise (finger palpation only)
- Patients receiving the prosthesis develop glaucoma, therefore it seems appropriate to place tube shunts before or at the time of keratoprosthesis surgery

CONCLUSIONS

- Boston Keratoprosthesis is associated with development of Glaucoma
- Tube Shunts are required to control IOP in patients receiving the prosthesis
- Tube Shunt placement before or at time of surgery seems appropriate
- Larger study sample and longer follow-up are necessary

Commercial Relationship: None

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Figure 4: Patient 1, preoperative photo (graft failure)

Figure 5: Patient 1, one month post-op

Figure 6: Patient 1, one year post-op

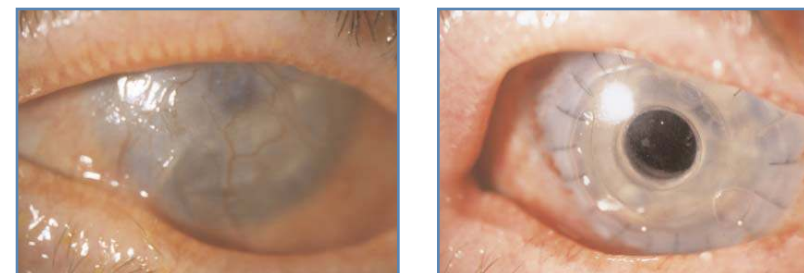


Figure 7: Patient 2, preoperative photo (ocular cicatricial pemphigoid)

Figure 8: Patient 2, one month post-op

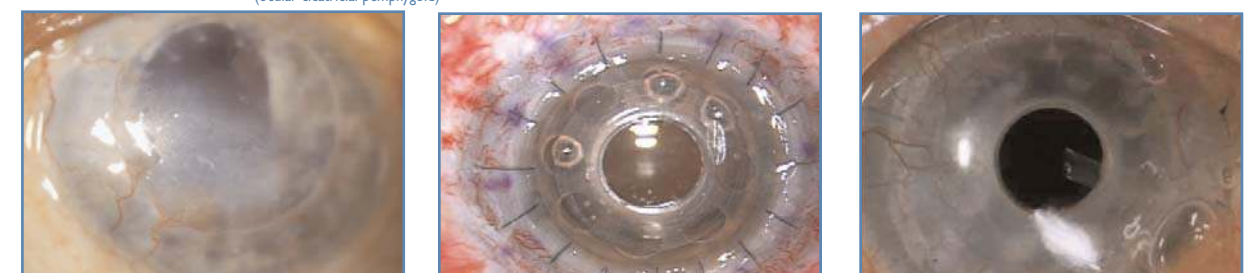


Figure 9: Patient 3, preoperative photo (graft failure)

Figure 10: Patient 3, one day post-op

Figure 11: Patient 3, one year post-op