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.
• Intraocular pressure was measured by finger palpation at 1 day, 1 week, 1 month and then at 3 month intervals.

Boston K-Pro Characteristics
1. front part: contains optical element
2. donor corneal graft: healthy tissue decreases melts
3. back plate: fenestrations facilitate nutrition to cornea
4. titanium locking ring: avoids unscrewing of posterior plate
5. bandage contact lens: decreases evaporative forces

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 ≈ posterior segment potential in all cases

Table 1: Characteristics of the Study Population

<table>
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<tr>
<th>No. of Eyes</th>
<th>Follow-Up (months, mean ± SD)</th>
<th>Age (years, mean ± SD)</th>
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<td>15</td>
<td>15 ± 7.2</td>
<td>66.8 ± 20.6</td>
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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 11
Tube Shunt\(^1\) pre-KPro 9
Tube Shunt\(^1\) 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
  - 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

REFERENCES