SPECIAL SURGICAL CONSIDERATIONS IN THE CASE OF COMBINED SURGERY FOR GLAUCOMA TUBE INSERTION AND BOSTON TYPE I KERATOPROSTHESIS IMPLANTATION.

Dr. Carolina Pallás Ventayol
Dr. Honorio Pallás Ventayol
Glucoma Department at IMO, Institut de Microcirurgia Ocular, Barcelona. Resident in Training at Hospital San Pedro de Logroño, La Rioja.

The Boston Type I Keratoprosthesis (K-pro) is a last chance option for certain patients with corneal blindness, many of whom can achieve good vision if only for a short period of time.

Whereas some patients have pre-existing glaucoma, others develop concurrent glaucoma after surgery. This is one of the main challenges of keratoprosthesis surgery. One approach to this sight-threatening complication is through the use of glaucoma drainage devices.

CASE REPORT:

25-year-old male. Intense discomfort and loss of vision in his only, right eye. Diagnosed with bilateral congenital glaucoma within a week of birth.

Left enucleation aged 10 for:
- Painful and blind eye.
- Uncontrolled intraocular hypertension, despite multiple surgical procedures.

In his remaining eye:
- Goniotomy.
- 2 trabeculectomies.
- Cataract surgery without intraocular lens (IOL) implantation.
- 3 penetrating keratoplasties.

On examination:
- Light perception, without projection (vision 2 years previously had been hand movement).
- Bullous epithelial and diffuse stromal corneal oedema.
- Aphakia, with cortical and capsular remnants, but no evidence of vitreous in the anterior chamber (anterior OCT proved inconclusive due to media opacity).
- Indirect gonioscopy: bitemporal angle with multiple, diffuse, broad peripheral anterior synechiae.
- Flat retina, with almost total glaucomatous neuropathy.
- Goldmann tonometry: Reading of 22 mmHg (against a pachymetry of 820), with 3 topical agents and Diamox/12 hr.
- Finger palpation: 30 mmHg.

IMO’S SURGICAL TECHNIQUE FOR AHMED GLAUCOMA VALVE PLACEMENT IN BOSTON TYPE I KERATOPROSTHESIS PATIENTS:

2 years after this triple surgery:
- Vision of counting fingers.
- Bandage contact lens well tolerated.
- K-Pro with no sign of breakdown or endophthalmitis (in long-term steroid, fortified vancomycin and a fluoroquinolone antibiotic).
- Tube long enough to be easily seen.
- Tube well-positioned and patent.
- Stable optic nerve on the stereoscopic viewing.
- Digitally-measured intraocular pressure (IOP) between 15 and 20 mmHg, on no topical treatment.
- No longer any discomfort.
- Follow-up 3-monthly by cornea and glaucoma specialists.

Key Points:
1. The site of tube insertion depends on the status of the iris, lens, and vitreous. The pars plana approach is advantageous because:
   - By placing the external implant further away from the limbus:
     * The risk of tube exposure induced by contact between the tube and back plate is minimised.
     * The risk of tube exposure caused by repeated contact with the edge of the bandage contact lens is lessened.
     * The likelihood of crowding within the anterior chamber, a cause of tube obstruction, is reduced.
2. Timing for pars plana vitrectomy:
   - The use of Eckardt temporary keratoprosthesis (with a 6 mm optic) permits sufficient visualisation of the peripheral retina to achieve as thorough a pars plana vitrectomy as possible.
   - In case of triple surgery combining pars plana vitrectomy, Ahmed valve implantation and k-pro, we always complete pars plana vitrectomy prior to implanting a permanent Boston Keratoprosthesis (which only has a 3 mm optic).
3. Tube length:
   - The tube should be left long, oriented radially, and parallel to the iris plane for its tip to be seen easily only using the slit-lamp, avoiding the need for anterior segment imaging tests which are often not readily available to the surgeon.