Vitreoretinal Surgery in Severe Eye Trauma

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My Presentation Will be About

• Temporary keratoprosthesis – PPV – Penetan keratoplasty in combined anterior and posterior segment trauma

• The Use of Continuous Silicone Oil Infusion as Preoperative Tool in a Severely Traumatized Eye
Combined Anterior and Posterior Segment Eye Trauma and Surgical Approach

Results of penetrating keratoplasty (PKP)-Pars plana vitrectomy (PPV) using temporary keratoprosthesis (TKP) in combined anterior and posterior segment trauma
Most severe eye traumas involve both anterior and posterior segments.

Corneal opasities may prevent safe and timely posterior segment reconstruction.

Unfortunately many of these eyes are still enucleated without giving surgeon a chance to visualize the posterior segment.
• First TKP model introduced in 1981 by Landers – Foulks

• Second model was designed by Eckardt in 1987
METHODS

► Patient operated between 2006 - 2014
► Retrospective, consecutive, case series
► 10 eyes of 10 patients
► All patients had combined anterior and posterior segment trauma with corneal opacitiy which precludes further intervention
► Anatomical and functional results and complications were evaluated
RESULTS

► Mean age is 53 (22-72) years

► Male/ Female: 7 / 3

► Mean follow-up time: 12 (3-48) months

► Mean interval between the primary incidence and combined surgery - 12 (7-32) days.
OCULAR HISTORY

►Etiology;
  • 7 patients had open globe injury
    • One patient had multiple foreign bodies (2-4 mm)
    • One patient had single foreign body (18 mm)
  • 3 patients had closed globe injury
  • All patients had retinal detachment and corneal opacity which precludes vitreoretinal surgery
Initial Surgical Procedures

► All patients underwent PPV with Landers type temporary keratoprosthesis
► 5 patient 20 G vitrectomy
► 5 patients 23 G vitrectomy
  • 1 case underwent scleral buckle,
  • 4 " " lensectomy
  • 2 " " intraocular foreign body removal
  • 1 " " silicone retention suture
  • 5000 cs Silicone oil injection (n:10)
  • Penetran keratoplasty (n:10)
Anatomical Results

• In 9 (90 %) cases retina attachment were achieved in the initial surgery
• Retina remained detached in 1 (%10) case in the initial surgery
• Follow up period
  ➤ Recurrent RD (n:2)
  ➤ Hypotony (n: 5)
  ➤ Graft failure (n: 6)
  ➤ Re PKP (n:1)
  ➤ Evisceration (n:1)
Functional Results

► Preoperative VA
   ▶ 1 case → no light perception
   ▶ 4 " → light perception
   ▶ 5 " → HM

► Final BCVA
   ▶ 1 case → 0,3
   ▶ 2 " → ≥ 20/400
   ▶ 3 " → 1 m FC
   ▶ 3 " → hand motion
   ▶ 1 " → no light perception
HYPOTONY

► Preoperative;
   3 (30%) patients had hypotony ( < 5 mm Hg)
► Postoperative;
   5 (50%) patient had hypotony ( < 5 mm Hg)
DISCUSSION

► TKP – PPV and PPK is preferred in patients with corneal opacity that could not allow vitreoretinal surgery
► TKP could considerably prevent unavoidable eye loss
► Improvement in functional visual acuity could be obtained in some patients
► Early intervention, limited retinal injury may result with better outcomes
► Visual outcomes are limited because of recurrent corneal problems and persistent hypotony issues
The Use of Continuous Silicone Oil Infusion as Preoperative Tool in a Severely Traumatized Eye
• Viscosity of oil is related to the length of the polymer chains therefore to molecular weight of oil

• In Regular silicone oil low molecular weight part known as toxic substance of oil

• Postoperative emulsification of silicone oil seems to be related to the number of low molecular weight polymer chains

• Manufacturers aim; decrease the low molecular chain from regular oil
New LMW Silicone Oil

• Intraoperative tool
• First used by David Wong
  • 5 patients
    • 3 patients had RD
    • 2 patients had TRD
  • Helpful
    • vitreous base shaving
    • Break detection

The Use of Continuous Silicone Oil Infusion as a Peroperative Tool to Facilitate Break Localisation, Vitreous Base Dissection and Drainage of Subretinal Fluid

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New LMW Silicone Oil

- Dr Bernd Kirchhof
  - Severe trauma
  - Severe subretinal and vitreous hemorrhage
Specification

• 70 ml
• Viscosity : 5 (m Pas)
• Density : 0,9 g /cm³
• Indication :
  • Severe bleeding / trauma
  • Heavy persistent hemorrhages
  • Penetrating injuries
Low Molecular Weight Silicone Oil

- Joint with the PFCL to form single bubble
- Immiscible with water and hemorrhage
- Higher refractive index than vitreous (1.4)
- Easier identification all breaks
- Easier vitreous base removal
The Use of Continuous Silicone Oil Infusion as Preoperative Tool in a Severely Traumatized Eye
Possible Disadvantages

• Early emulsification
• Every drop of LMWS must removed
• Transient hypotony may occur
• Subretinal Oil
• LMWS may be a useful intraoperative tool in VRS

  • Severe bleeding / trauma
  • Heavy persistent hemorrhage
  • Penetrating injuries cases
• Trauma still is the major cause of visual loss in the World
• New Technologies in vitreoretinal surgery considerably prevent unavoidable eye loss
• Despite all these unfavourable points, restoration of some functional visual ability and prevention of enucleation in most patients is a reward for efforts
Thank You