OUTCOME OF THERAPEUTIC PENETRATING KERATOPLASTY USING GLYCEROL-PRESERVED DONOR CORNEA IN INFECTIOUS KERATITIS

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Introduction

- Complicated infectious keratitis can be successfully treated with penetrating keratoplasty
- Corneal donor in optisol is preferred in most practice
- Corneal donor insufficiency was a common problem in many countries
- Glycerol-preserved cornea is used as substituted in some situation

Objective

- This study aim to report the *surgical outcomes and complications* of therapeutic penetrating keratoplasty using glycerol-preserved cornea in severe infectious keratitis

Material and Methods

Study design

- Hospital-based retrospective review
- This study was approved by the Khon Kaen university ethics committee
- 10 years results (2003-2013) from KKU Eye Center, Srinagarind hospital, Khon Kaen University, Thailand
- Total 22 eyes from 22 patients were included

Previous studies have shown glycerol-preserved cornea may be used in infectious keratitis

The sample size is relatively small and no report about reinfection rate and glaucoma

All authors has no financial or proprietary interest
Inclusion
- Patient who were diagnosed infectious keratitis (IK) and underwent penetrating keratoplasty using glycerol-preserved cornea during 2003-2013 in Srinagarind hospital

Exclusion
- Infectious keratitis patient who underwent PK using cornea donor in Optisol
- Severe infectious keratitis with scleral extension
- Infectious keratitis with unidentified causative agents by corneal scraping, culture, PCR, or confocal microscopy

Outcomes
- Baseline characteristics
  - age, sex
  - causative agents and lesion size
- Preoperative factors
  - Storage time of corneal donors
  - Presurgical period
  - Donor size
- Postoperative complications
  - Wound integrity
  - Recurrent rate of infection
  - Secondary glaucoma
- Visual outcome

Baseline characteristics
- Total 22 eyes, male:female = 13:9
- Mean ages was 50.7 years (range from 28-85 years)

Causative agents
- Fungus 17 eyes (77%)
- Mixed infection 3 eyes (13.5%)
- Bacteria 1 eye (4.5%)
- Protozoa 1 eye (4.5%)

Glycerol-preserved cornea
- Presurgical time was ranged from 1-27 day after admission
- Delayed surgery more than 7 days was observed in 7 eyes
- The donor size ranged from 7.5 to 9.5 millimeters.
- Storage time of glycerol-preserved cornea was ranged from 2 day to 5 years
Reinfection

- Recurrent of infection was observed in 15 of 22 eyes (68%), start earliest on post-op day 2 to 45 days post-op
  - Fungus 12 eyes (80%)
  - Mixed infection 3 eyes (20%)
- 9 of 15 eyes (60%) had evisceration or enucleation

Reinfection rate was higher compare to previous studies.

The possible explanations were

1. Higher fungal to bacterial keratitis ratio
   - Present study 17:5, Yang et al. 5:9, Lin et al. 4:4
   - Poor response to antifungal agents
   - Higher drug resistance
   - High virulence agents i.e., Pythium spp.

2. Delay surgery
3. Inadequate treatment: poor compliance

Glycerol-preserved cornea?

Other complications

At 6 months follow up
- 35% (8/22): wound leakage
- 85% (11/13): secondary glaucoma
- Post-operative visual acuity at 6 months
  - Range from 1/60-No LP

Glycerol-preserved graft

- Feilmeier MR et al reported antimicrobial and antiprotease properties of glycerine
- John Larry King reported successful operation of lamella keratoplasty using 20 year-storaged graft
- Glycerol-preserved cornea may not be the risk factors for high recurrence rate

Restoration of globe integrity

- Prior study showed 50-90% success rate
- Ours showed 100% success in the first 2-4 days, then one third of cases had wound leakage
- The possible explanations
  1. Reinfection-corneal melting
  2. Graft fragility (long storage time ?)

Discussion
Glaucoma

- Sharma et al. reported that the larger donor we used, the higher rate of glaucoma we found.
  - Donor size 9-11 mm, secondary glaucoma 33%.
  - If larger than 11 mm, secondary glaucoma 47%.

(8) Sharma N et al. Cornea 2014

Glycerol-preserved donor

- When compared to standard optisol graft, glycerol-preserved graft tend to have thicker and harder consistency.

Suggestions

- Soaked the graft in BSS at least 15 minutes before surgery.
- Beware of graft-host inapproximation.
- Antiglaucoma drugs prophylaxis in all cases.

Glaucoma

- Our average graft size was 7.5-9.5mm, but higher incidence of glaucoma was noted.
  1. Post-op inflammation
  2. Inaccurate IOP measurement
     - Graft edema

Limitations

1. 5 surgeons -> variety of surgical techniques
2. No control group (standard optisol-preserved graft group)

Conclusion

Therapeutic penetrating keratoplasty using glycerol-preserved cornea has high rate of secondary glaucoma and recurrence of infection with unsatisfied visual results.

It may be effective substitutes for evisceration or enucleation in countries where donor tissue is deficient.
Thank you for your attention