

Hot Topics in Corneal Disease: What's New and Next in Diagnosis and Treatment

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Course Abstract:

From microbial and neurotrophic keratitis to ectasia and endothelial dysfunction, this course provides practical guidance on current management and emerging advances across the full spectrum of corneal disease, from endothelium to epithelium.

Learning Objectives:

1. Review practical treatment approaches for microbial keratitis, neurotrophic keratitis, ectasia, and endothelial dysfunction.
2. Understand advanced diagnostic tools for corneal diseases.
3. Explore innovative new treatments.

Course Outline:

1. Microbial Keratitis
 - a. History
 - i. Contact lens wear
 1. Extended wear highest risk
 - ii. Immunocompromised
 - b. Diagnostics
 - i. Traditional agar plating
 1. Blood
 2. Chocolate
 3. Sabouraud
 - a. Standard of care for cultures
 - b. Limitations frequent replacement and refrigeration
 4. Slides
 5. Universal Transport Medium
 6. Submit to lab, wait for ID and sensitivities
 - ii. PCR swabs
 1. 24hr results with sensitivities
 - a. Easy storage in practice
 - iii. Confocal microscopy
 1. Acanthamoeba keratitis
 - a. Cysts and trophozoites visible
 - iv. Corneal biopsy
 1. Pathology after tissue removal
 2. Last resort

- c. Treatment
 - i. First line
 - 1. Moxifloxacin and Polymyxin/Trimethoprim
 - 2. Fortified antibiotics
 - a. Vancymycin and Tobramycin
 - b. Option for office storage
 - ii. PACK-CXL
 - 1. Future: CXL reaction sterilizes
 - a. No clinically significant differences in outcomes versus traditional management
 - iii. Pipeline meds
 - 1. Acanthamoeba
- 2. Corneal Neuropathy
 - a. Diagnostics
 - i. History
 - 1. Herpetic keratitis
 - 2. Diabetes
 - 3. Corneal refractive surgery
 - 4. Long term contact lens wear
 - 5. Heavy BAK
 - ii. Corneal sensitivity
 - 1. Quality vs quantity
 - a. Swab fiber
 - i. Quality, Comparative, Y vs N, More vs Less, high variability
 - b. Aesthesiometer
 - i. Quantity, less than 4 reduced sensitivity, regional
 - c. Non contact aesthesiometer
 - i. Quantitative
 - 1. Hyposensitive
 - 2. Hypersensitive
 - iii. Confocal Microscopy
 - 1. Nerve morphology
 - a. Tortuosity and nodules
 - b. Treatment
 - i. Elimination of exacerbating contributors
 - 1. Change to preservative free
 - ii. Lubrication
 - iii. Protection
 - 1. Bandage soft lens
 - 2. Scleral Lens
 - 3. Tarsorrhaphy
 - iv. Pharma
 - 1. Cenegermin-bkbj

- 2. Pipeline
- v. Regeneration
 - 1. Autologous serum
 - 2. Amniotic membrane
 - 3. Nerve transplantation
 - 4. BMAK
 - a. Transplantation of descemet membrane
 - b. Acts at substrate for epithelial cell proliferation
- 3. Corneal Ectasia
 - a. Diagnostics
 - i. Topography
 - 1. I-S
 - 2. Axis skew
 - 3. Radius of curvature
 - ii. Tomography
 - 1. Anterior elevation
 - 2. Posterior elevation
 - 3. Global pachymetry
 - 4. Epithelial thickness
 - 5. Next generation OCT
 - a. In-vivo corneal biopsy
 - iii. Biomechanics:
 - 1. Contact
 - a. Scheimpflug pneumatic
 - i. Applanation time
 - b. OCT elastography
 - i. Homogenous anterior and posterior strength
 - 2. Non contact
 - a. Brillouin microscopy
 - i. Focal spectral shift
 - b. Phase Decorrelation OCT
 - i. Full corneal analysis
 - b. Treatment
 - i. Reinforce
 - 1. CXL
 - a. Various forms
 - i. Epi-off
 - b. Pipeline
 - i. Epi-on
 - ii. Epi-on plus oxygen
 - iii. Laser diode
 - 2. Pharma
 - a. Pipeline
 - i. LOX upregulation

- ii. Regenerate lost collagen
 - ii. Recontour
 - 1. Subtract
 - a. TGPRK
 - i. Selective minimal tissue removal
 - 2. Add
 - a. ICRS
 - i. PMMA
 - ii. Synthetic material may lead to complications
 - b. CAIRS
 - i. Fresh corneal tissue shaped ring segment
 - ii. Overcome limitations of synthetic material
 - c. CTAK
 - i. Sterilized Allograft Tissue
 - 1. Gamma sterilization
 - 2. Extends the gift of donation to multiple recipients
 - d. BLT
 - i. Bowman's layer onlay
 - 3. Replace
 - a. DALK
 - i. Innovations
 - 1. Vital et al Grip and Rip technique
 - b. PK
 - i. Continued decline in use
4. Endothelial Dysfunction
 - a. Diagnosis
 - i. Specular Microscopy
 - 1. Endothelial cell morphology
 - ii. Tomography
 - 1. Corneal thickness
 - 2. In Vivo optical biopsy
 - a. Visualization of endothelial layers
 - b. Treatment
 - i. EK
 - 1. DSAEK
 - a. Stroma, DM, and endo
 - 2. DMEK
 - a. DM and endo only
 - b. More challenging procedure
 - ii. DSO/DWEK
 - 1. No donor material required
 - 2. Long visual recovery
 - iii. Artificial Endothelium

1. HEMA/MMA copolymer
- iv. Endothelial Cell Culture
 1. Injected cells to repopulate endo