



Cornea 2024

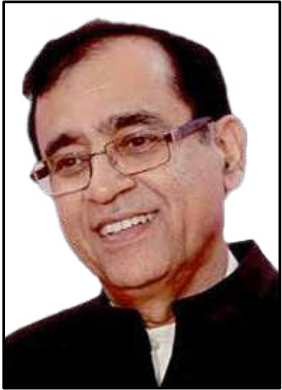
A Vision for 2024 and Beyond



Subspecialty Day
Mar 14, 2024



OFFICE BEARERS



Harbansh Lal
President



Samar Kumar Basak
President Elect



Partha Biswas
Vice President



Lalit Verma
Immediate Past President



Santosh G. Honavar
Honorary General Secretary



Manoj Chandra Mathur
Honorary Treasurer



Namrata Sharma
Chairperson Scientific Committee



Prashant Keshao Bawank
Chairman ARC



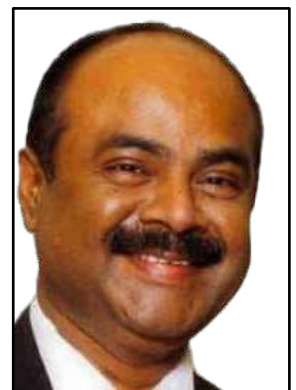
M. Vanathi
Editor-Journal



Krishna Prasad Kudlu
Editor-Proceedings



C. V. Gopala Raju
Joint Secretary



Elankumaran Pasupathi
Joint Treasurer

CORNEA

Members - Scientific Committee



Somasheila I. Murthy



Jatinder Singh Bhalla



Pradip Kumar Mohanta



Piyush R Bansal



Vardhaman Kankaria



Amit Porwal



**Fairooz Puthiyapurayil
Manjandavida**



Members - Academic & Research Committee



Tinku Bali
Member ARC (North Zone)



Kasturi Bhattacharjee
Member ARC (East Zone)



Shrinivas M. Joshi
Member-ARC (South Zone)



Anagha Heroor
Member-ARC (West Zone)



Deepak Mishra
Member ARC (Central Zone)

CORNEA

Dr Aditi Ghosh



Dr Aditya Pradhan



Dr AK Jain



Dr Amit Gupta





DMEK in Eyes with Deep Anterior Chambers

Dr Anthony John Aldave, MD
USA



Financial Disclosures:

Consultant for:

AcuraStem

Amber Ophthalmics

Avellino Laboratories

ClearView Healthcare Partners

Dompe

Guidepoint

Health Advances

Kala

MedEdicus

Office Hours

Tarsus

Thea Pharmaceuticals

W. L. Gore & Associates

Performing DMEK successfully in eyes with deep anterior chambers can be a challenge, even for the experienced DMEK surgeon. However, the following guidelines can greatly facilitate the performance of DMEK in these eyes.

1. DMEK (endothelium out)
 - a. When the surgeon is requesting donor tissue for an eye with a deep anterior chamber, it is strongly recommended to use tissue from a donor over 60 years old to facilitate unfolding.
 - b. It is essential to shallow the anterior chamber as much as possible to enable unfolding of the DMEK graft and to maintain the graft in the unfolded orientation. This can be achieved by:
 - i. Releasing/aspirating fluid to create a corneal concavity
 - ii. Placing small air bubbles beneath the peripheral iris (0.1 cc of air in a 1 cc syringe on a 30 gauge cannula)
 - iii. Applying digital pressure on the globe during an unfolding maneuver and releasing pressure when the DMEK graft is unfolded to prevent scrolling of the unfolded DMEK graft
 - c. The preferred unfolding and centering techniques are:
 - i. Compress and release (centering and unfolding)
 - ii. Direct manipulation of the graft (one or two 30 gauge cannulas)
 - iii. Aspiration of the graft (30 gauge cannula)
 - iv. Injection of air bubble above or below the graft
2. DMEK (endothelium in)
 - a. The use of a DMEK graft folded with the endothelium in can greatly facilitate and expedite unfolding. As the DMEK graft does not need to be unfolded on the iris, a deep anterior chamber does not make unfolding of the endothelium in DMEK more complicated.
 3. DMEK (pull-through technique)
 - a. The use of infusion forceps and a pull-through technique, similar to that routinely used for DSEK surgery, can also greatly simplify the performance of DMEK in eyes with deep anterior chambers.

References

1. Ong HS, Htoon HM, Ang M, Mehta JS. "Endothelium-Out" and "Endothelium-In" Descemet Membrane Endothelial Keratoplasty (DMEK) Graft Insertion Techniques: A Systematic Review With Meta-Analysis. *Front Med (Lausanne)*. 2022 Jun 14;9:868533.
2. DMEK: new and emerging techniques. *Review of Ophthalmology* 2022 April; 58-65.

CORNEA

Dr Anubha Rathi



*Dr Anudhati Anshu
Singapore*





DMEK and DSEK

Dr Audrey Rostov

USA



This presentation will discuss managing complications of DMEK and DSEK. Through video format, complications including management of intraocular hemorrhage, air bubble, EK with previous PK, insertion techniques and graft unscrolling challenges will be discussed.

Dr Bhaskar Roy Choudhary



Dr Bhaskar Srinivasan



Corneal Imaging in Microbial Keratitis And AI: What Lies Beneath

Dr Chintan Malhotra



The cornea is the 'window of the eye' and corneal imaging provides a 'window to that window.' Anterior segment optical coherence tomography (ASOCT) and In Vivo Confocal Microscopy (IVCM) are the main modalities of clinical utility for microbial keratitis.

ASOCT provides information about structural changes predominantly, with various patterns having been described e.g. infiltrates and scars appear as hyperreflective lesions within the corneal stroma, inflammatory plaques as hyperreflective lesions over the endothelium or epithelium, corneal edema as increase in corneal thickness or loss of concavity and stromal necrosis as cystic spaces within the stroma. These patterns are however not specific to any particular microorganism. ASOCT thus complements slit lamp biomicroscopy and provides supplementary information for assessing disease severity and for monitoring progression.

In cases of retrocorneal plaques, ASOCT has been shown to broadly indicate the etiology with plaques of fungal keratitis having irregular borders which may be well defined or clear, while those of herpetic keratouveitis have a clear demarcation between the retrocorneal membrane and the posterior cornea.

IVCM with laser scanning confocal microscopes e.g. HRT 3 enables subcellular level magnification (upto 800 X) with lateral and axial resolutions of 1-2 μm and 4 μm respectively. In addition to structural changes it helps guide the etiological diagnosis in cases of fungal, Pythium, acanthamoeba, microsporidial and nocardia keratitis. Most bacteria cannot be visualized due to their small size though their footprints (inflammatory cells, scarring etc) may be seen. Fungal hyphae appear as highly reflecting, branching/bifurcating interlocking structures 3-10 μm in diameter and usually not seen in isolation. Visualization of spore like structures on the filaments (chlamydo spores) may be an indicator of worsening of the disease. Acanthamoeba trophozoites and cysts may both be visualized with the double walled cysts usually occurring in clusters or chains, with each cyst usually measuring 10-20 μm diameter but may range from as small as 5 μm to as large as 200 microns. Nocardia appears as multiple, thin (<1 μm), short beaded filamentous structures which are thinner than fungal hyphae. Microsporidia appear as multiple ovoid, pin point 'spore like structures' which unlike yeasts do not demonstrate budding.

For both keratomycosis and acanthamoeba keratitis culture from corneal scrapings remains the gold standard diagnostic modality. However certain limitations of using

cultures as the diagnostic modality e.g. delay of upto 2 weeks in getting positive cultures, relatively low positivity rates and difficulty in acquiring samples from deeper lesions are circumvented by IVCM. Confocal microscopy allows for instantaneous visualization of the offending agent thus allowing early initiation of therapy and has been demonstrated to have high sensitivity (90% and beyond) and specificity.

A new dimension to imaging in microbial keratitis is being provided by incorporation of artificial intelligence (AI). AI algorithms are being developed to diagnose infectious keratitis and determine etiology from both clinical photographs i.e. slit lamp images and IVCM.

AI based on slit lamp images has in certain cases been shown to reach accuracy levels of approximately 80%, surpassing general ophthalmologists and comparable to cornea specialists. On IVCM, diagnostic models e.g. those differentiating between fungal keratitis and acanthamoeba keratitis have reported higher sensitivity and specificity than discriminative models i.e. those differentiating between aspergillus and fungal keratitis. AI in the diagnosis of infectious keratitis however still suffers from multiple limitations including being highly dependant on image quality and lower performance in the setting of coexisting pathologies e.g. surgical scars, conjunctivalization etc and mixed infections. However as AI technology continues to develop, it is likely to play an increasingly important role in the diagnosis and management of infectious keratitis.

Key Take home messages:

- ASOCT and Confocal microscopy are useful adjuncts to clinical and microbiological diagnosis of infectious keratitis.
- ASOCT mainly assesses structural changes i.e. thinning and is useful for monitoring disease progression.
- Confocal microscopy allows for etiological diagnosis in cases of fungal, protozoal and nocardia keratitis. While it does not allow for species identification in majority of the cases, the rapidity of diagnosis possible and the high sensitivity and specificity make it an invaluable tool for diagnosis and managing fungal and acanthamoeba keratitis.
- Artificial intelligence using diagnostic and discriminative models is an evolving field in diagnosis of microbial keratitis, though its exact role in the diagnostic and management algorithm will need to be better defined.



References

1. Oliveira MA, Roas A, Soares M et al. Anterior Segment Optical Coherence Tomography in the Early Management of Microbial Keratitis: A Cross-Sectional Study. *Acta Med Port* 2020 May;33(5):318–325
2. Takezawa Y, Suzuki T, Shiraishi A. Observation of Retrocorneal Plaques in Patients With Infectious Keratitis Using Anterior Segment Optical Coherence Tomography. *Cornea* 2017 Oct;36:1237–1242
3. Chidambaram JD, Prajna NV, Lanjewar S et al. In Vivo Confocal Microscopy Cellular Features of Host and Organism in Bacterial, Fungal, and Acanthamoeba Keratitis. *Am J Ophthalmol* 2018;190: 24–33.
4. Malhotra C, Jain AK, Kaur S et al. In vivo confocal microscopic characteristics of microsporidial keratoconjunctivitis in immunocompetent adults. *Br J Ophthalmol* 2017; 101: 1217–1222
5. Lee HJ, Alipour F, Cruzat A et al. Utility of In Vivo Confocal Microscopy in Diagnosis of Acanthamoeba Keratitis: A Comparison of Patient Outcomes *Cornea* 2023;42:135–140
6. Hoffmann JJ, Yadav R, Sanyam SD et al. Diagnosis of Fungal Keratitis in Low-Income Countries: Evaluation of Smear Microscopy, Culture, and In Vivo Confocal Microscopy in Nepal. *J.Fungi* 2022,8,955.
7. Soleimani M, Cheraqpour K, Sadeghi R, Pezeshgi S, Koganti R, Djalilian AR. Artificial Intelligence and Infectious Keratitis: Where Are We Now? *Life*. 2023; 13(11):2117. <https://doi.org/10.3390/life13112117>
8. Vupparaboina, K.K.; Vedula, S.N.; Aithu, S.; Bashar, S.B.; Challa, K.; Loomba, A.; Taneja, M.; Channapayya, S.; Richhariya, A. Artificial intelligence based detection of infectious keratitis using slit-lamp images. *Investig. Ophthalmol. Vis. Sci.* 2019, 60, 4236.
9. Lv, J.; Zhang, K.; Chen, Q.; Chen, Q.; Huang, W.; Cui, L.; Li, M.; Li, J.; Chen, L.; Shen, C.; et al. Deep learning-based automated diagnosis of fungal keratitis with in vivo confocal microscopy images. *Ann. Transl. Med.* 2020, 8, 706.
10. Hung, N.; Kang, E.Y.-C.; Shih, A.G.-Y.; Lin, C.-H.; Kuo, M.T.; Hwang, Y.-S.; Wu, W.-C.; Kuo, C.-F.; Hsiao, C.-H. Using Slit-Lamp Images for Deep Learning-Based Identification of Bacterial and Fungal Keratitis. *Diagnostics* 2021, 11, 1246.

CORNEA

Corneal Transplantation : India's challenges

Dr Gullapalli N Rao



Corneal opacification from a variety of causes constitute one of the major causes of blindness in India with the highest magnitude in the world.

Current estimates suggest that 100,000 corneal transplants are required annually to deal with the magnitude of corneal blindness.

Factors contributing the success of corneal transplantation include

- Quality of donor cornea
- Nature of recipient pathology and
- Surgical and postoperative factors including trained surgeon, infrastructure and postoperative care

It is estimated that around 100,000 transplants are required annually to address the problem of treatable corneal blindness. Against this need, only around 30000 transplants are done annually.

To meet the need optimally, the following are required

- around 100,000 corneal donors

At least 500 well trained corneal surgeons performing transplant procedures actively
More ophthalmologists trained to provide necessary follow up care with availability of

- required medications
- optical correction

Active partnership among cornea specialists, eye bankers, civil society and the government is required to meet all these requirements.

Currently, only a minor fraction of ophthalmologists trained in corneal transplantation are performing these procedures. This has to change. A system has to be created to facilitate greater participation of trained cornea specialists to perform corneal transplantation actively. Making available donor corneas of optimal quality will promote this.

A national plan for eye banking, corneal specialist education, effective and equitable distribution system of all corneas to the surgeons, exposure to the care of corneal transplants for all ophthalmology residents and practitioners are critical for the success of the programme.

A detailed programme for implementation in phases has to be created and implemented rigorously. India has all the potential presents required and what is required now is to move ahead with the implementation of a concerted plan.

Financial disclosures : None

Dr Himanshu Matalia



Acute chemical injuries: pearls in management

Dr Ikeda Lal



“The authors have no relevant financial interests to disclose”

Outline:

1. Introduction and epidemiology
2. Causative agents
3. Pathophysiology
4. Grading of chemical burns
5. Major principles of management
6. Medical management
7. Indication and technique of amniotic membrane graft, tarsorrhaphy (surgical videos and cases)
8. Role of allogenic SLET
9. Algorithm for management

Management will be illustrated with the help of clinical cases and surgical videos.

Key message:

Acute chemical injuries are true ocular emergencies and must be treated as soon as possible. Alkali burns are more severe than acid burns, lime being the most common agent in our country. The severity of injury depends on the chemical and duration of exposure. Therefore, the first dictum here is to quickly rule out an open globe injury and then thoroughly irrigate the ocular surface with the most sterile fluid available. Eversion of upper lid is important to remove any retained chemical. Dua's grading system is useful to determine the extent of damage.

The main goals of management are to re-establish an intact epithelium, control inflammation and monitor intra-ocular pressure (IOP). Medical management includes instillation of steroid eye drops, antibiotic eye drops, cycloplegics when needed along with lubricant eye drops. Chemical injuries of grade 3 and above might require amniotic membrane graft. Tarsorrhaphy helps in epithelial healing and is a very useful procedure in specific cases. In severe burns, complete central tarsorrhaphy may be required. Allogenic SLET (Simple Limbal Epithelial Transplantation) has been described as a useful technique in severe burns (grade 5 and 6) to re-establish an intact epithelial surface.

References

1. Dua HS, King AJ, Joseph A. A new classification of ocular surface burns. *Br J Ophthalmol* 2001;85:1379–83.
2. Tandon R, Gupta N, Kalaivani M, et al. Amniotic membrane transplantation as an adjunct to medical therapy in acute ocular burns. *Br J Ophthalmol* 2011;95:199–204.
3. Iyer G, Srinivasan B, Agarwal S, Tarigopula A. Outcome of allo simple limbal epithelial transplantation (alloSLET) in the early stage of ocular chemical injury. *Br J Ophthalmol*. 2017 Jun;101(6):828–833.
4. Iyer G, Srinivasan B, Agarwal S. Algorithmic approach to management of acute ocular chemical injuries—l's and E's of Management. *Ocul Surf*. 2019 Apr;17(2):179–185.

CORNEA

Dr Jeewan Titiyal



Dr Jnanankar Medhi



Dr John Sarkar





Femto-assisted DMEK

Dr Jod Mehta
Singapore



Deep posterior corneal scarring can be a challenging situation for the corneal surgeon. Conventional treatment often involves full thickness corneal transplantation. In this lecture we will describe a new technique of intraoperative guided femto assisted dmek. The intraoperative guided OCT and the liquid interface allow precise trephination of the posterior lamellar in cases of post DALK posterior scarring. This may be done as a primary procedure or secondary. Outcomes and examples in a series of cases will be illustrated.

Dr Kyongjin Cho
Korea



Dr Manpreet Kaur



CORNEA

Brief Outline of talk in CORNEA Subspecialty Day @ AIOC 2024

Prof Dr M Vanathi

*Prof of Ophthalmology, Cornea & Ocular Surface, Cataract & Refractive Services,
Dr. R P Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India
mvanathi.rpc@gmail.com*



Financial Disclosure: NIL

Keratoconus is the commonly encountered ectasia of the cornea, with bilateral asymmetrical involvement. The challenge in management of keratoconus lies in managing the irregular astigmatism due to the progressive corneal thinning and steeping. The need to evaluate alternate management methods for visual rehabilitation in progressive keratoconus has led to exploring the role of tissue addition keratoplasty in this condition. Described procedures of Tissue addition keratoplasty procedures involving the use of human donor corneal tissue include intrastromal keratoplasty (ISLK), Bowman layer transplantation, corneal allogenic intrastromal ring segment (CAIRS) implantation, and femtosecond intrastromal lenticular implantation (FILI) 1. There seems to be a variable response in the improvement in refractive outcomes that

can be achieved, with enhancement in the biomechanical stability of the cornea. Patients of progressive keratoconus who are either poor candidates or unwilling for contact lens wear or not suitable for corneal collagen crosslinking may be suitable candidates for ISKP. ISKP may be considered as a minimally invasive lamellar keratoplasty technique, with decreased risk of graft rejection and convenient postoperative care. However interface concerns such as epithelial implantation, infection, stromal folds, and quality of vision due to two interfaces remain to be considered. There is a need to standardise the technique, with the depth of lamellar dissection and thickness of the lenticule to be implanted yet to be defined as a standardized protocol in lenticule addition keratoplasty. ISKP is currently heralded as a promising alternative in the progressive keratoconus, providing visual rehabilitation, corneal stability, and improved biomechanics.



Subspecialty Day 2024

CORNEA

Dr Muralidhar Ramappa



Dr Namrata Sharma



Dr N Venkatesh Prajna



Dr Paras Mehta



CORNEA

Positive Pressure and penetrating Keratoplasty

Dr Prabjot Channa, MD



Posterior vitreous pressure (PVP) during penetrating keratoplasty can be difficult to manage and despite adequate preventative measures. Prevention is key and depends on identifying and controlling risk factors that can be modified.

The incidence of PVP is increased in the presence of ocular disorders such as a shallow anterior chamber, iris pathology, zonular instability, open posterior capsule, abnormal location of intraocular lens, aphakia, eyes with poor scleral rigidity like keratoconus, high myopia, short axial length with large crystalline lens. Patient related factors include CHF, COPD, severe obesity, bull neck patients. Other risk factors include external globe compression from incomplete akinesia and extraocular muscle tension, eyelid or eye speculum pressure on the globe, retrobulbar or intraorbital hemorrhage, orbital vascular congestion and increased venous pressure from head below heart, Valsalva maneuver, bucking under light general anesthesia, coughing & sneezing, large volume of intraorbital local anesthetic.

Acute hypotony from aqueous loss during trephination is a set up for PVP. There is a pressure gradient from the vitreous cavity to the anterior chamber causing the vitreous to push anteriorly. Reducing the risks of PVP include minimizing the duration of ocular hypotony during surgery, judicious use of OVD to maintain the anterior chamber, being expeditious when performing surgery, use of topical and systemic aqueous suppressants to reduce IOP and systemic hyperosmotic agents like mannitol, if not contraindicated.

If general anesthesia is used, akinesia should be achieved by deep anesthesia and or muscle paralysis, using non depolarizing agents. If local intraorbital anesthesia is performed injected volume has to be kept in mind to prevent excessive orbital pressure

and proptosis. Use of hyaluronidase to block facilitates infiltration in orbital tissues. Numerous techniques to manage PVP during penetrating keratoplasty have been described. In the Price graft over host technique (1998) the graft is sutured across the trephinated and sutured host cornea which maintains a formed anterior chamber and thus avoid intraoperative complications. An adequate amount of OVD is placed over the host cornea before the donor cornea is placed over it. This technique was used in 33 eyes and no primary or secondary graft failure occurred. In the modified graft over host technique described by Dekaris et al, after partial trephination, the host cornea is covered with a generous amount of OVD and the donor sutured with 4 interrupted sutures at 12,3,6,9 o'clock and a continuous 10-nylon suture is used to close the donor cornea after incising the host, quadrant by quadrant. Once the third quadrant is sutured, the 4 quadrant of the host tissue is incised and the host cornea carefully removed and the remaining quadrant immediately closed.

Other techniques include placing a temporary retaining suture across the anterior chamber, as described by Simcoe in 1979. A modified suture technique, called "Basket" mattress sutures described by Cheung et al in 2020, allowed for a successful PKP in all of the 15 patients.

Another technique describe by McCartney et al for managing positive pressure during pseudophakic keratoplasty involves using a 2.54 cm 27-gauge needle passed across the anterior chamber from limbus to limbus just anterior to the iris to stabilize the IOL, restore chamber depth and allow for donor tissue suturing.

Pars plana vitreous aspiration and pars plana vitrectomy to reduce intraocular pressure preceding triple procedures have also been described.

References

1. Positive vitreous pressure: Pathophysiology, complications, prevention, and management. Argyrios Chronopoulos, MD, Gabriele Thumann, MD, James Schutz, MD. Survey of Ophthalmology 62 (2017)
2. Price graft over host technique to manage positive pressure during penetrating keratoplasty. James C. Loden, MD, Francis W. Price, Jr., MD. JCRS Vol 24, June 1998
3. Incidence, Pathophysiology, complications and management of positive vitreous pressure during penetrating keratoplasty : A literature review, Majed Alkharashi et al. Clinical Ophthalmology, 583-590, DOI 10.2147/oph.S382502
4. "Basket" mattress suture to manage positive vitreous pressure during penetrating keratoplasty. Albert Y. Cheung et al 2020 Canadian Ophthalmological Society
5. Managing Posterior Pressure during Pseudophakic Keratoplasty. David McCartney, MD, John Gottsch, MD, Walter J. Stark, MD. Arch Ophthalmol Vol 107, September 1989
6. Positive Pressure during penetrating keratoplasty can be solved with modified graft-over-host technique. Iva Dekaris et al Acta Ophthalmologica 2014;92:282-285
7. Positive End-Expiratory Pressure as a risk factor for severe positive vitreous Pressure During Combined penetrating keratoplasty and Cataract Extraction, Angelique Pillar et al Cornea. Vol 35, Number 11, November 2016
8. Core vitrectomy preceding triple corneal procedure in patients at high risk for increased posterior chamber pressure. Shimomura Y et al Jpn J Ophthalmol. 1997;41(4)
9. Anterior vitreous tapping to manage positive vitreous pressure during triple procedures. Ophthalmology 2005;112:875-8



Subspecialty Day 2024

CORNEA

Dr Praful Maharana



Dr Prajakta Dandekar



Dr Prashant Garg



CORNEA

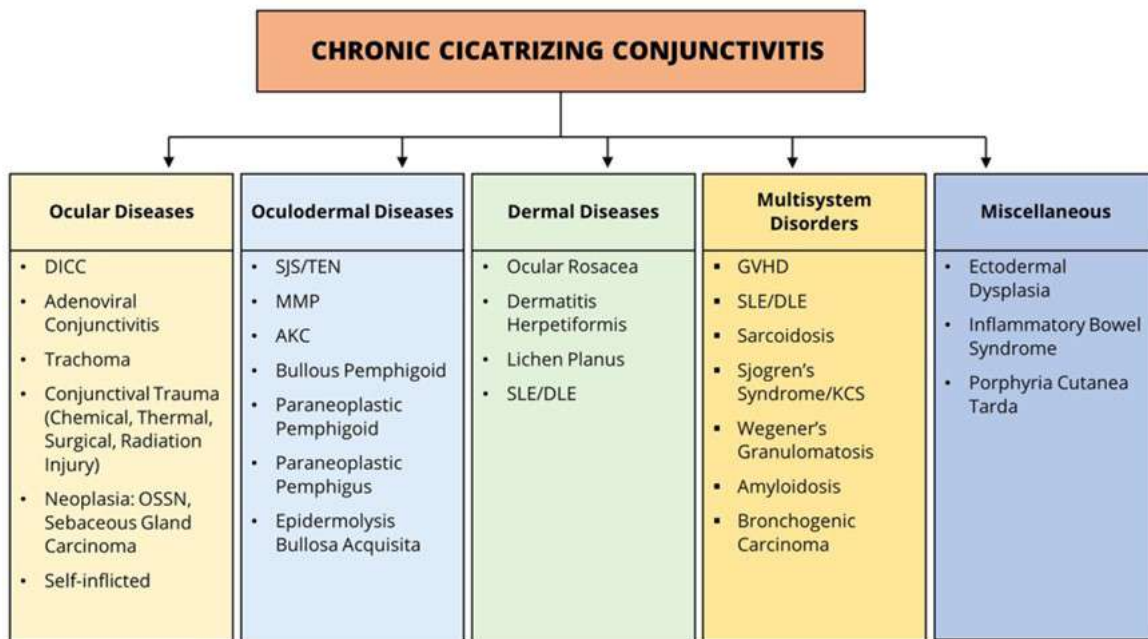
A “CCC” we are not happy about: Chronic Cicatricial Conjunctivitis

*Dr Purvasha Narang (MS, DNB)
Associate Professor, AIIMS, Nagpur*



No financial disclosures

Differential diagnosis of CCC:



Pillars of management:

- Medical management
 - Immunosuppression
 - Collaboration with Internist, Rheumatologist, Dermatologist
 - Supportive Resources- Autologous serum
 - Glaucoma, Oculoplasty & Retina expertise
- Scleral and mini-scleral Contact lenses
- Surgical management
 - AMG
 - MMG

- SLET
- K-Pro
- Tenon Patch Graft

Key take-away Messages:

- It is important to ascertain the cause of CCC.
- Proper documentation at initial presentation, follow up visits for response to therapy.
- Avoid referral diagnosis of SJS for most of the cases and prefer CCC.
- Whenever diagnosis is in doubt- Use scoring systems and perform Conjunctival biopsy.
- A correct & early diagnosis and appropriate treatment initiation can prevent patient from progressing to blinding sequelae.



References

1. Vazirani J, Donthineni PR, Goel S, Sane SS, Mahuvakar S, Narang P, Shanbhag SS, Basu S. Chronic cicatrizing conjunctivitis: A review of the differential diagnosis and an algorithmic approach to management. *Indian J Ophthalmol.* 2020 Nov;68(11):2349-2355. doi: 10.4103/ijo.IJO_604_20.
2. Shanbhag SS, Chanda S, Donthineni PR, Basu S et al. *Br J Ophthalmol* doi:10.1136/bjophthalmol-2019-314928
3. Jain, N; Jakati, S†; Shanbhag, S; Basu, Sayan‡. Direct Immunofluorescence Findings and Factors Affecting Conjunctival Biopsy Positivity in Ocular Mucous Membrane Pemphigoid. *Cornea* ():10.1097/ICO.0000000000003382, Oct 2023.
4. Ong HS, Setterfield JF, Minassian DC, Dart JK; Mucous Membrane Pemphigoid Study Group 2009–2014. Mucous Membrane Pemphigoid with Ocular Involvement: The Clinical Phenotype and Its Relationship to Direct Immunofluorescence Findings. *Ophthalmology.* 2018 Apr;125(4):496-504
5. Shanbhag SS, Chanda S, Donthineni PR, Sane SS, Priyadarshini SR, Basu S. Clinical clues predictive of Stevens-Johnson syndrome as the cause of chronic cicatrizing conjunctivitis. *Br J Ophthalmol.* 2020 Jul;104(7):1005-1009. doi: 10.1136/bjophthalmol-2019-314928.

CORNEA

The Art and Science of Conjunctivoplasty

Dr Quresh B. Maskati



It seems strange, almost anachronistic to talk about a surgical procedure, which is many decades old; which does not require any expensive gadgets; which does not have a steep learning curve; yet which can restore comfort to thousands of our patients. Conjunctivoplasty or Gunderson's Hood surgery however, has fallen out of favour and is now hardly performed in teaching institutions. Thus recently qualified eye surgeons venturing into private or hospital practice have rarely seen this surgery performed and are unaware of its benefits. I firmly believe it has a definite place in modern ophthalmic practice.

It is indicated in patients with bullous keratopathy to provide pain relief, in impending corneal perforations when donor cornea tissue is not immediately available, in non healing ulcers due to any cause to buy time. If the patient has visual potential, the limbal stem cells are spared during the procedure. If there is no perception of light, the peritomy can be done at limbus itself.

There are some tips to ensure a perfect result:

1. Always have a good assistant who holds up two ends of the conjunctiva approximately one clock hour apart with 2 good non toothed forceps, pulling the conjunctiva a little away from the limbus and towards the sky. Then you as the surgeon can dissect all the sub conjunctival tissue away from the conjunctiva he is holding up and excise it, taking care not to injure the 6 extra-ocular muscles. Excision is important as mere dissection will result in retraction later.
2. Take care not to breach the orbital septum as you will then have orbital fat herniation through and post-op a narrow palpebral fissure
3. Be gentle with the dissection under the conjunctiva to avoid button-holing. However, if it does occur, pause and suture the button hole with one or more 7/0 polyglactin sutures

4. Go around all 12 clock hours with the assistant dropping the conjunctiva after your dissection and then picking up two ends again at the next clock hour. The orbital septum is closer to limbus at the lower fornix area so dissect less at 6 o'clock area.
5. Once you have finished one round, try and spread the upper conjunctiva over the cornea. It should cover 2/3rd of the cornea without any tension, with the speculum still in the eye. If it does not, repeat one more round. You will be surprised how much additional sub conjunctival tissue you will still find for removal. In your first few cases you may have to repeat 2-3 rounds before the upper conjunctiva can be spread easily over the cornea
6. Scrape off all the epithelium from the cornea. If patient was very symptomatic, in a bullous keratopathy case, you can do multiple anterior stromal punctures as well, all over the cornea.
7. Make 2 lamellar grooves at 4 and 8 o'clock positions in the sclera -3 mm away from limbus with a BP knife and suture the upper conjunctiva to these grooves by a mattress 6/0 polyglactin suture
8. Pull the inferior cut edge of the conjunctiva upward and suture to the upper conjunctiva with 8/0 polyglactin sutures from 4-8 o'clock taking interrupted sutures fairly close to each other.
9. At the end of the surgery, the conjunctiva should have covered the entire cornea with no tension with the speculum still inside with no shallowing of the fornices. In conclusion, if you take care of these surgical nuances, you will have a long lasting conjunctivoplasty in place with a symptom free patient with no retraction and deep fornices and a normal palpebral fissure. The cosmetic appearance is not bad either as the conjunctiva you have pulled over is very thin and in spite of the blood vessels, semi-transparent. In eyes with visual potential, you can even do a penetrating keratoplasty later after scraping off the conjunctival flap!

Dr Radhika Natarajan



Dr Radhika Tandon





DMEK in Complex Situations

Dr Rajesh Fogla



Descemet Membrane Endothelial Keratoplasty ie DMEK, is currently the preferred technique of endothelial keratoplasty worldwide among corneal surgeons, due to the advantage of faster visual recovery and lower risk of endothelial rejection. Successful implantation of donor DM scroll in DMEK requires a relatively clear cornea for good visualization, and normal anterior segment anatomy to unfold donor DM using no touch technique.

DMEK can also be performed in complex scenarios associated with corneal oedema such CHED, aphakia, fixed dilated pupil, shallow anterior chamber with peripheral

synechiae, post trabeculectomy / tube shunts, deep anterior chamber, etc. This would require some modifications in routine surgical techniques, along with additional procedures such as indirect illumination using a light pipe to improve visibility of donor DM, secondary IOL implantation to create a barrier at pupillary plane, pupilloplasty to reconstruct iris plane, endothelial in technique of donor insertion to maintain correct orientation of donor DM, air bubble assisted unfolding in eyes with deep anterior chamber etc for successful completion of DMEK surgery. This presentation will cover all these scenarios using surgical videos for better understanding.

Dr Rajesh Sinha



Dr Rishi Swarup



Dr Samar Basak



Microbial keratitis: Is it fungal or Pythium?

Clinical score for diagnosis to make us smarter



Dr Samrat Chatterjee

Cornea & Anterior Segment Services, MGM Eye Institute

Financial interest: Nil

Fungal keratitis can clinically resemble Pythium keratitis both morphologically and also during direct microscopy evaluation of corneal scrapings.^[1,2] Experienced microbiologists frequently confuse the aseptate or sparsely septate filaments of Pythium insidiosum with hyaline filamentous fungi.^[3] Culture findings or molecular analysis gives a definitive diagnosis.^[1,3] When microbiological findings are ambiguous, negative, or delayed, the clinical history, risk factors and morphological features of the keratitis can help in diagnosis. A delay in diagnosis for Pythium keratitis can have poor outcome.

Morphological features that are typical of fungal keratitis are:^[4]

- Dry surface: Dry looking surface of a greyish white ulcer.
- Feathery margins: distinct fine, linear lines in the corneal stroma radiating from the ulcer margins giving it a typical fuzzy appearance.
- Plaques: non-pigmented or pigmented dry-raised slough
- Satellite lesions: Round, infiltrates away from the main body of ulcer.
- Ring infiltrates: Ring-shaped stromal infiltrates
- Other signs: Endothelial exudates (thick yellow exudates adhered to the back of the cornea)

Morphological features that are presumed to be typical of Pythium keratitis are:^[1,2]

- Tentacles: Tentacles are thicker and longer than hyphae, which radiates from the ulcer margins.
- Reticular pattern: A reticular pattern consists of a network of linear and dot-like stromal opacities, in the subepithelial or superficial corneal stroma radiating from the ulcer margin.
- Intra-stromal dots: Intra-stromal dots were pinhead sized stromal lesions
- Peripheral furrow: A furrow is a groove in the corneal stroma present at the periphery of the ulcer.

However, a retrospective review showed that there was considerable overlap of clinical features between the two entities.^[5] Hence, a scoring system was devised, that included (1) tentacles, (2) intra-stromal dots, (3) ring-shaped infiltrate, (4) reticular pattern, and (5) furrow at ulcer periphery. Each of these signs are assigned a score of 1.^[5] The sensitivity and 1-specificity (false positive) of the aggregate score are:

Total score	Sensitivity	1-specificity
1	0.852	0.116
2	0.556	0.014
3	0.222	0.000
4 or more	≤0.074	0.000

The probability of erroneously diagnosing Pythium keratitis in the presence of one sign (score 1+) is approximately 11.6%, and reduces to 1.4% if two signs (score 2+) are present.^[5] This should have sufficient power to guide treating ophthalmologists to change treatment course, or re-investigate. In a community-based eye care facility lacking a microbiology laboratory, a significant score will alert the primary eye care worker to timely refer the patient to a higher centre for a microbiology work-up, and thus avoid any delay in diagnosis and treatment. In secondary of tertiary care setting, ophthalmologists will be able to alert microbiologists, and forewarned, the latter may specifically look for signs suggestive of Pythium insidiosum during direct microscopic examination of slides from corneal scrapings.

References

1. Dua HS, King AJ, Joseph A. A new classification of ocular surface burns. Br J Ophthalmol 2001;85:1379–83.
2. Tandon R, Gupta N, Kalaivani M, et al. Amniotic membrane transplantation as an adjunct to medical therapy in acute ocular burns. Br J Ophthalmol 2011;95:199–204.
3. Iyer G, Srinivasan B, Agarwal S, Tarigopula A. Outcome of allo simple limbal epithelial transplantation (alloSLET) in the early stage of ocular chemical injury. Br J Ophthalmol. 2017 Jun;101(6):828–833.
4. Iyer G, Srinivasan B, Agarwal S. Algorithmic approach to management of acute ocular chemical injuries—l's and E's of Management. Ocul Surf. 2019 Apr;17(2):179–185.



Subspecialty Day 2024

CORNEA

Dr Savitri Sharma



Dr Sayan Basu



CORNEA

Dry eye diagnosis: a novel approach

Dr Shizuka Koh
Japan



Financial disclosure: Alcon: L, Bausch + Lomb: L, Cooper Vision: L, J&J: L, Menicon: L, Nikon: L, Novartis: L, Oculus: C, L, Ophtecs: L, Otsuka: L, Rohto: L, Santen: L, SEED: F, L, Senju: L

Based on the changes in the understanding of the types, symptoms, and signs of dry eye disease, Asia Dry Eye Society (ADES) proposed new perspective on dry eye. Dry eye definition by ADES is; dry eye is a multifactorial disease characterized by unstable tear film causing a variety of symptoms and/or visual impairment, potentially accompanied by ocular surface damage. ADES categorizes dry eye into three types; aqueous deficient dry eye, decreased wettability dry eye, and increased evaporation dry eye based on the tear film abnormality or epithelial surface abnormality. Each type has insufficient component; aqueous deficient dry eye (aqueous), decreased wettability dry eye (membrane associated mucin), and increased evaporation dry eye (lipid). According to the ADES, dry eye can be diagnosed by the combination of symptoms and unstable tear

film. Actually, it is highly dependent on “tear film stability”. With a simple tool, use of fluorescein, we can diagnose dry eye.

In this presentation, a diagnostic method to suggest the insufficient components of ocular surface is introduced with movies. Based on the fluorescein breakup pattern, we can classify the dry eyes. The basic of fluorescein technique, an essential first step in ocular surface exam will be revisited. I hope this will be useful for your practice tomorrow.

TAKE HOME MESSAGES

- Proper dry eye diagnosis is important to maximize patient satisfaction.
- Just a paper strip of fluorescein helps the dry eye diagnosis.

References

1. Tsubota, et al. New Perspectives on Dry Eye Definition and Diagnosis: A Consensus Report by the Asia Dry Eye Society. *Ocul Surf.* 2017 15:65-76, 2017
2. Tsubota, et al. A New Perspective on Dry Eye Classification: Proposal by the Asia Dry Eye Society. *Eye Contact Lens.* 46 Suppl 1:S2-S13, 2020
3. Yokoi, et al Classification of Fluorescein Breakup Patterns: A Novel Method of Differential Diagnosis for Dry Eye. *Am J Ophthalmol.*180:72-85, 2017



Intraocular lens management in PK surgery

*Dr Sonal Tuli, MD, Med
USA*



Ensuring optimal visual outcomes for patients who are undergoing cataract surgery either in conjunction with or following penetrating keratoplasty presents unique challenges. Preoperative measurements can be complicated by irregular corneal surfaces and changes in corneal power post-operatively. Choice of intraocular lens depends on various factors such as visual requirements, contact lens use, and comorbidities in that eye as well as the status of the other eye. The decision of whether to perform simultaneous or sequential corneal and cataract surgery depends on various factors including the status of the existing cornea and patient preference.

Intraoperatively, various techniques can be used to assess and refine the intraocular power. In addition, astigmatism management strategies including corneal and lens options can minimize postoperative astigmatism and improve postoperative visual quality. Newer lenses may optimize outcomes by allowing the surgeon to perform postoperative adjustment. Another option is to perform refractive surgery after cataract surgery.

In conclusion, effective IOL management in PK surgery requires a personalized approach and carefully addressing the refractive needs of the patient.

Take home points:

- A careful discussion with patients is essential to determine their visual requirements and needs instead of a one size fits all approach
- There are several options for mitigation of the astigmatic and ametropic outcomes during and after cataract surgery including compression sutures, relaxing incisions, refractive surgery, and adjustable lenses

References

1. Nguyen DQ, Mumford LL, Jones MN, Armitage WJ, Cook SD, Kaye SB, Tole DM. The visual and refractive outcomes of combined and sequential penetrating keratoplasty, cataract extraction, and intraocular lens insertion. *Eye (Lond)*. 2009 Jun;23(6):1295-301.
2. Bineshfar N, Tahvildari A, Feizi S. Management of post-keratoplasty ametropia. *Ther Adv Ophthalmol*. 2023 Oct 16;15:25158414231204717.
3. Moreno-Martínez A, Martín-Melero O, Andrés-Pretel F, Gómez-Cortés A, Granados-Centeno JM. Outcomes of Phacoemulsification With Toric Intraocular Lenses in Addressing Postkeratoplasty Astigmatism. *Cornea*. 2024 Jan 1;43(1):76-82.

Dr Suchi Smitha



Dr Sujata Das



CORNEA

Surgical Management of Stromal Dystrophies- Algorithmic approach

Dr Sunita Chaurasia



The most seen corneal stromal dystrophies are the Epithelial-Stromal TGFβ1 dystrophies and Macular corneal dystrophy.^{1,2} The epithelial-stromal corneal dystrophies include Reis-Buckler Corneal Dystrophy, Theil-Behnke Corneal dystrophy, lattice corneal dystrophy, Granular Corneal Dystrophy type 1 and granular corneal dystrophy type 2. There are phenotypic variations in the clinical presentation of each of these dystrophies.³⁻⁵ Hence, there are diverse methods of management that are guided primarily by the predominant level of involvement of the deposits. The various strategies in the management are phototherapeutic keratectomy (PTK), alcohol kerato-epithellectomy (AKE), femtosecond anterior lamellar keratoplasty (ALK),

hemi-ALK, deep anterior lamellar keratoplasty (DALK- big bubble/manual) and penetrating keratoplasty (PK). The stromal dystrophies recur at different rates with a diversity in the recurrence patterns, that varies with the surgical management and the underlying genetic mutation. The decision making on the type of ideal intervention is guided by parameters such as age at intervention, primary versus secondary intervention, pachymetry and genetic test results. The purpose of the presentation is to highlight the importance of precision medicine-based approach in future over the current conventional trial and error method of management.

References

1. Weiss JS, Møller HU, Aldave AJ, Seitz B, Bredrup C, Kivelä T, Munier FL, Rapuano CJ, Nischal KK, Kim EK, Sutphin J, Busin M, Labbé A, Kenyon KR, Kinoshita S, Lisch W. IC3D classification of corneal dystrophies--edition 2. *Cornea*. 2015;34(2):117-59.
2. Das AV, Chaurasia S. Clinical Profile and Demographic Distribution of Corneal Dystrophies in India: A Study of 4198 Patients. *Cornea*. 2021;40(5):548-553.
3. Chaurasia S, Mishra DK, Murthy S, Das R, Edward DP, Ramappa M. Clinical and Optical Coherence Tomography Correlation of Recurrence Patterns After Femtosecond Laser-Assisted Anterior Lamellar Keratoplasty in Reis-Bucklers Corneal Dystrophy. *Cornea*. 2023 Sep 14.
4. Chaurasia S, Ramappa M, Mishra DK. Clinical diversity in macular corneal dystrophy: an optical coherence tomography study. *Int Ophthalmol*. 2019;39(12):2883-2888.
5. Chaurasia S, Mishra DK. Atypical presentation of macular corneal dystrophy managed by Descemet stripping endothelial keratoplasty. *Indian J Ophthalmol*. 2019;67(1):118-119.



Double to trouble: Infections in Ocular Surface Disease

Dr Sushmita G Shah



Financial Disclosures: Nil

Infections in the setting of Ocular Surface Disease (OSD) are challenging due to a pre-existing abnormal ocular surface, altered ocular surface milieu, presence of systemic disease, use of systemic medications and other external factors. Contact lens wear, trichiasis and use of topical steroids are considered as significant pre-disposing factors.

Etiopathogenesis

1. Breakdown of epithelial barrier – alteration in innate immunity
2. Reduction in protective tear proteins due to qualitative & quantitative alterations in tear film

Both events lead to increased risk of microbial colonization on the ocular surface.

Commonest organisms

1. Gram positive bacteria – most commonly Coagulase negative Staphylococci (CoNS) and other Staphylococcal spp.
2. Herpes simplex virus
3. Chlamydia
4. Mycobacterium
5. Polymicrobial

Management

1. Corneal scraping and treatment based on microbiology and antibiogram. Microbiological evaluation will be helpful in differentiating infective from non-infective corneal ulcers. Microbial keratitis due to gram positive bacteria can be treated by monotherapy with fourth generation or as per culture and sensitivity reports. In polymicrobial infections, multiple antibiotic agents may be required. Patients should be kept under close observation to monitor clinical response and treat complications early. It is preferable to use preservative free formulations.
2. Treatment and adequate control of systemic disease, in consultation with the physician, should be done to obtain quick response to ocular disease.
3. Adequate preservative free lubrication BAK, preservative present in most lubricants and antibiotic formulations have deleterious effect on the ocular surface.
4. Management of complications which include, non-healing epithelial defect, stromal melt, corneal perforation etc. Autologous serum drops are useful in achieving healing of epithelial defects as also surgical modalities like tarsorrhaphy. Systemic doxycycline therapy may help in reducing stromal melts. Corneal perforation or excessive thinning may be managed by application of cyanoacrylate glue, amniotic membrane grafting, tenon patch graft etc

References

1. Narayanan S, Redfern RL, Miller WL, Nichols KK, McDermott AM. Dry eye disease and microbial keratitis: is there a connection? *Ocul Surf*. 2013 Apr;11(2):75-92.
2. Khoo P, Cabrera-Aguas M, Robaei D, Lahra MM, Watson S. Microbial Keratitis and Ocular Surface Disease: A 5-Year Study of the Microbiology, Risk Factors and Clinical Outcomes in Sydney, Australia. *Curr Eye Res*. 2019 Nov;44(11):1195-1202.
3. Kate A, Deshmukh R, Donthinani PR, Sharma N, Vajpayee RB, Basu S. Management of corneal perforations in dry eye disease: Preferred practice pattern guidelines. *Indian J Ophthalmol*. 2023 Apr;71(4):1373-1381.

CORNEA

Dr Tuhin Chowdhury



Dr Varsha Rathi



Dr Vineet Joshi



Dr Virender Sangwan





Dr Vishal Jhanji
USA



Post Refractive Surgery Keratitis

Refractive surgery requires a high level of precision to meet outcome expectations of patients. Keratitis occurring after refractive surgery can delay visual recovery and can be devastating. The reported incidence of infectious keratitis is between 0% and 1.5%. Staphylococci, streptococci, and mycobacteria are the common etiological organisms. Laboratory identification of the organism is important. In addition to medical management, interface irrigation, flap amputation, collagen cross-linking and therapeutic keratoplasty are used for such cases.

Advances in Dry Eye Imaging

New advances in imaging allow objective measurements for dry eye as well as define new parameters that cannot be measured by clinical assessment alone. A combination of these modalities provides important information on the properties of the structural and functional parameters in dry eyes. Newer modalities for dry eye imaging included non-invasive tear breakup time, optical coherence tomography, meibomian gland imaging, interferometry, and in vivo confocal microscopy.

Triple vs staged procedure: revisiting the debate

Patients with corneal endothelial disease are at risk for developing cataract as their corneal disease worsens. If the patients need both cataract and corneal surgery, what is the best treatment approach: a staged procedure of cataract removal with IOL implantation followed later by endothelial keratoplasty, or a triple procedure that combines all three steps? The decision needs to be tailored for each patient based on factors such as age, corneal clarity and need for faster visual rehabilitation.

What is different about post-LASIK ectasia?

Post-refractive surgery corneal ectasia is one of the rare, yet potentially devastating complications encountered after refractive surgery including laser in situ keratomileusis (LASIK) and photorefractive keratectomy (PRK). It is characterized by a progressive increase in myopia, with or without increasing astigmatism. Management options include contact lenses, collagen cross linking and rarely corneal transplantation.

Dr Uma Sridhar



