

Two Truths and a Lie

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Course Description

Eye care has come a long way, but there are still some myths that continue to influence the way that we take care of our patients. Two Truths and a Lie is a case-based presentation to discuss these "myths" regarding anterior segment eye disease and ways to avoid the pitfalls of following old treatment patterns. In this interactive course, the faculty will debate and demonstrate new ways to address common findings in our practices every day.

Learning Objectives

1. Understand the differential diagnosis of TED

2. Learn novel treatment options for TED
3. Obtain knowledge about the natural course of EKC
4. Understand management strategies for herpetic keratitis
5. Obtain knowledge of the herpetic eye disease study
6. Learn diagnostic testing for neurotrophic keratitis including how to measure corneal sensitivity
7. Recognize how to manage complex presentations with illustrative patient cases

Outline

Thyroid Eye Disease (TED)

1. Case-Patient presents with swollen lids
2. Differential Diagnosis of TED
3. Review Thyroid Dysfunction
 - Hyperthyroidism
 - i. Grave's Disease
 1. Review pathophysiology
 2. Role of orbital fibroblasts by autoantibodies, which leads to orbital inflammation early on in the disease and subsequent fibrosis.
 - b. Hypothyroidism
 - i. Hashimoto's
 - c. TED
 - i. Pathophysiology
 - ii. Incidence
 - iii. Signs and Symptoms
 1. Dry Eye
 2. Exposure /Proptosis
 3. Lid Retraction/Lagophthalmos
 4. Blink Dynamics/Frictional Forces
 5. Ocular Inflammation
 6. Autoimmune Conditions
 7. Optic Nerve Compression
 8. Inflammation and fibrosis inside a confined space
 9. Diplopia
 10. EOM infiltration, Inflammation, and Fibrosis
 - iv. Current Clinical Outcomes
 1. Rundle's Curve
 - v. Historic Treatments-The lie "Wait and watch."
 1. RAI Therapy
 2. Medications
 3. Surgery
 - a. Orbital decompression
 - b. Lid retraction

- 4. Thyroid supplementation
- 5. Orbital Radiation
- vi. Smoking

- 2. Case Presentation
 - a. Photos, MRI, CT's and other supporting documentation
 - b. Current treatment for TED focuses primarily on supportive and palliative care and includes ocular lubrication, prism glasses for diplopia and lifestyle modifications, such as smoking cessation, selenium and vitamin D supplementation and systemic thyroid disease control.
 - c. Once a patient is in the stable phase, some undergo surgical intervention, including orbital decompression, strabismus surgery and eyelid reconstruction.
 - d. Urgent surgery is reserved for severe situations involving compressive optic neuropathy or extensive corneal exposure.
- 3. New Treatment Options-Research revealed a signaling pathway that involves activation of insulin-like growth factor 1
 - a. Receptors (IGF-1R) in patients with Graves' disease.
 - b. This pathway acts synergistically with thyroid-stimulating hormone receptors and enhances the mechanism of action, increasing orbital tissue inflammation.
 - c. By blocking the IGF-1R, the actions of IGF-1 are inhibited and the inflammatory and proliferative process associated with Graves' ophthalmopathy may be diminished.
 - d. Blood tests to order -The Other Lie
- 4. Developing Interdisciplinary Relationships and Bridging Patient Care with Co-management of patients with TED
- 5. Epidemic Keratoconjunctivitis (EKC)
 - a. Definition
 - i. Adenoviral infection
 - ii. Peripheral lymph adenopathy (PAN)
 - iii. Redness
 - iv. Chemosis
 - v. Photophobia
 - vi. Sub-epithelial infiltrates
 - b. Prevalence
 - c. Natural course of the disease
 - i. Pre-existing respiratory infection
 - ii. 3-5 day incubation period
 - iii. Starts monocularly moves to other eye within 24-48 hours
 - d. Myth: Treat these patients with artificial tears and send them on their way
 - e. Treatments

- i. Early intervention is key
 - ii. Zirgan
 - iii. Betadine
 - 1. Melton/Thomas protocol
 - iv. Combination Therapy
 - v. Povidone iodine topical therapy
 - vi. Tacrolimus for SEIs
 - f. Long term complications
- 6. Case Presentation
 - a. 42 year old female reports to clinic for worsening red eye left eye more than right eye,
 - i. Started 5 days ago for left eye
 - ii. 4 days ago for right eye
 - iii. Red, gritty, scratchy, feels like something is under her eyes
 - iv. Started getting sore throat, swollen lids
 - v. Went to urgent care for treatment
 - 1. Told it was allergic conjunctivitis
 - vi. Rx for Zerviate, never filled
 - vii. Told to substitute Pataday, bought it, but never used
 - b. Contact lens wearer (-10.00D sphere OU)
 - c. VAs in glasses (2 years old), OD 20/30, OS 20/30
 - d. Slit lamp examination
 - e. Lids: swelling with mild tenderness
 - f. Bulbar Conj: Diffuse injection with chemosis, small patchy hemorrhages scattered OU
 - g. Palpebral conj
 - i. OD- diffuse injection, small raised area inferior central with slight ridge
 - ii. OS- large pseudomembrane with elevation and fibrosis
 - h. Cornea: 2+ SPK OU, small linear staining at inferior limbus OS
 - i. Picture appears to be dendritic
 - ii. On blink, lesion moves denoting fibrosis
 - i. Diagnosis: Hemorrhagic EKC with pseudomembranes
 - j. Treatment:
 - k. Zylet q2h OU
 - l. Zirgan 5x/day OU
 - m. Day 1-5:
 - i. Pseudomembranes recede OD>OS

- ii. While receding OS membrane breaks into 2 smaller membranes with elevation that causes sensations nasal and temporal
 - iii. Continue Zylet q2h OU
 - n. Day 6: Breaking of pseudomembrane
 - o. “Oh, I’m heading on a cruise x 10 days leaving on Monday and I need to be able to wear my contact lenses” - THIS IS THE REAL EMERGENCY
- 7. Herpes simplex virus (HSV) Keratitis
 - a. Symptoms – Pain, red eye, photophobia, tearing, decrease vision, skin lesion, previous episodes
 - b. Signs
 - i. Eyelids – clear vesicles the crust then heal without scarring
 - ii. Conjunctivitis
 - iii. Keratitis
 - 1. Dendritic
 - 2. Stromal
 - 3. Neurotrophic ulcer
 - iv. Uveitis
 - v. Retinitis
 - c. Differentials – Herpes zoster virus, recurrent corneal erosion, acanthamoeba keratitis, vaccinia keratitis
 - d. Herpetic Eye Disease Study
 - e. Treatment
 - i. Eyelid – topical antiviral ointment, warm compress
 - ii. Conjunctivitis – Antiviral drops
 - iii. Epithelial
 - 1. Antiviral drops, consider debridement, cycloplege for pain
 - iv. Stromal
 - 1. Cycloplege, Topical steroid, topical or oral antiviral
 - 2. Consider antibiotic with epi defect
 - 3. Aqueous suppressant for increase IOP
 - v. Necrotizing IK
 - 1. Treat defect and infection / consider surgical options
 - f. Case example
- 8. Neurotrophic keratitis (NK) definition
 - a. Degenerative disease
 - b. Corneal sensitivity reduction
 - c. Spontaneous epithelium breakdown
 - d. Impaired corneal healing
 - e. Development of corneal ulceration, melting, and perforation
- 9. Etiology of NK
 - a. Herpetic eye disease (zoster and simplex) diabetes, ophthalmic procedures, neurosurgical procedures, dry eye disease, ocular surface injury /

inflammation, topical drug toxicity (such as BAK), topical anesthetic abuse, stroke, systemic medications, chemical and physical burns, contact lens abuse, topical drug toxicity, irradiation to eye or adnexa

- b. Ocular surgery
 - i. Laser in situ keratomileusis
 - ii. Photorefractive keratectomy
 - iii. Corneal transplantation surgery may cause corneal denervation
 - iv. Penetrating keratoplasty (PK)
 - v. Deep anterior lamellar keratoplasty (DALK)

10. Pathophysiology of NK

- a. Cornea histological alterations
 - i. Thinning/disruption of the epithelial layer
 - ii. Cytoplasmic swelling of epithelial cells
 - iii. Loss of microvilli
 - iv. Disorganization of Bowman's membrane
 - v. Stromal melting/scarring
 - vi. Corneal neovascularization

11. Trigeminal nerves and NK

- a. Provides corneal sensation
- b. Supplies trophic factors
- c. Plays key role to maintain anatomical integrity and function of the ocular surface
- d. Impairment of corneal trigeminal innervation causes morphological and metabolic epithelial disturbances and leads to development of recurrent or persistent epithelial defects
- e. Common mechanism of trigeminal damage in several causes of NK

12. Diagnosis of NK

- a. Clinical ocular and systemic history
- b. Complete eye examination
- c. Assessment of corneal sensitivity
 - i. Cotton swab
 - ii. Corneal aesthesiometer
 - 1. Cochet-Bonnet contact aesthesiometer
 - 2. CRCERT-Belmonte non-contact aesthesiometer
 - iii. Dental floss
 - iv. Eye drops should be applied after testing corneal sensitivity
- d. Corneal staining
 - i. Sodium fluorescein, lissamine green or rose Bengal
- e. Schirmer test
- f. Corneal scrapings and cultures if needed to rule out bacterial, viral, fungal or parasitic infections. These may be associated with reduced corneal sensitivity
- g. In vivo confocal microscopy
- h. Mackie classification - classified according to severity of corneal damage

- i. Stage I - epithelial alterations
 - 1. Hyperplasia and/or irregularity of the epithelium
 - 2. Punctate keratopathy
 - 3. Corneal edema
 - 4. Neovascularization
 - 5. Stromal scarring
- ii. Stage II - a recurrent or persistent epithelial defect (PED)
 - 1. Most common superior half of the cornea
 - 2. Typically, oval in shape
 - 3. Margins are smooth and rolled due to impaired epithelial healing
- iii. Stage III – corneal ulcer
 - 1. Stromal involvement
 - 2. Melting
 - 3. Perforation

13. Management of NK

- a. Goal is to promote corneal healing and avoid complications
 - i. Preservative free eye drops, gels and ointments
 - ii. Treat ocular surface diseases (dry eye, blepharitis, exposure keratitis, limbal stem cell deficiency)
- b. Stage based approach
 - i. Stage 1 - Punctate keratopathy
 - 1. Goal - Avoid epithelial breakdown
 - 2. Treatment
 - a. Frequent use of preservative free artificial tears
 - b. Lubricant ointment
 - c. Autologous serum
 - d. Therapeutic soft contact lens
 - ii. Stage II – PED
 - 1. Goal - Promote PED healing and prevent the development of a corneal ulcer
 - 2. Treatment includes all of the above for stage I
 - a. Patching/tape tarsorrhaphy
 - b. Amniotic membrane grafting
 - c. Tarsorrhaphy, gold weight, or botulinum induced ptosis
 - d. Topical Nerve Growth Factor
 - e. Scleral lens
 - f. Antibiotic eye drops to prevent bacterial infections
 - g. Caution with topical corticosteroids. May could induce stromal melting.
 - iii. Stage III – Corneal ulcer
 - 1. Treatment includes all of the above for stages I and II

- a. If stromal melt, N-acetylcysteine, oral tetracycline and medroxyprogesterone

iv. Surgical options

1. Corneal neurotization

- a. transfers the supraorbital or supratrochlear nerve to either directly or indirectly with a nerve graft to the neurotrophic cornea

2. Amniotic membrane transplantation

3. Conjunctival flap

14. Clinical case of 74-year-old Hispanic male

- a. Urgent appointment for sudden onset of vision changes
- b. Longstanding history of diabetes under control
- c. Surgical history
 - i. Cataract surgery both eyes one year prior
 - ii. Epiretinal membrane surgery left eyes
- d. Dry eyes both eyes
- e. Diagnosis and treatment