

Front to Back and Everything In Between: Keratoconus and Cross Linking

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Overview

Keratoconus, a progressive, bilateral and asymmetric disease of the cornea was reported in the literature by Yaron Rabinowitz, MD to affect approximately 1:2000 people. This report was published in 1998. All before any type of commercially available devices to image and assess the posterior aspect of the cornea was in use.

Fast forward to 2020!

As corneal refractive surgeries such as LASIK and PRK have thrived since the initial Rabinowitz study, there has also been steadily increasing rates diagnosing keratoconus and other corneal ectatic diseases. Current estimates on the incidence of the disease have been made to be somewhere in the range of 1:500-1:750. This more than doubles the incidence of the disease that until recently had no treatment to halt its progression. Contact lenses are an option to improve quality of vision but not stop progression and corneal transplant is a last resort treatment with high risk. Now a treatment to halt one of the most commonly diagnosed corneal diseases by eye care providers is FDA approved. Corneal Collagen Cross Linking (CXL) is a booming procedure in the United States through FDA approved. It is imperative that Optometrists have current understanding of the family of ectatic diseases, best methods of diagnosis, pre CXL treatment of keratoconus, referral for CXL treatment.

Description

This lecture will focus on all of the most current information from around the world on corneal shape, keratoconus and CXL. Most importantly, it will highlight the detection of corneal ectatic disease by examining and evaluating the elevation, shape and risk factors of the posterior aspect of the cornea using advanced Scheimpflug technology.

Objectives

1. Review of anatomy of the cornea
2. Review of the physiology of the cornea
3. Define the disease of Keratoconus according to the Global Consensus Ectasia Panel
4. Discuss elevation mapping
5. Discuss corneal biomechanics
6. Review and discuss current surgical and non-surgical treatments including contact lenses

Course outline

- I. Clinical presentations of keratoconus (KC) patients

- a. Natural Course of History
 - b. Pathogenesis
 - c. Classic challenges in KC management
 - d. Signs and symptoms
 - i. Impact of early detection
 - ii. Early vs. late signs of KC
 - e. Early detection and other diagnostic methodologies
 - i. Elevation-based tomography
 - ii. Corneal biomechanics
 - f. Corneal ectasia post refractive surgery
 - i. Diagnosis
 - ii. Why does the disease occur?
 - iii. Normative pre-operative data
 - iv. Management
- II. Overview of Diagnostic methodologies: Past, Present and Future
- a. High Tech Vs. Low Tech Detection Modalities
 - i. Classic biomicroscopic signs
 - ii. Manual keratometry
 - iii. Placido-Based topography
 - iv. Elevation-Based tomography
 - 1. Anterior elevation
 - 2. Posterior elevation
 - 3. Best fit sphere
 - 4. Elevation vs. curvature
 - 5.
 - v. Pachymetry
 - 1. Distribution of pachymetry
 - 2. Central pachymetry
 - 3. Belin Ambrosio Display and analysis
 - 4.
 - vi. Wavefront sensing aberrometer
 - vii. Corneal biomechanical measurements
- III. Medical/Surgical Treatment Modalities
- a. Corneal Collagen Crosslinking(CXL)
 - i. Mechanism of actions
 - ii. Patient selection criteria

- iii. Treatment goal(s)
- iv. FDA Status
- v. New clinical investigations on CXL
 1. Transepithelial delivery
 - a. Glaukos
 - b. Epion Therapeutics
 2. Accelerated CXL
 3. CXL combined with adjunct procedures

b. IntraCorneal Ring Segments

- i. Mechanisms of action
- ii. Patient Selection Criteria
- iii. Treatment goal(s)
- iv. Current and future trends
 1. Femtosecond laser application
 2. Segment parameters

c. Topography-Guided Photorefractive Keratectomy

- i. Mechanisms of action
- ii. Patient selections
- iii. Treatment goal(s)

d. Conductive Keratoplasty

- i. Mechanisms of action
- ii. Patient selection criteria
- iii. Treatment goal(s)

e. Superficial Keratectomy

- i. Patient selection criteria
- ii. Treatment goals

f. Keratoplasty

- i. Intralase-Enabled Keratoplasty
 1. Mechanisms of actions
 2. Donor/host configurations
 3. Potential advantages

IV. Non-Surgical Treatment Modalities

- a. Pre-operative Vs. Post-Operative patient management
- b. Spectacle
 - i. Patient selection criteria
 - 1. Subjective visual symptoms
 - 2. Objective topography/tomography indications
- c. Contact Lenses
 - i. Patient selection criteria
 - ii. Mechanisms of action
 - iii. Evolving trends in specialty contact lenses
 - iv. Utilization trends in specialty contact lenses
 - 1. Growing list of Options
 - 2. Gas permeable lenses (Corneal-GPs)
 - 3. Soft lenses/Custom Soft lenses
 - 4. Piggyback lenses
 - 5. Recesses piggyback lenses
 - 6. Hybrid lenses
 - 7. Scleral lenses (Scleral-GPs)