Managing Post-Operative Complications for LASIK and PRK

LASIK Flap Complications
- Epithelial defects
  - Cause
    - Basement membrane dystrophy
    - Recurrent erosion syndrome
    - Dry eyes
    - Trauma
  - Treatment
    - PRK as alternative
    - Pre-treat dry eye disease/ocular surface irregularities
    - Bandage contact lens

- Striae
  - Microstriae Vs. Macrostriae
  - Cause
    - Poor flap adherence
    - Trauma and Eye Rubbing
    - High myopic ablation
  - Treatment
    - Microstriae
      - Dependent upon subjective complaints and objective findings
    - Macrostriae
      - Immediate referral to surgeon to refloat flap and reposition

- Diffuse lamellar keratitis (DLK)
  - Multifactorial Cause
  - Treatment
    - Stage 1
      - Topical corticosteroids
    - Stage 2
      - Topical corticosteroids Vs. Oral corticosteroids
    - Stage 3
      - Topical corticosteroids Vs. Oral corticosteroids
      - Referral to surgeon
    - Stage 4
      - Flap amputation

- Epithelial ingrowth
  - Etiology
    - Active proliferation or iatrogenic introduction of epithelium at flap edge
  - Risk factors
    - Flap edge irregularities
    - Iatrogenic
Clinical manifestations
  - Classification systems

Surgical treatment
  - Re-lift and irrigate
  - Bandage contact lens
  - Close observation

- Transient light sensitivity syndrome (TLSS)
  - Signs and Symptoms
    - High raster bed and side-cut energy
      - Cytokine aggregation
      - Increased keratocyte activity
  - Treatment
    - Aggressive topical corticosteroids

- Infection
  - Signs and Symptoms
  - Organisms and timing of onset
    - Gram positive/negative organisms
    - Mycobacterium
    - Fungal
  - Treatment
    - Pulse loading of broad spectrum antimicrobial agents that are rapidly bactericidal
      - Fortified vancomycin
      - Amikacin
    - Re-lifting the flap with cultures, scraping and irrigation
    - Flap amputation as last resort
    - Inhibit collagenase production
      - Doxycycline

- Ectasia
  - Risk factors
    - Ectatic disorders
    - Specific topographic patterns
    - Residual stromal bed thickness
    - Low pre-operative corneal thickness
    - High myopia
    - Young age
    - Other: Family history and chronic eye rubbing
  - Prevention
    - Utilizing alternative treatments (ie, Surface ablation, Phakic IOL)
    - Avoid retreatment in cases with a low RSB
  - Management of postoperative ectasia
    - Spectacles or soft contact lenses
    - Avoid eye rubbing
    - Rigid gas permeable contact lenses
• Intra-corneal ring segments
• Corneal collagen cross-linking
• Corneal transplantation

• Marginal Sterile Corneal Infiltrates
  o Pathophysiology
    • Corneal hypersensitivity to bacterial exotoxins colonizing the eyelids
    • Epithelial injury
  o Clinical diagnosis
    • Occurs 1-5 days post-surgically
    • Localized or circumferential infiltrate peripheral to the flap edge
  o Clinical management
    • Topical corticosteroid every 1-2 hours
    • Identify patients who are high risk and pretreat them accordingly
      • Acne rosacea
      • Atopic disease
      • Blepharitis
      • Dry eye

• Dry eye
  o Risk factors
    • Gender
    • Pre-existing dry eye
    • Hinge properties (ie, Location, Width)
    • Ablation depth
  o Diagnostic approach
    • Schirmer test I/II, and Phenol red thread
    • TBUT
    • Tear Osmolarity
    • Ocular surface staining
    • Ocular Surface Disease Index (OSDI)
  o Treatment
    • Artificial tears
    • Lid scrubs
    • Topical cyclosporine A 0.05%
    • Punctal plugs
    • Oral dietary supplements
      • Omega-3 fatty acids
      • Doxycycline
    • Autologous serum

Photorefractive keratectomy (PRK)

Corneal haze
Classification
  - Typical transitory haze
  - Late haze

Cause
  - Ultraviolet exposure
  - Discontinuation of topical corticosteroids
  - Delayed epithelial healing
  - Systemic autoimmune disease

Pathophysiology and Grading system
  - Disruption of basement membrane
    - Keratocyte transformation into activated fibroblasts

Risk factors
  - Depth of ablation/Refractive status considerations
  - Diameter of ablation
  - Corneal healing time
  - Irregularity of post-operative stromal surface
  - Basement membrane integrity
  - Tear fluid transforming growth factor beta levels

Prevention
  - Mitomycin C
  - Vitamin C

Treatment
  - Topical corticosteroids
  - Phototherapeutic keratectomy with mitomycin C 0.02%

RCE

Pathophysiology
  - Abnormal basal epithelial cell layer
  - Abnormal basement membrane
    - Overexpression of proteases and collagenase (MMP-9)
  - Absent or abnormal hemidesmosomes
  - Loss of anchoring fibrils

Treatment
  - Medical
    - Hyperosmotic agents
    - Artificial tears
    - Topical corticosteroids
    - Bandage contact lens
    - Tetracycline class antibiotics
  - Surgical
    - Anterior stromal micropuncture
    - Surgical keratectomy
    - Phototherapeutic keratectomy