Basic Refractive Surgery Course

Postoperative Complications

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LASIK early Postoperative Complications

**Flap Dislocation**

Displacement of the flap from the stromal bed

Significant pain with severely reduced vision

Flap which is often edematous and rolled, should be lifted, flattened and repositioned
Flap Striae

Large thin flap, improper BCL placement, removal of lid speculum, and eye rubbing can increase the risk of striae.

Micro: folds in Bowman’s membrane. Cause minimal visual deficit.

Macro: folds in the flap. Reduce VA due to irregular astigmatism, halos, starbursts.
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**Flap Striae**

Visually significant striae should be treated as soon as possible to avoid fixed striae.

- Relift, refloat flap
- Reposition
- Flap traction with forceps or sponge
- Hyperthermic treatment
- PRK

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Interface Debris/ Remnants

- Oil
- Mucous
- Particles from the sponge
- Metallic fragments from the Blade
- RBC
- Powder from gloves
- Lint fibres
- Lashes

➢ Peripheral debris which not associated with keratitis or neovascularization can be left undisturbed
➢ Central debris should be removed and irrigated as soon as possible

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Diffuse Lamellar Keratitis (DLK)

Diffuse non-infectious inflammation at the level of the interface during the first few days after LASIK
Possible causes, most of these are based on speculation without supporting data

- Betadine
- Impure BSS
- Retained meibomian secretions
- Metallic debris
- Talc from gloves
- Thermal effect from the laser
- Lubricants on the microkeratome or blades
- Topical medications such as anesthetics
- Bacterial cell wall components (lipopolysaccharides)
- Endotoxins
- Interleukin-1 released from corneal epithelial cells following cell injury or death

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Diffuse Lamellar Keratitis

Stage I

seen on day 1 as white, granular cells in the periphery with sparing of the visual axis.

Stage 2

seen on day 2 or 3, shows white cells in the visual axis

- Topical steroids
- Daily follow up

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**Diffuse Lamellar Keratitis**

**Stage 3**
involves an aggregation of cells clumped in the visual axis and associated with haze and reduce vision.

**Stage 4**
involves central stromal necrosis, melt, and secondary hyperopia with irregular astigmatism

- Topical steroids
- Daily follow up
- Oral corticosteroids
- Flap lift and rinse interface with BSS

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Late Diffuse Lamellar Keratitis

After corneal trauma

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**Epithelial Ingrowth**

Mechanical dragging by keratome blade during keratectomy
Backflow during irrigation carrying floating epithelial cells
Ingrowth at the junction of the epithelium and keratotomy
Implantation with instruments
Cell migration through epithelial defect

Complications
- Decrease visual acuity
- Anterior stromal melt

- Lifting flap
- Manual removal
- Flap suturing
- Topical corticosteroid

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Transient Light-Sensitivity Syndrome
intense light sensitivity with normal visual acuity and unremarkable slit-lamp examination
primarily associated with the 6- and 15-kHz IntraLase models, but has been noticed rarely with 30- and 60-kHz or even later models¹
It is observed within 2 to 6 weeks after femtosecond laser-assisted LASIK, although it can rarely occur several months after surgery intensive topical corticosteroids every hour while awake for 48 hours followed by a taper over 2 weeks

Rainbow Glare
This phenomenon is believed to be secondary to diffractive light scattering²
Symptoms occur within 3 months and patients describe seeing 4 to 12 bands of color²

Corneal Haze/Scarring

- epithelial basement membrane defects
  → TGF-beta and PDGF penetrate the stroma and drive the development of myofibroblasts
  → Myofibroblasts produce small amounts of the collagen, causing opacities which patients experience as late haze

0 = Clear, no haze
0.5 = Trace corneal haze
1.0 = mild corneal haze not affecting refraction
2.0 = moderate corneal haze with difficult refraction
3.0 = corneal haze preventing refraction but anterior chamber visible
4.0 = severe corneal haze preventing refraction and completely obscuring iris details

Mitomycin-C

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**Dry Eye**

The most common postoperative complication

Neurotrophic in origin, dry eye symptoms are fairly common in patients prior to LASIK. Worse in patients who are known to have dry eye. Present with Punctate Epithelial Erosions and visual fluctuation.

May last 6 to 8 months
- Artificial tear drop
- Topical cyclosporine A
- Punctal plug

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Corneal Infection

Very rare 0.02%, Gram-positive organisms are the most common

Early (within 2 weeks of surgery) Staphylococcus and streptococcus

Late (2 weeks to 3 months after surgery) fungi, nocadia, atypical mycobacteria

Reactivation of herpes simplex and zoster

Management:
In case of interface infiltrate, lifting of flap and removal of all infective foci
Irrigation with vancomycin or amikacin
Intensive fortified antibiotic

Halo and Glare effects

Halos occur when the mesotopic pupil size is larger than the treated optical zone size.

Glare symptoms have been attributed to optical aberrations which are magnified when the pupil dilates in the dark.

Halos and glare generally resolve over 3-6 months.
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Decentered Ablation

Loss of BCVA
Irregular astigmatism
Night vision problems
Ghosting, glare
Postoperative Complications

Steroid-induced intraocular pressure

Interface fluid syndrome
Slit lamp: a clear zone between the stromal bed and flap representing a pocket of interface fluid
Elevated IOP causes a transudation of fluid into interface
It is often diagnosed incorrectly as DLK

Be careful: the IOL measures falsely low
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**Regression**

The tendency of an eye to return to its original refraction
Combination of epithelial hyperplasia and remodeling of stroma

Myopic patients who have more than 6.0 diopters
Hyperopic patients

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**Undercorrection/Overcorrection**

Incorrect preoperative refraction (most common)
Incorrect laser calibration
Environmental condition in OT
Incorrect data entry
Incomplete or decentered ablation
Incorrect interpretation of nomogram
Unstable ametropia
It is important to be able to identify and manage complications as soon as possible.

Most of the complications can be managed without significant effects on refractive outcomes.
Thank you!