Laser-assisted cataract surgery: Is it worth it?

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COURSE DESCRIPTION:
Cataract surgery is one of the most commonly performed medical procedures in the US. In the past decade, the introductions of presbyopic and toric IOLs have elevated cataract surgery into a refractive procedure. The latest introduction of femtosecond laser-assisted cataract surgery promises better predictability and safety of refractive cataract surgery but does it produce improved visual outcome compared to conventional surgery? Current literature provides mix reports. This course aims to discuss the femto-laser assisted cataract surgery technology, review the published data to date, and provide personal first 36 months of clinical experience with the laser technology.

OUTLINE:

I. Femto-laser-assisted refractive cataract surgery (FLACS)
   Globe experience Vs US experience

II. Systems available in US
   A. LenSx - Alcon
   B. Catalys - AMO
   C. LensAR - LENSAR
   D. Victus – Technolas/ B&L (femto- LASIK & femto-cataract)
   E. Differences between units: patient interface and imaging systems

III. Technology
   A. Femtosecond laser interface
   B. OCT vs Scheimplflug imaging and guidance
   C. Capsulorhexis (manual Vs laser)
      1. Predictability
      2. Precisions
3. Challenging cases

D. Lens fragmentation
   1. Patterns
   2. Reduced effective phacoemulsification time
   3. Reduced post-op inflammation
   4. Reduced endothelial cell damage
   5. Reduced macular swelling

E. Limbal relaxing incisions
   1. Location
   2. Depth
   3. Design

F. IOL options
   1. Toric IOL
   2. Multifocal IOL
   3. Pseudoaccommodating IOL

G. Intra-operative Wavefront analysis: ORA

H. Pupil size requirements

IV. Published data on visual and refractive outcomes

A. Nagy et al
B. Filkorn et al
C. Lawless et al
D. Abell et al
E. Mihaltz et al
F. Ng et al

V. Comparison of Refractive Outcomes of Laser Assisted Refractive Cataract Surgery vs Conventional Refractive Cataract Surgery with Phacememulsification – Ng, Jenkins, Nguyen

Purpose
To compare the 1 month post-operative refractive outcome between patients who underwent laser-assisted refractive cataract surgery with premium intraocular lenses (IOL) using a femtosecond laser and those who underwent conventional refractive cataract surgery with premium IOLs.

Method
This is a retrospective study that compares the visual outcome of 32 eyes from 32 patients undergoing laser-assisted refractive cataract surgery
(Alcon LenSx) versus 30 eyes from 30 patients undergoing conventional refractive cataract surgery all with implantation of premium IOLs by the same surgeon.

**Results**

At 1 month after surgery the mean manifest spherical equivalent was statistically significantly less (better) in the laser group as compared with the conventional group. The mean spherical equivalent was $+0.023 \pm 0.328$ diopters in the laser group versus $-0.192 \pm 0.431$ diopters in the conventional group ($p=0.032$).

**Discussion**

Overall the results using femtophaco was statistically better than phaco alone in premium IOLs. The mean spherical equivalent was $-0.19\pm0.43$ diopters in the conventional group and $+0.02\pm0.33$ diopters. Visual acuity in logMAR was $0.171\pm0.130$ in conventional group and $+0.065\pm0.059$ in laser group. Looking at cumulative percentages, those in the laser group was more than twice as likely to achieve 20/20 and 20/25 or better uncorrected vision as compared to the conventional group.

**Conclusion**

Laser-assisted refractive cataract surgery with a femtosecond laser provides significantly better visual outcomes, as measured by 1 month post-op uncorrected acuity and residual refraction, than conventional refractive cataract surgery in premium IOL patients, especially toric IOLs. The improvement in visual outcome predictability in the laser group is possibly from the more precise laser capsulorrhexis and limbal relaxing incisions, resulting in better effective lens positioning and correction of corneal cylinder.
VI. Does laser-assisted cataract surgery make sense for your patients?
   A. Who are good candidates?
      1. Those seeking refractive outcome
      2. Traumatic cataract (rupture anterior capsule)
      3. Zonular dehiscence
      4. Narrow anterior chamber
      5. Pseudoexfoliation syndrome
      6. Pediatric cataract
   B. Who are not poor candidates?
      1. Small, non-dilating pupil <5.0mm
      2. Narrow fissures (suction ring)

VII. Cost Issues
   A. Surgical versus refractive aim
   B. Patient expectation and selection
   C. Abell et al. Cost-effectiveness study

VIII. Latest clinical experience