

Manual versus bladeless Femtosecond Laser-assisted small incision cataract surgery: Comparison of Refractive outcomes



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Purpose

Comparative evaluation of refractive outcomes of manual small-incision versus femtosecond-laser assisted clear-cornea cataract surgery.

Methods

133 consecutive eyes subjected to cataract surgery.

Two groups were formed:

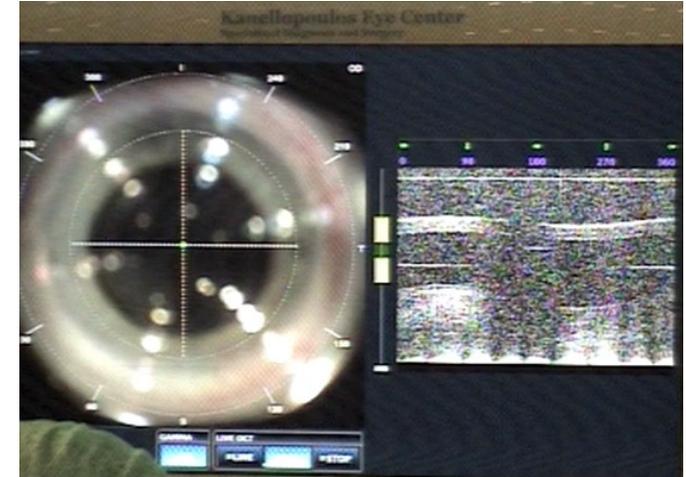
- group-A manual phacoemulsification(n=66);
- group-B femtosecond-laser assisted (n=67), employing the LenSx (Alcon Surgical, Ft. Worth, TX) laser.

All cases were evaluated for refraction, visual acuity, keratometry, tomography, pachymetry, endothelial cell counts, intraocular pressure, and type of spherical or toric IOL implanted.

The groups were matched for age, gender, pre-operative vision metrics, and cataract severity.

Follow-up time was up to 1 year.

Toric IOL subgroups were also compared.



Results

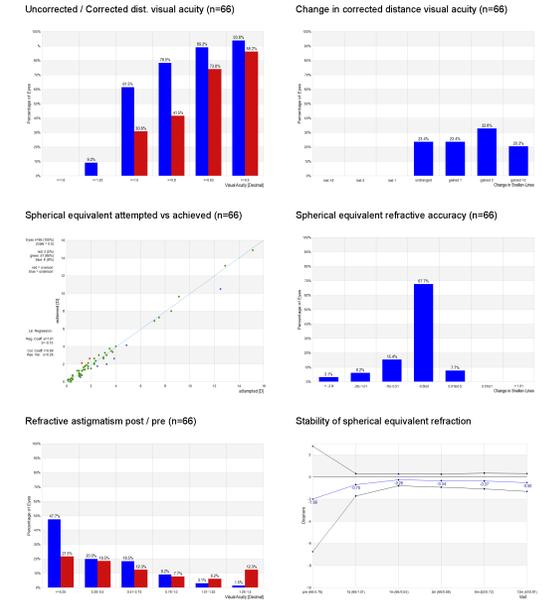
In group-A post-operative UDVA was 20/20 or better in 61.5% of the eyes and 20/25 in 78.5%. The femtosecond group-B had improved outcomes (p=0.075 and p=0.042): post-operative UDVA was 20/20 in 62.7% of the eyes and 20/25 in 85.1%.

Linear regression scatterplots of achieved versus attempted spherical equivalent had excellent regression coefficients (a=1.01 group-A, 0.97 group-B). There were 67.7% cases in group-A and 67.2% in group-B (p=0.873) within $\pm 0.50D$ of refractive equivalent.

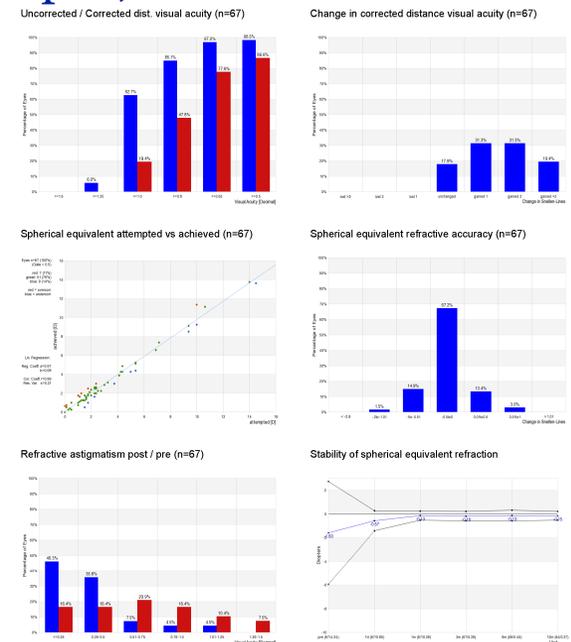
Slight trend of under-correction was noted in group-A.

Average residual manifest cylinder in the toric subgroup-A was -0.50D (95% Limit-of-Agreement, LoA=-0.78D), and in toric subgroup-B -0.45D (95% LoA=-0.45D).

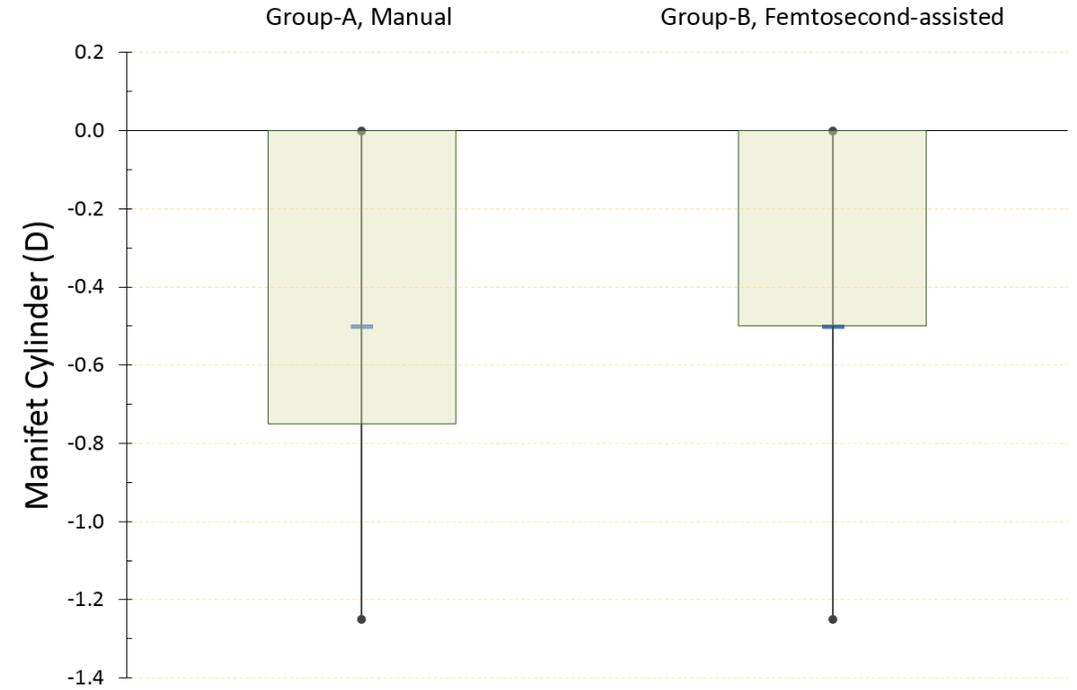
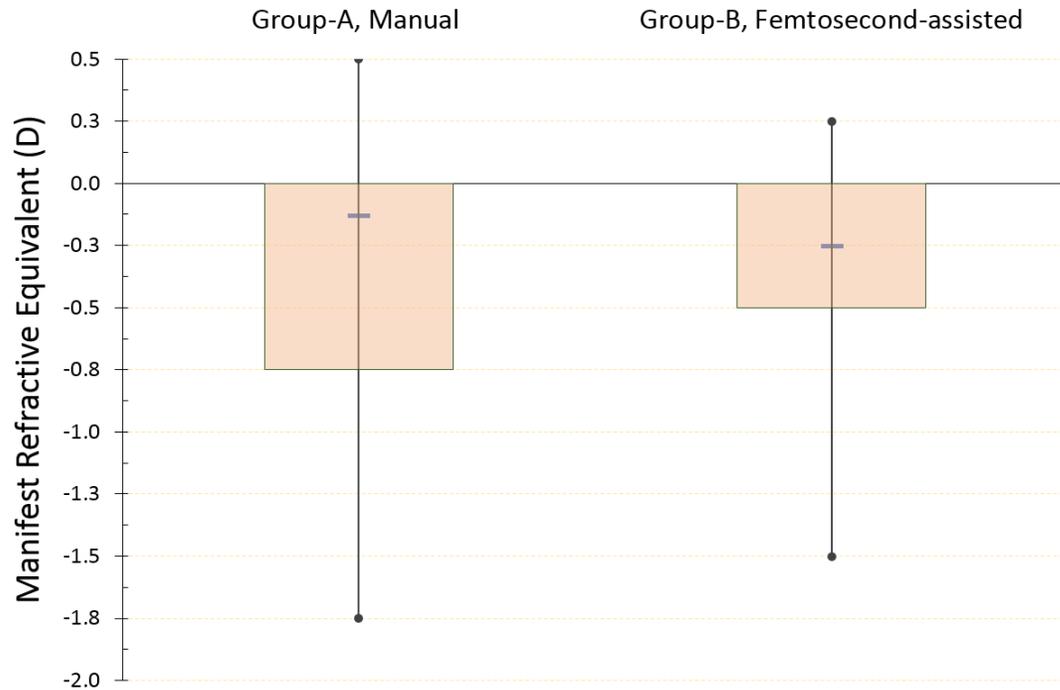
Results: group-A, manual



Results: group-B, LenSx



Results: Toric Subgroups



Discussion

Cataract surgery, although initially employed to remove the opaque crystalline lens, has recently been increasingly evaluated in regard to its optimal refractive outcome that may significantly affect the quality of everyday life. Patients and clinicians' expectations dictate the least amount of post-operative astigmatism and sphere.

The projected improvement in corneal incision and capsular opening precision, as well as the reduction of total ultrasound energy required for lens nucleus breakdown, may potentially improve refractive outcomes and enhance safety for patients in comparison to 'manual' phacoemulsification. Exact positioning and dimensioning of the anterior capsular opening may also help reduce IOL decentration and tilt.

Determination of effective ELP and lens placement with minimal tilt are among the challenges in modern cataract surgery.

This is even more important in cases with past corneal refractive surgery (eg LASIK or PRK), a population that is expected to soon reach 'cataract maturity': Considering that the first 'wave' of such refractive surgeries occurred approximately twenty years ago, at an estimated average patient age of 30, this population is now approaching the onset for cataract surgery.



Conclusions

- Refractive outcomes in terms of visual acuity, residual refractive error, as well as total phacoemulsification energy appear to favor the femtosecond laser-assisted group-A, suggesting clinical benefit in utilizing this technology in routine small-incision cataract surgery.

