Original Research Article

Managing High Anisometropia with Blended Refractive Surgery: A Comparative Study on Patient Outcomes

Abstract:

Purpose: To compare patient-reported outcomes (PROs) and satisfaction results after blended refractive surgery with one eye Lasik laser/ PRK and another eye ICL..

Patients and methods: A Quality of life and Patient reported spectacle independence (PRISQ) questionnaire was administered to patients who had undergone blended Refractive surgery at 2 months of follow-up.

Results: Overall PROs and satisfaction was similar among all the groups. Refractive outcomesand accuracy were similar among the groups, Refractive outcome differences were not meaningful among thegroups and were not a differentiating factor in PROs. Substantially fewer patients in the third group noticed glare and halo compared with the 3.0/3.0 group (P<0.0001,chi-square test). No new safety concerns were reported.

Conclusion: The choice of blended refractive surgery resulted in a higher percentage of patients who were deemed unfit for LVC being satisfied with Near, intermediate, and distance vision, overall the fewer PRO differences were not statistically significant.

Keywords: Implantable collamer lens, Lasik laser , photo refractive keratectomy , spectacle independence,glare, haloes.

Introduction

“Refractive surgery encompasses any procedure that corrects refractive error.It is well recognized that refractive surgery has significant impact on quality of life and daily work, with benefits extending beyond spectacle independence. Today, Refractive surgery has evolved beyond the stereotypical ‘laser eye surgery’. With the Advent of technologies like Femtolasik / SMILE ,ICL/IPCL, Customised RLE wide range of refractive errors are being corrected leading to rise in demand of the refractive services” (Sanders & Vukich 2003).

“Inspite of all advancements a good percentage of patients present with difference of high refractive error in both eyes i.e Anisometropia leading to them being deemed unfit for a single refractive procedure.High-myopia anisometropia patients may have difficulty with fusion when wearing spectacles. A common practice followed by many centres is laser vision correction for the fit eye and contact lens for the eye unfit for lasik / PRK. Which surgical procedure will be chosen for the eyes of anisometropia patients mainly depends on the level of refractive error” (Sanders & Vukich 2003).

"Due to the limits of patients' corneal conditions, LVC has been generally chosen for the correction of <12 D of myopia and with a thickness of Cornea ranging 470 – 555 µm, and the outcomes are poor in high-myopia cases compared to cases of low to moderate myopia. While ICL, a posterior-chamber phakic intraocular lens, is the preferred technique for high myopia of >12 D. Lasik was advocated for patient with residual post ablation stromal bed of around 300µm , anyone with < 300 µm was advised PRK" [11] .

Previous studies (Sanders & Vukich 2003, 2006; Sanders 2007; Igarashi et al. 2009; Kamiya et al. 2012) have reported the grouping comparisons of ICL and laser-assisted *in situ* keratomileusis (LASIK)

The current study probably the first in india was objectively conducted to compare the patient reported outcomes of ICL implantation in one eye and LVC in the contralateral eye and investigate the long-term visual quality and stability.

Patients and methods:

The present study is conducted in the Department of Ophthalmology. Ethics reviews and approvals were conducted and obtained by the institutional review board. : A Total of 50 subjects were divided into two groups one group who underwent ICL (phakicIOL) in one eye and lasik laser in other and another group ICL in one eye and PRK in other were reviewed.

Patients who gave their expressed consent for refractive surgery workup and after thorough counseling agreed to go ahead with blended refractive surgery were taken up. Some non surgical options like contact lens was also suggested for the unfit eye , due to the recurring cost of acquiring and maintaining the lenses most patient chose against it .

A Quality of life and Patient reported spectacle independence (PRISQ) questionnaire was administered to patients who had undergone blended Refractive surgery and 2 months of follow-up

Results:

Overall PROs and satisfaction was similar among all the groups. Refractive outcomes and accuracy were similar among the groups, Refractive outcome differences were not meaningful among the groups and were not a differentiating factor in PROs. Substantially fewer patients in the third group noticed glare and halo compared with the 2.0/2.0 group (P<0.0001, chi-square test). No new safety concerns were reported.

Complete satisfaction level was noted in “Seeing in the distance”, “Recognising faces across the street”, Watching television, Driving a car by night, Using steps, Crossing the road, Using public transport and Employment / Housework activities. While in some cases satisfaction category “Seeing in the bright light / glare”, “Seeing in the poor light / dim”, “Appreciating colors”, “Driving a car by day”(not at all 18, 72%) and (a little 7, 28%).

Function comfortably without glasses or contacts was noted in

Complete satisfaction with vision without glasses or contacts was observed.

Table 1 :Overall PROs and satisfaction

	Not at all (1)	**A little (2)**	**Quite a bit (3)**	**A lot (4)**
Reading	**38 (67.9%)**	**12 (21.4%)**		
Seeing in the distance	**50 (100%)**			
Recognising faces across the street	**50 (100%)**			
Watching television	**50 (100%)**			
Seeing in the distance	**50 (100%)**			
Seeing in the bright light / glare	**36(72%)**	**14 (28%)**		
Seeing in the poor light / dim	**36 (72%)**	**14 (28%)**		
Appreciating colors	**36 (72%)**	**14(28%)**		
Driving a car by day	**38 (76%)**	**12 (24%)**		
Driving a car by night	**50 (100%)**			
Using steps	**50 (100%)**			
Crossing the road	**50 (100%)**			
Using public transport	**50 (100%)**			

Travelling independently	**36 (72%)**	**14 (28%)**		
Moving in unfamiliar surrounding	**36 (72%)**	**14 (28%)**		
Employment / Housework activities	**50 (100%)**			

Spectacle independence with blended refractive surgery was observed in 38 (76%) of cases while 12 (24%) still need glasses.

Table 2 :Frequency Table

Need glasses	**Frequency**	**Percentage**
Yes	**12**	**24%**
No	**38**	**76%**

Table 3 :Function comfortably without glasses or contacts

	All the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
Wear Glasses or contacts for					**50(100 %)**
Function comfortably without glasses or contacts	**26(52%)**	**24(48%)**			
Satisfaction with vision without glasses or contacts	**50(100%)**				

Discussion:

- The different surgical methods for the correction of myopia among anisometropia patients are based on the principles of safety and efficacy.
- The long-term visual quality and stability of different surgical methods should be evaluated.

- In this study we presented patient reported outcomes and satisfaction results after hybrid refractive surgery.
- No infection, corneal dilation or other adverse reactions were observed, suggesting that both ICL implantation and corneal LVC are safe and reliable in cases with suitable indications
- The visual image magnification rate and visual quality were improved after blended refractive surgery
- A study by Nicolas et al reports better quality of vision, stable refraction and high satisfaction score after 9 years in a patient treated for high myopia with one eye ICL and other eye LASIK. (1)
- Another study by Roberto Zalvidar et al reported better visual quality gains, short term safety and refractive stability .(2)
- A study by Xunchen et al also demonstrated that ICL implantation and LRS techniques are both safe and effective procedures for myopia with suitable indications.(3)

Conclusion:

The choice of blended refractive surgery resulted in a higher percentage of patients who were deemed unfit for LVC being satisfied with Near, intermediate, and distance vision, overall the fewer PRO differences were not statistically significant.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Ethical Approval: The present study is conducted in the Department of Ophthalmology. Ethics reviews and approvals were conducted and obtained by the institutional review board

Consent: Patients who gave their expressed consent for refractive surgery workup and after thorough counseling agreed to go ahead with blended refractive surgery were taken up

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