

Intraoperative aphakic refraction as an adjunct for intraocular lens power calculation in post-corneal refractive surgery

Dear Editor,

The accurate calculation of intraocular lens (IOL) power in patients with refractive surgery is challenging and many formulas have been used for the same. The goal of this study was to compare the accuracy and predictability of IOL power calculation using intraoperative aphakic refraction to those available on the website of the American Society of Cataract and Refractive Surgery (ASCRS) in patients with previous myopic corneal refractive surgery.

Retrospective analysis of patients with previous photorefractive keratectomy (PRK) or laser-assisted *in situ* keratomileusis (LASIK) for myopia with subsequent cataract surgery during 2014–2019 by reviewing their medical records. IOL power in each case was computed using an online ASCRS calculator. In addition, intraoperative on the table aphakic refraction was done in each case to confirm the IOL power [Fig. 1]. The IOL power using the aphakic refraction technique was obtained by multiplying the aphakic correction with 1.8.

Our study assessed a total of consecutive 28 eyes from 18 patients with no disparity against gender. Among the 28 eyes, 2 eyes were post-PRK whereas the remaining were post-LASIK [Table 1]. Only one eye had coexisting choroidal neovascular membrane (CNVM). The values of IOL dioptric power obtained by the ASCRS calculator and the aphakic refraction were comparable [Table 2].

Twenty-seven out of twenty-eight eyes had best-corrected visual acuity (BCVA) better than 6/9 post-cataract surgery with 60.7% with <-1D of spherical equivalent and 82.2% with <-1.5D spherical equivalent. Only one eye showed BCVA of 6/60 due to the pre-existing CNVM.

Predicting the IOL power in post-myopic refractive surgery using standard calculation results in underestimating the IOL power due to altered index of refraction, inaccurate calculation of keratometry values by conventional keratometry, and inaccurate effective lens position prediction.^[1] ASCRS is an accurate tool^[2,3] and is a commonly used method for IOL power calculation in patients with previous corneal refractive surgery.

The aphakic refraction technique has been studied to provide extremely accurate postoperative refraction in cataract eyes with IOL implantation after the previous LASIK.^[4,5] It has been observed that aphakic refraction is more reliable in nearly emmetropic eyes with the aphakic spherical equivalent in the range +8.50 to +12.38 D.^[4]

Slight modifications in the technique of aphakic refraction were done to prevent errors and to obtain repeatable and satisfactory results. In our cases, on the table aphakic refraction was carried out as opposed to Mackool *et al.*,^[4] where the patient was made to wait for an hour after the procedure to carry out the aphakic refraction. To ensure a good glow on the table, the viscoelastic was completely removed and the anterior chamber was just formed with

Table 1: Demographic details of study population

Parameter	Range	Mean
Pre-refractive surgery spherical equivalent (n=25)	-2 D--12.75 D	-8.01±2.83
Age at cataract surgery (n=28)	32-68 years	46.5±9.89
Axial length (n=28)	24.40-30.69 mm	27.56±1.56
IOL power implanted (n=28)	10.5-22.5 D	18.12±3.55

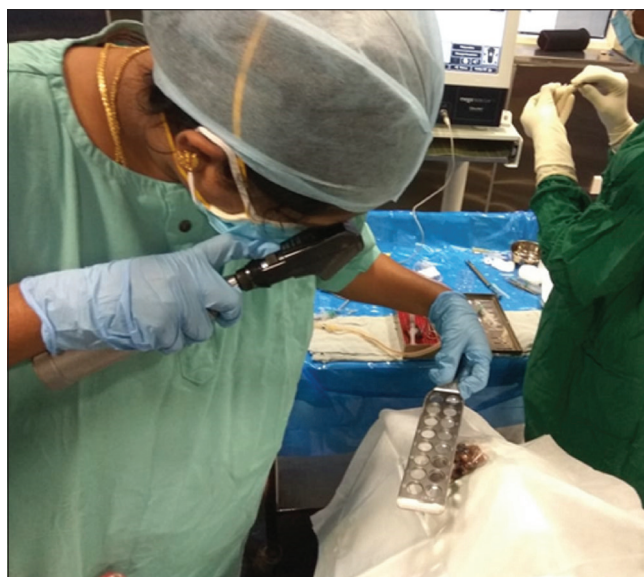


Figure 1: Showing on the table aphakic refraction being performed

a balanced salt solution as under- or over-filling can affect the result obtained through aphakic refraction. The corneal clarity was maintained by using a balanced salt solution on the cornea during aphakic refraction. Also, in our study, we used a correction factor of 1.8 (depending on the A constant and type of IOL inserted) as opposed to the correction factor of 1.75 by Mackool *et al.*^[4]

Our study highlighted calculating IOL power using the ASCRS calculator (Shammas and Barrett True K) and the aphakic refraction technique was comparable.

Our study was able to show that intraoperative aphakic refraction can be used as an adjunct in these challenging cases to confirm the IOL power. Aphakic refraction technique is inexpensive, cost-effective, and can be easily carried out. The limitation of our study was its retrospective nature and smaller sample size.

Intraoperative aphakic refraction is a viable option to aid in obtaining desired outcomes and a valuable tool in our armamentarium. The best result may be obtained by combining different techniques which will help in optimizing the outcome. However, the final call lies in the analytical judgment of the surgeon.

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Conflicts of interest

There are no conflicts of interest.

Table 2: Test analysis between IOL power calculation(in Dioptres) among different methods

Methods Compared	Methods	n	Mean±SD	P
SHAMMAS (ASCRS)-aphakic refraction	SHAMMAS	28	17.53±3.51	P<0.05
	Aphakic refraction	28	18.09±3.35	
Barrett true K method (ASCRS) - aphakic refraction	Barrett True K method	25	16.78±3.05	P<0.05
	Aphakic refraction	25	17.76±3.35	

The results are statistically significant with *P* value<0.05

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