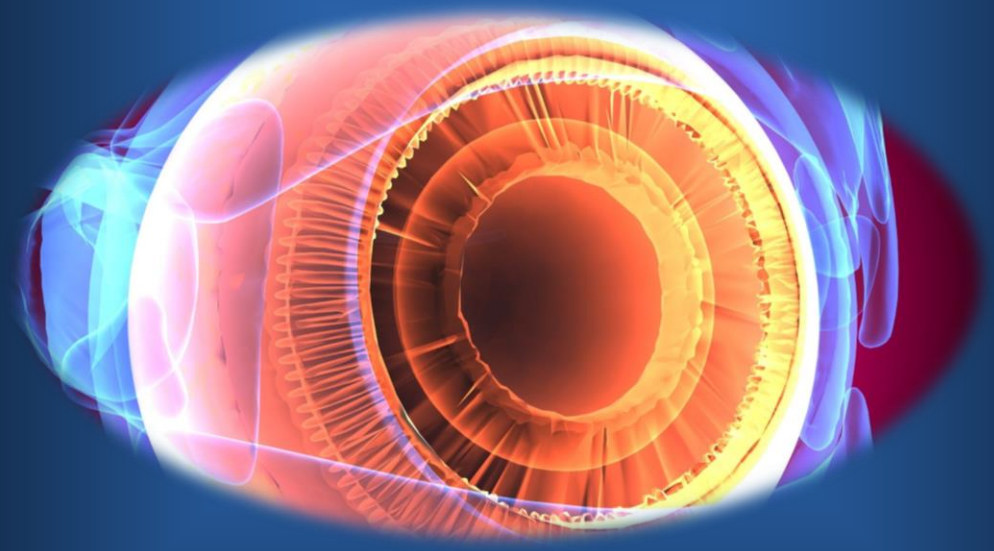
ophthal Focus

Vol 1 | Issue 15|2020



Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you 'Ophthal Focus' which contains latest and interesting news in the field of Ophthalmology.

This issue contains

- Effect of a Schlemm's Canal Microstent on Early Postoperative Intraocular Pressure after Cataract Surgery: The HORIZON trial
- Ratio of Axial Length to Corneal Radius and Accuracy of Intraocular Lens Power Calculation Based on Biometric Data
- Four-Year Survival of Descemet Membrane Endothelial Keratoplasty in Patients With Previous Glaucoma Surgery

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Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited

Effect of a Schlemm's Canal Microstent on Early Postoperative Intraocular Pressure after Cataract Surgery: HORIZON trial

Cataract is a common comorbidity in patients with glaucoma. Cataract surgery in patients with glaucoma requires special consideration and can potentially pose a higher risk of complications. One such complication, acute postoperative elevation in intraocular pressure (IOP), has been well reported in the literature and occurs more frequently in patients with glaucoma. The reasons for IOP elevation are poorly understood but thought to be due to viscoelastic retention in the anterior chamber and poorly functioning trabecular outflow pathway in the glaucomatous eye. Acute postoperative IOP elevation can result in potential morbidity in eyes with preexisting glaucoma and optic nerve damage, requiring more intensive medical and sometimes surgical treatment for elevated IOP.

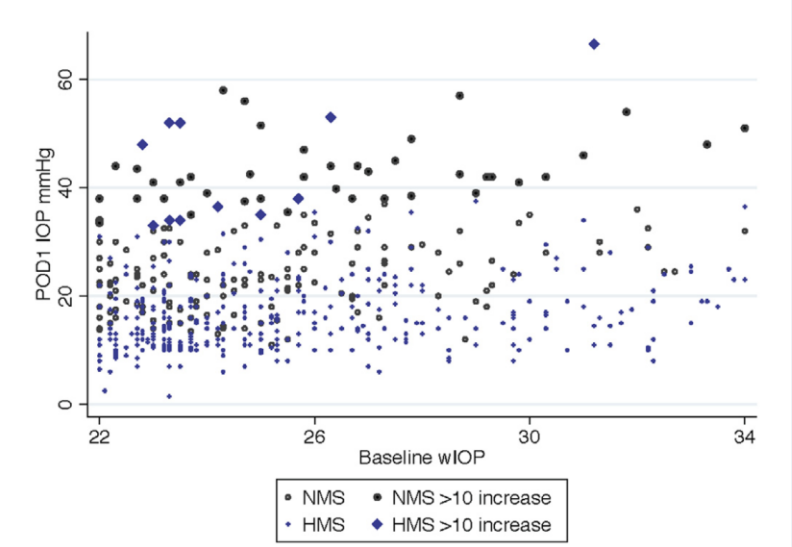
Implantation of the HMS reduces the incidence of markedly elevated IOP, average IOP, incidence of IOP spikes, and need for medication in the early postoperative period in unmedicated patients with glaucoma who received no other IOP spike prophylaxis.

To compare early postoperative intraocular pressure (IOP) in patients who underwent cataract surgery alone with those who underwent cataract surgery combined with implantation of a Hydrus Microstent (HMS) (Ivantis, Irvine, CA). This is the Subanalysis of data from the randomized controlled HORIZON trial, a multicenter trial including 26 US and 12 international sites. Participants with mild/moderate primary open-angle glaucoma (POAG) and visually significant cataract with mean modified diurnal IOP between 22 and 34 mmHg after washout of IOP-lowering medications were included.

A total of 556 subjects were randomized in a 2:1 ratio to undergo cataract surgery with placement of the HMS versus cataract surgery alone (no microstent [NMS]). All eyes were washed out of IOP-lowering medications before surgery and remained unmedicated until surgery. No IOP-lowering prophylaxis was used postoperatively. Comprehensive eye examination including measurement of intraocular pressure was conducted on postoperative day (POD) 1, week 1, and month 1. Postoperative IOP >40 mmHg was analyzed as the primary outcome. Incidence of IOP increase >10 mmHg above baseline, unmedicated IOP, and mean IOP were analyzed as secondary outcomes.

A total of 369 eyes were randomized to the HMS group, and 187 eyes were randomized to cataract surgery alone. The HMS and NMS groups did not differ with respect to baseline demographic or ocular characteristics. On POD1, the incidence of IOP spike >40 mmHg was significantly higher at 14.4% in the NMS group compared with 1.4% in the HMS group ($P < 0.001$). The incidence of IOP increase ≥10 mmHg relative to baseline on POD1 was also significantly higher in the NMS group than in the HMS group (22.5% vs. 3.0%, $P < 0.001$). IOP in the NMS group was significantly higher than in the HMS group (27.6 vs. 17.0 mmHg, $P < 0.001$). In multivariable logistic regression analysis, higher baseline IOP predicted higher odds of POD1 IOP spike >40 mmHg, whereas the presence of HMS was associated with a lower likelihood of postoperative IOP spike.

The addition of an HMS at the time of cataract surgery lowered the risk of markedly elevated IOP in the early postoperative period in patients with glaucoma.



Incidence of intraocular pressure (IOP) increase >10 mmHg on postoperative day 1 (POD1) relative to preoperative wIOP. HMS = Hydrus Microstent; IOP ¼ intraocular pressure; NMS = no microstent; 10 increase =10 mmHg above baseline IOP; wIOP = washout intraocular pressure.

		Univariate, Procedure Adjusted			Multivariable		
Baseline Parameters	Interval	*OR* *	*95% CI*	*P Value*	*OR* *	*95% CI*	*P Value*
HMS	vs. NMS	**0.08**	**0.03–0.2**	**<0.001**	**0.07**	**0.03–0.2**	**<0.001**
Age	10 yrs older	1.4	0.8–2.3	0.2			
Women	vs. men	0.6	0.3–1.2	0.1			
Race	vs. white	**0.1**	**0.1–0.9**	**0.04**	0.1	0.1–1.1	0.06
No. of screening medications	1 more medication	0.8	0.5–1.3	0.4			
Baseline wIOP	5 mmHg higher	**2.5**	**1.4–4.3**	**0.002**	**2.3**	**1.3–4.1**	**0.006**
CCT	0.1 mm thicker	1.1	0.9–1.2	0.3			
VF MD	5 dB greater loss	0.7	0.3–1.3	0.2			
Prior SLT	vs. no SLT	2.1	0.9–5.1	0.1			

CCT = central corneal thickness; CI = confidence interval; dB = decibels; HMS = Hydrus Microstent; NMS = cataract surgery alone; OR = odds ratio; POD1 = postoperative day 1; SLT = selective laser trabeculoplasty; VF MD = visual field mean deviation; wIOP = mean modified diurnal unmedicated intraocular pressure.
*An OR >1 indicates higher likelihood of IOP spike (defined as POD1 IOP >40 mmHg), whereas an OR <1 indicates lower likelihood of IOP spike.
Boldface indicates significance at $P < 0.05$.

Logistic Regression Analysis to Identify Predictors of Postoperative Day 1 Intraocular Pressure >40 mmHg

In conclusion, it was found that implantation of the HMS reduces the incidence of markedly elevated IOP, average IOP, incidence of IOP spikes, and need for medication in the early postoperative period in unmedicated patients with

glaucoma who received no other IOP spike prophylaxis. This could significantly decrease postoperative morbidity in patients with glaucoma. Future studies are needed to examine additional individual risk factors for IOP increase and compare these benefits against the ability of medications such as acetazolamide to prevent similar IOP increases.

Source: Zebardast N et al. Ophthalmology. 2020 Sept. online ahead of print. https://doi.org/10.1016/j.ophtha.2020.01.025.

Ratio of Axial Length to Corneal Radius and Accuracy of Intraocular Lens Power Calculation Based on Biometric Data

Cataract surgeries are both rehabilitative and refractive procedures. With modern surgical techniques, patients' expectations for perfect postoperative vision are increasing day by day. Partial coherence interferometry has increased the precision of the preoperative measurements, leading to improved postoperative refractive results. This retrospective observational case series evaluated the features of the axial length-to-corneal radius (AL/CR) ratio in Japanese patients with cataracts and to determine the accuracy of intraocular lens (IOL) power calculation formulas according to the AL/CR features and the axial length (AL).

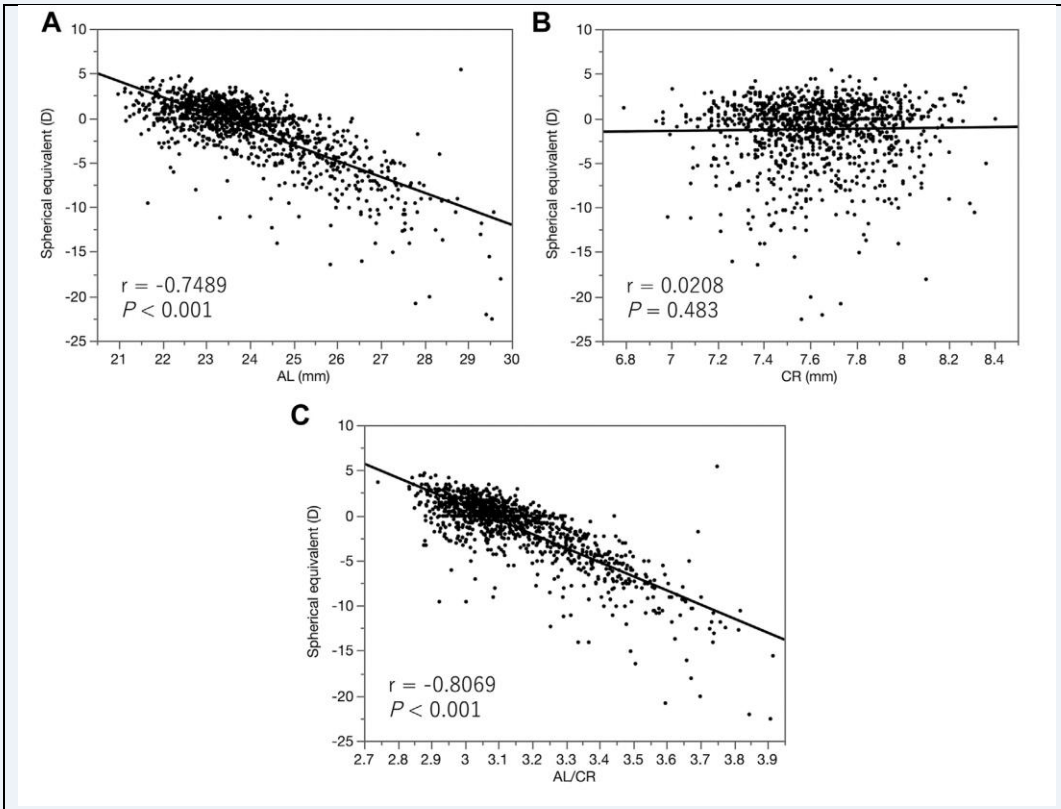
Surgeons should pay attention to the selection of IOL power calculation formulas in eyes with highAL/CR ratios.

Setting was a clinical practice. Patient population was a total of 1,135 eyes (1,135 patients) with cataracts. Observation procedures included measurement of the AL and corenal radius (CR) by optical biometry and evaluation of the refractive outcomes by using the SRK/T, Holladay 1, Hoffer Q, Haigis, and Barrett Universal II

formulas. Main outcome measurements were the features of the AL/CR ratio and the accuracy of IOL power calculations based on the AL/CR ratio and the AL.

The mean AL/CR ratio was 3.15 ± 0.19. Significant weak negative correlations were observed between the spherical equivalent (SE) and AL (r = −0.7489; P < .001) and between the SE and AL/CR ratio (r = −0.8069; P < .001); no correlation was found between the SE and CR (r = 0.0208, P = .483). For medium ALs and high AL/CR ratios, the SRK/T formula performed less accurately. For long ALs and high AL/CR ratios, the Holladay 1 and Hoffer Q formulas performed less accurately. The Barrett Universal II formula performed well across a range of ALs and AL/CR ratios.

The AL/CR ratio explained the total variation in the SE better than the AL alone. Surgeons should pay attention to the selection of IOL power calculation formulas in eyes with high AL/CR ratios.



A: Scatterplosts of AL and shperical equivalent; B: Scatterplots of CR and sperical equivalent; C: Scatterplots of AL/CR and spherical equivalent; AL[axial length; AL/CR ratio[axial length-to-corneal radius ratio; CR[corneal radius;D[diopters.

In conclusion, the mean AL/CR ratio was the highest compared with previously published data from other countries. The AL/CR ratio explains the total variation in the SE better than the AL alone. The SRK/T formula performed less accurately in eyes with medium ALs with high AL/CR ratios. Furthermore, the Holladay 1 and Hoffer Q formulas performed less accurately in eyes with long ALs with high AL/CR ratios. The Barrett Universal II formulas performed well across a range of ALs and AL/CR ratios. Surgeons should pay attention to the selection of IOL power calculation formulas in eyes with highAL/CR ratios.

Source: Omoto MK et al. American J Ophthalmology 2020 Sept. https://doi.org/10.1016/j.ajo.2020.03.006

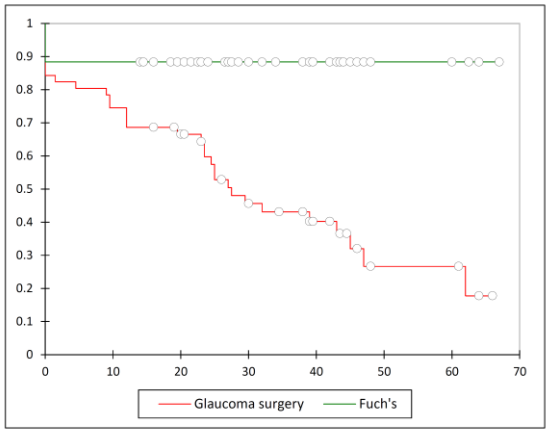
Four-Year Survival of Descemet Membrane Endothelial Keratoplasty in Patients With Previous Glaucoma Surgery

Endothelial keratoplasty has become the treatment of choice for corneal endothelial cell failure and continues to evolve as more data on surgical outcomes become available. Nevertheless, performing endothelial keratoplasty in some scenarios continues to be challenging. This was a retrospective, comparative case series to evaluate 4-year outcomes of Descemet membrane endothelial keratoplasty (DMEK) in eyes with previous glaucoma surgery. Patients with previous trabeculectomy or glaucoma drainage device (GDD) implantation who later underwent DMEK (study group) were matched for follow-up duration with Fuchs dystrophy DMEK patients (control group). The minimum follow-up was 18 months. Primary outcomes included graft survival and rejection rates, and secondary outcomes included rates of detachment/rebubble, endothelial cell loss,

DMEK performed in eyes with previous glaucoma surgery has good early outcomes, but 4-year rejection and failure rates are high.

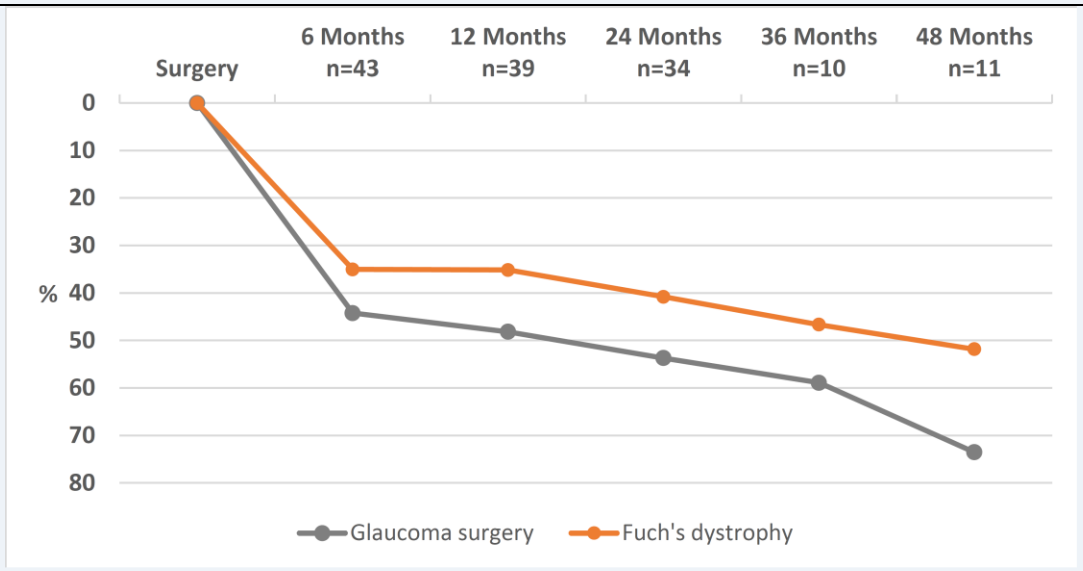
best spectacle-corrected visual acuity, intraocular pressure, and glaucoma medications/surgeries. Subgroup analysis compared eyes with and without a GDD.

Ninety-four eyes of 91 patients were included. There were 51 eyes of 49 patients in the study group (GDD = 32 eyes, no GDD = 19 eyes) and 43 eyes of 42 patients in the control group. The mean follow-up was 37.9 ± 15.2 and 33.8 ± 13.5 months, respectively (P = .322). Graft survival probability of the study group at 12, 24, 36, and 48 months was 75%, 60%, 43%, and 27%, respectively, compared with a consistent 88% in the control group (P < .001). Survival curves of study subgroups (GDD and no GDD) were significantly lower than the control group (P < .001). Rejection rates in the study and control groups were 19.6% and 2.3%, respectively (P = .010). Endothelial cell loss in the study group was 12%-22% higher than the control group at 12, 24, 36, and 48 months (P = .049, P = .027, P = .200, and P = .004). In eyes with previous glaucoma surgery, DMEK has good early outcomes, but longer-term rejection and failure rates are high. Physicians and patients should be cognizant of the high likelihood of graft failure in this setting.



	Time (Months)	12	24	36	48	
Cumulative survival probability	Fuch's dystrophy (n at risk)	88% (43)	88% (28)	88% (17)	88% (6)	P<0.001
	Glaucoma Surgery (n at risk)	75% (40)	60% (28)	43% (17)	27% (6)	

Kaplan-Meier survival curve demonstrating the cumulative survival probability of Descemet membrane endothelial keratoplasty grafts in eyes with previous glaucoma surgery compared with Descemet membrane endothelial keratoplasty grafts in eyes with Fuchs dystrophy. Circles represent censored observations



Endothelial cell loss rates after Descemet membrane endothelial keratoplasty in eyes with previous glaucoma surgery (study group) and in eyes with Fuchs dystrophy (control group).

In conclusion, DMEK performed in eyes with previous glaucoma surgery has good early outcomes, but 4-year rejection and failure rates are high. Physicians and patients should be cognizant of the high likelihood of graft failure in this setting.

Source: Sorkin N et al. American J Ophthalmology 2020 Sept. https://doi.org/10.1016/j.ajo.2020.05.020