Predictability of Intraocular Lens Power Calculation Formulae in Infantile Eyes with Unilateral Congenital Cataract: Results from the Infant Aphakia Treatment Study: Reply

Deborah K Vanderveen, MD[1], **Rupal H. Trivedi, MD**[2], **Nizam Azhar, PhD**[3], **Michael J. Lynn, MS**[3], and **Scott R. Lambert, MD**[4]

[1]Children's Hospital Boston, Harvard Medical School, Boston MA

[2]Storm Eye Institute, Charleston, SC

[3]Department of Biostatistics and Bioinformatics, Rollins School of Public Health, Emory University, Atlanta, GA

[4]Department of Ophthalmology, Emory University School of Medicine, Atlanta GA

We appreciate Dr Cooke's comments and interest in the Infant Aphakia Treatment Study (IATS) population for comparison of intraocular lens (IOL) calculation formula performance.[1] We also appreciate his assistance in accessing some of the additional formulae. The table shows absolute prediction errors for the IATS eyes using the manufacturer's A-constant. Of the 4 additional formulae examined (bold), T2 had the smallest mean and median absolute prediction error.

We were not able to optimize the T2 and Universal formulae using publicly available software. When optimized constants were used for commonly available formulae, we found better mean and median absolute prediction errors for each formula, but optimization did not change which formula gave the best median value. While optimization of constants would allow an ideal comparison of formula performance in very short eyes, calculations obtained from this cohort would not be valid for generalized use because of the small number of eyes and variability in ultrasound machines and techniques (immersion vs contact) used at different study centers. As Dr Cooke notes, the T2 formula was designed to address the nonphysiological behavior of the Sanders-Retzlaff-Kraff Theoretical formula for IOL prediction in very long eyes (axial length>36.2mm)and to address the ''cusp phenomenon,'' which refers to errors in corneal height calculations that are found for each axial length in association with high keratometry readings. We agree that since infant eyes often have steep corneal measurements, the T2 formula may offer an advantage in IOL calculation. We thank Dr. Cooke again for his thoughts and interest.

Corresponding author: Deborah K. VanderVeen, MD, 300 Longwood Avenue, Fegan 4, Boston MA 02115, 617-355-8761, Fax 617-730-0392, deborah.vanderveen@childrens.harvard.edu.

REFERENCE

1. VanderVeen DK, Trivedi RH, Nizam A, Lynn MJ, Lambert SR. Predictability of intraocular lens power calculation formulae in infantile eyes with unilateral congenital cataract: Results from the Infant Aphakia Treatment Study. Am J Ophthalmol. 2013; 156(6):1252–1260. [PubMed: 24011524]

TABLE

Absolute Prediction Error by Intraocular Lens Calculation Formula using Manufacturer Constants

Formula (n=42)	Absolute Predictor Error (Diopters)	
	Mean ± SD	Median (*)
Haigis (n=33)	3.5 ± 2.2	3.5 (1.4, 5.1)
Hoffer Q	2.6 ± 2.0	2.1 (0.7, 4.0)
Holladay 1	1.7 ± 1.3	1.2 (0.7, 2.5)
Holladay 2	1.9 ± 1.5	1.4 (0.6, 2.9)
Olsen (n=33)	2.2 ± 1.7	1.6 (0.9, 3.3)
SRK/T	1.4 ± 1.1	1.3 (0.3, 2.1)
SRK II	2.4 ± 1.8	2.2 (0.9, 3.6)
T2	1.3 ± 1.0	1.1 (0.5, 2.0)
Universal	3.0 ± 2.2	2.8 (1.1, 4.7

SD=Standard Deviation; SRK/t=Sanders-Retzlaff-Kraff Theoretic; SRK II=Sanders-Retzlaff-Kraff II.

*(1st Quartile, 3rd Quartile)