Predicting Postoperative Anterior Chamber Angle for Phakic Intraocular Lens Implantation Using Preoperative Anterior Segment Metrics

Supplementary Materials

Supplementary Table 1. Definitions of AOD500, AOD750, ARA500, ARA750, TISA500, TISA750, TIA500, TIA750, SSA500, and SSA750.

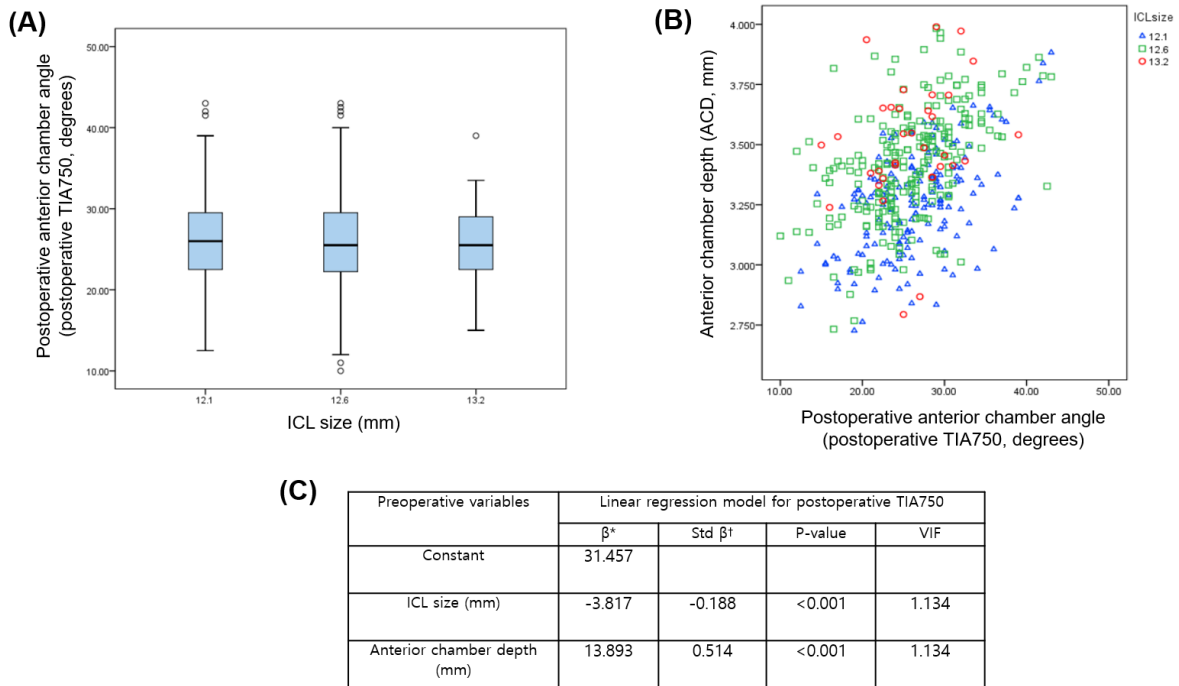| Variables	Definition
AOD500	AOD500 was measured as the perpendicular distance from the trabecular meshwork 500 μm anteriorly from the scleral spur to the anterior iris surface.
AOD750	AOD750 was measured as the perpendicular distance from the trabecular meshwork 750 μm anteriorly from the scleral spur to the anterior iris surface
ARA500	ARA500 is the trabecular-iris space area 500 μm from the angle recess bounded anteriorly by the AOD500, posteriorly by a line drawn from the angle recess perpendicular to the plane of the inner scleral wall to the opposing iris, superiorly by the inner corneoscleral wall, and inferiorly by the iris surface.
ARA750	ARA750 is the trabecular-iris space area 750 μm from the angle recess bounded anteriorly by the AOD750, posteriorly by a line drawn from the angle recess perpendicular to the plane of the inner scleral wall to the opposing iris, superiorly by the inner corneoscleral wall, and inferiorly by the iris surface.
TISA500	TISA500 was defined as the trabecular-iris space area 500 μm from the scleral spur, bounded anteriorly by the AOD500, posteriorly by a line drawn from the scleral spur perpendicular to the plane of the inner scleral wall to the opposing iris, superiorly by the inner corneoscleral wall, and inferiorly by the iris surface.
TISA750	TISA750 was defined as the trabecular-iris space area 750 μm from the scleral spur, bounded anteriorly by the AOD750, posteriorly by a line drawn from the scleral spur perpendicular to the plane of the inner scleral wall to the opposing iris, superiorly by the inner corneoscleral wall, and inferiorly by the iris surface.
TIA500	TIA was measured by tracing a line of 500 μm from the angle recess toward the Schwalbe line and another line on the surface of the iris to the point perpendicular to the first line.
TIA750	TIA was measured by tracing a line of 750 μm from the angle recess toward the Schwalbe line and another line on the surface of the iris to the point perpendicular to the first line.
SSA500	SSA500 was measured by tracing a line of 500 μm from the scleral spur toward the Schwalbe line and another line on the surface of the iris to the point perpendicular to the first line.
SSA750	SSA750 was measured by tracing a line of 750 μm from the scleral spur toward the Schwalbe line and another line on the surface of the iris to the point perpendicular to the first line.

Supplementary Table 2. Equations for predicting postoperative anterior chamber angles, including TIA500, TIA750, SSA500, and SSA750.

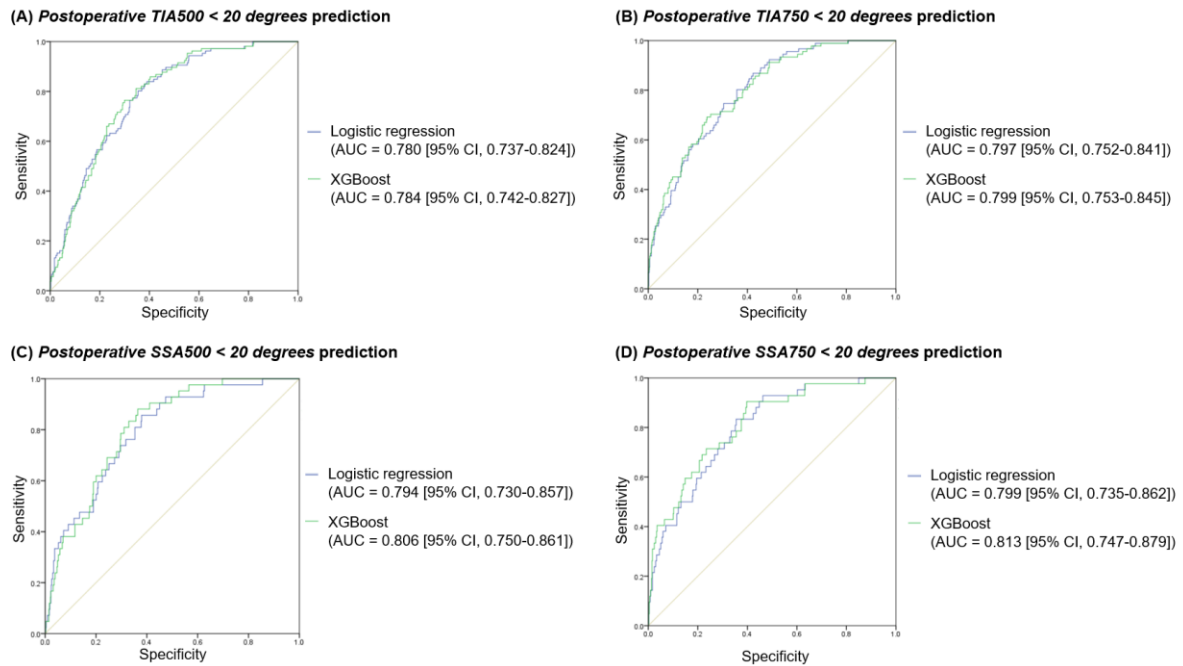| Target variables	Regression models using preoperative factors
Postoperative TIA500	$23.624 - 4.487 \times ICL\ size\ (mm) - 2.308 \times puil\ size\ (dark, mm)$ $+ 15.818 \times ACD\ (mm) + 1.221 \times ACW\ (mm)$ $+ 0.009 \times CLR\ (\mu m) + 0.132 \times TIA750\ (degree)$
Postoperative TIA750	$34.011 - 5.000 \times ICL\ size\ (mm) - 1.927 \times pupil\ size\ (dark, mm)$ $+ 12.517 \times ACD\ (mm) + 1.651 \times ACW\ (mm)$ $+ 0.007 \times CLR\ (\mu m) + 0.065 \times TIA750\ (degree)$
Postoperative SSA500	$25.924 - 6.303 \times ICL\ size\ (mm) - 3.007 \times pupil\ size\ (dark, mm)$ $+ 17.286 \times ACD\ (mm) + 3.348 \times ACW\ (mm)$ $+ 0.011 \times CLR\ (\mu m) + 0.161 \times TIA750\ (degree)$
Postoperative SSA750	$32.378 - 5.973 \times ICL\ size\ (mm) - 2.349 \times pupil\ size\ (dark, mm)$ $+ 15.959 \times ACD\ (mm) + 2.466 \times ACW\ (mm)$ $+ 0.008 \times CLR\ (\mu m) + 0.112 \times TIA750\ (degree)$

AOD500, angle open distance at 500 µm; AOD750, angle open distance at 750 µm; ARA500, angle recess area at 500 µm; ARA750, angle recess area at 750 µm; ICL, implantable collamer lens; SSA500, scleral spur angle at 500 µm; SSA750, scleral spur angle at 750 µm; TISA500, trabecular iris space area at 500 µm; TISA750, trabecular iris space area at 750 µm; TIA500, trabecular iris angle at 500 µm; TIA750, trabecular iris angle at 750 µm
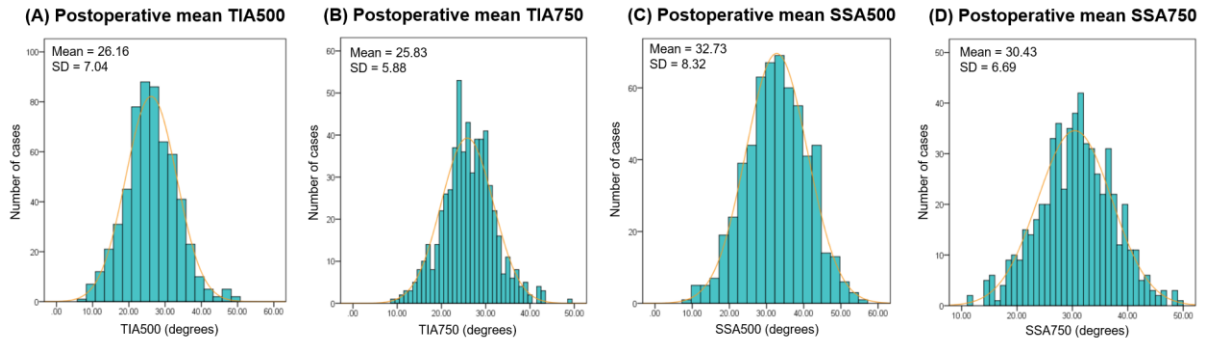
Supplementary Figure 1. Distribution of postoperative TIA500, TIA750, SSA500, and SSA750.

Preoperative variables	Linear regression model for postoperative TIA750			
	β*	Std β†	P-value	VIF
Constant	31.457			
ICL size (mm)	-3.817	-0.188	<0.001	1.134
Anterior chamber depth (mm)	13.893	0.514	<0.001	1.134

Supplementary Figure 2. Exploratory analyses related to the ICL size. (A) The box plots reveal no postoperative anterior chamber angle (TIA750) differences between different ICL sizes. (B) The distribution plot and (C) regression analysis reveal the interaction between anterior chamber depth and ICL size to predict postoperative anterior chamber angle (TIA750).

(A) *Postoperative TIA500 < 20 degrees prediction*

(B) *Postoperative TIA750 < 20 degrees prediction*

(C) *Postoperative SSA500 < 20 degrees prediction*

(D) *Postoperative SSA750 < 20 degrees prediction*

Supplementary Figure 3. Narrow ACAs (< 20°) prediction results using a five-fold cross-validation based on the whole dataset.

Supplementary Figure 4. Calculator webpage established for postoperative ACA prediction based on preoperative measurements. The application is publicly accessible via a web browser (https://taekeuntoo.github.io/) for a prompt hands-on experience with postoperative ACA prediction.