ARTICLE

Accuracy of new-generation intraocular lens calculation formulas in eyes undergoing combined silicone oil removal and cataract surgery

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Purpose: To compare the performance of new-generation and traditional intraocular lens (IOL) calculation formulas in eyes undergoing combined silicone oil (SO) removal and cataract surgery and to evaluate the prediction accuracy of Wang-Koch (WK) adjustment in SO-filled long eyes.

Setting: Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China.

Design: Retrospective consecutive case-series study.

Methods: New-generation formulas (Barrett Universal II, Emmetrypa Verifying Optical, Kane, and Ladas Super formulas) and traditional formulas (Haigis, Hoffer Q, Holladay 1, and SRK/T formulas) were compared. The performance of WK adjustment was assessed in eyes with axial length more than 26 mm. The median absolute error (MedAE) was the main parameter to evaluate the accuracy of formulas.

Results: A total of 211 participants (211 eyes) who underwent combined SO removal and phacoemulsification with IOL implantation were included. Four new-generation formulas displayed statistically significant lower MedAE (0.32 to 0.35 diopter [D]) and higher percentage of eyes within ±1.00 D of prediction error (85.31% to 87.20%) compared with those of the traditional formulas (MedAE: 0.39 to 0.50 D; ±1.00 D: 81.04% to 81.99%, P < .05). For SO-filled long eyes, all traditional formulas showed hyperopic bias (0.36 to 0.65 D, P < .05), except for Haigis formula (0.28 D, P = .083), and this bias could be corrected by WK adjustment (P > .05). EVO formula displayed the lowest MedAE both in total (0.32 D) and in long eyes (0.33 D).

Conclusions: New-generation formulas and traditional formulas with WK adjustment showed satisfactory prediction accuracy in eyes undergoing combined SO removal and cataract surgery. EVO formula displayed the highest accuracy.

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With the continuous advances in instrumentation and surgical technique, pars plana vitrectomy (PPV) has been widely performed in a variety of vitreoretinopathy. As one of the commonly used intra-vitreal tamponades, silicone oil (SO) plays a critical role when treating complex vitreoretinopathy. Cataract formation or progression is the most frequent postoperative complication after PPV, and previous studies have reported that up to 100% of eyes showed cataract progression within 2 years. In particular, the SO tamponade is associated with the shortest interval between PPV and cataract surgery compared with other intravitreal tamponades.

More and more surgeons prefer to perform combined SO removal and phacoemulsification with intraocular lens (IOL) implantation in this situation, because combined surgery can reduce the number of operations and related costs and increase the visibility of the fundus. Unfortunately, it remains challenging to achieve desired target
for these patients. Therefore, it is urgent to improve the accuracy of refractive prediction in this special population.

Biometric measurement and IOL formula selection are 2 most important factors affecting the refractive error in SO-filled eye. New biometry instrument based on swept-source optical coherence tomography (SS-OCT) and a series of new formulas have appeared in recent years, such as Barrett Universal II (BUII) formula, Emmetropia Verifying Optical (EVO) formula, Kane formula, and Ladas Super formula (LSF), which might increase the possibility to achieve refractive target. However, the performance of these new-generation formulas based on SS-OCT device remains elusive in SO-filled eyes.

The aim of this study was to compare the prediction accuracy of new-generation formulas (BUII, EVO, Kane, and LSF) with traditional formulas (Haigis, Hoffer Q, Holladay 1, and SRK/T formulas) based on SS-OCT measurements in patients undergoing combined SO removal/phacoemulsification with IOL implantation. The performance of Wang-Koch (WK) axial length (AL) adjustment methods in high myopia subgroup was also evaluated.

METHODS
This retrospective consecutive case series study was performed under the approval of the Institutional Review Board/Ethics Committee of Zhongshan Ophthalmic Center, Sun Yat-sen University (2019KYPJ033). Informed consents were waived because only the medical records were involved. All procedures were conformed to the tenets of the Declaration of Helsinki.

Selection Criteria
The medical charts of patients were reviewed from August 16, 2018, to May 27, 2020, at Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China. The inclusion criteria included the following: (1) patients underwent a combined SO removal/phacoemulsification with IOL implantation; (2) in-the-bag implantation of hydrophobic acrylic IOL, including 1-piece IOL (eNista MX60, Bausch & Lomb, Inc.), and 3-piece IOL (Sensar AR40e, Abbott Medical Optics); and (3) preoperative biometry performed by IOLMaster 700. The exclusion criteria included the following: (1) keratopathy, glaucoma, uveitis, ocular trauma, or lens dislocation; (2) undergoing second SO tamponade due to recurrence of original disease; (3) history of scleral buckling surgery; (4) history of corneal refractive surgery; (5) preoperative astigmatism larger than 3.00 diopters (D); (6) severe posterior capsule opacification affecting manifest refraction; and (7) incomplete follow-up information. If both eyes of a patient meet the criteria, the right eye is selected for inclusion.

Data Collection
The following data were collected: age, sex, history of eye diseases and surgeries, indication for PPV and SO tamponade, surgical procedures, time between PPV and combined SO removal/cataract surgery, preoperative ocular biometric parameters [AL; corneal power; anterior chamber thickness (ACD)], measured from corneal epithelium to lens; lens thickness (LT); corneal diameter (CD)], type and power of IOL, preoperative and postoperative corrected distance visual acuity (CDVA), and refraction results at least 1 month postoperatively.

Formula Calculations
The performance of new formulas including BUII (version 1.05, available at http://calc.apacrs.org/barrett_universal2105/, accessed on June 20, 2020), EVO (version 2.0, available at https://www.evoolcalculator.com/calculator.aspx, accessed on June 20, 2020), Kane (available at https://www.iolformula.com, accessed on June 20, 2020), and LSF (version 1.0b, available at http://iolcalc.com, accessed on June 20, 2020) were evaluated. The traditional Haggis, Hoffer Q, Holladay 1, and SRK/T formulas were also calculated (available at http://www.eyecalcs.com/WEBCALCS/IOLcalc2/IOL2.html, accessed on June 20, 2020). The lens constants were optimized separately for 2 types of IOL, and the mean error (ME) of each formula was zeroed individually. For patients with AL more than 26 mm, the Haigis, Hoffer Q, Holladay 1, and SRK/T with the first linear (WK1), second linear (WK2), and nonlinear (WKni) versions of WK adjustment were evaluated.

Formula Evaluation
The accuracy of the formula was evaluated by the following parameters. First, each prediction error (PE) was back-calculated as the difference between the predicted and postoperative actual spherical equivalent. The mean PE (ME) was the mean of all the PEs for each formula evaluated. A positive and negative ME displays a hyperopic and myopic systemic bias, respectively. In addition, the SD of PE was reported, which reflects the prediction stability. Second, the absolute PE was the absolute value of each PE. The mean absolute PE (MAE) and the median absolute error (MedAE) were the mean and the median of all these values, respectively. Third, the percentage of eyes within ±0.25 D, ±0.50 D, and ±1.00 D of PE were also reported. The MedAE was set to be the main parameter when comparing the prediction accuracy of different formulas.

Statistical Analysis
The CDVA was recorded in decimal units and converted to logarithm of the minimum angle resolution (logMAR) units for the statistical analyses. Statistical analyses of IOL power calculation formulas were performed according to the published protocol. The normality of data was examined by the Kolmogorov-Smirnov test. The baseline characteristics of the participants were analyzed according to the IOL implanted. The 1-sample t test was used to test whether ME was statistically significantly different from zero. The Friedman test was performed to compare the percentage of cases within ±0.25 D, ±0.50 D, and ±1.00 D of PE. The statistical analysis was performed using IBM SPSS Statistics for Windows software (version 23.0, IBM Corp.). Multiple comparisons were performed by the Bonferroni adjustment. A corrected P value less than 0.05 was considered statistically significant.

RESULTS
Demographic and clinical characteristics of enrolled patients are listed in Table 1. In total, 211 eyes of 211 eligible patients (129 male patients) were included. The mean age of the patients was 54.49 ± 10.16 years (range 14 to 72 years). There were 53 eyes (25.12%) with AL longer than 26 mm. There were no statistically significant differences in demographic and clinical characteristics between 2 subgroups, except for age (P = .048) and time between PPV and SO removal (P = .029). Indications for PPV and SO tamponade included retinal detachment in 164 eyes (77.73%), proliferative diabetic retinopathy in 36 eyes (17.06%), macular hole in 6 eyes (2.84%), and vitreous hemorrhage in 5 eyes (2.37%).

A 3.0 mm transparent corneal incision was made during phacoemulsification with IOL implantation. In addition, posterior capsulectomy was performed on condition that an obviously opacified posterior capsule was observed.
Sixty-seven eyes were implanted with 1-piece IOL (enVista MX60 IOL) and 144 eyes with 3-piece IOL (Sensar AR40e IOL). The CDVA significantly improved from 1.18 ± 0.49 logMAR to 0.73 ± 0.42 logMAR after the combined SO removal and cataract surgery.

The prediction outcomes of 8 IOL calculation formulas in overall are summarized in Table 2 and Figures 1, A and 2, A. There were no statistically significant differences in parameters including MAE, MedAE, and percentages of cases within ±0.25 D, ±0.50 D, and ±1.00 D of PE among 4 new-generation formulas. The MedAE, in order of lowest to highest, was EVO (0.32 D), BUII (0.33 D), LSF (0.34 D), and Kane (0.35 D). EVO formulas also displayed the highest percentages within ±0.25 D (42.18%) and ±0.50 D (65.40%) of PE. Among 4 traditional formulas, Hoffer Q, Holladay 1, and SRK/T formulas displayed the same MedAE (0.39 D). The Haigis formula displayed a relatively lower but no statistically significant prediction accuracy compared with the other 3 traditional formulas (MedAE = 0.50 D, P > .05). Compared with 4 new-generation formulas, the traditional formulas showed statistically higher MAE (0.39 to 0.50 D) and lower percentages within ±0.25 D (26.54% to 35.55%), ±0.50 D (50.24% to 58.29%), ±1.00 D (81.04% to 81.99%) of PE. The predictive outcomes of 2 IOLs subgroups are shown in Table 1 (see Supplemental Digital Content 1, available at http://links.lww.com/JRS/A271) similar to the aforementioned results.

The prediction accuracy of 15 formulas in eyes with AL more than 26 mm is summarized in Table 3 and Figures 1, B and 2, B. All new-generation formulas showed no systematic bias, whereas all traditional formulas showed a statistically significant hyperopic shift (0.36 to 0.65 D) in highly myopic eyes, except for Haigis (0.28 D, P = .083). However, this hyperopic bias of 3 traditional formulas could be corrected by WK adjustment (P > .05). There were no statistically significant differences in prediction accuracy among formulas including BUII, EVO, Kane, LSF, and 4 traditional formulas with WK adjustment. The following formulas displayed relatively lower MedAE, including EVO (0.33 D), Kane (0.37 D), Holladay 1-WK (0.39 D), SRK/T-WK2 (0.40 D), and BUII (0.41 D).

### Table 1. Demographic and Clinical Characteristics of Participants.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Overall</th>
<th>1-piece IOL</th>
<th>3-piece IOL</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye, n (%)</td>
<td>211</td>
<td>67 (31.75)</td>
<td>144 (68.25)</td>
<td>.770</td>
</tr>
<tr>
<td>Male sex, n (%)</td>
<td>129 (61.14)</td>
<td>40 (59.70)</td>
<td>89 (61.81)</td>
<td>.048</td>
</tr>
<tr>
<td>Age (y)</td>
<td>54.94 ± 10.16</td>
<td>52.51 ± 12.04</td>
<td>55.47 ± 9.04</td>
<td>.866</td>
</tr>
<tr>
<td>Preop CDVA (logMAR)</td>
<td>1.18 ± 0.99</td>
<td>1.19 ± 0.51</td>
<td>1.18 ± 0.48</td>
<td>.439</td>
</tr>
<tr>
<td>Postop CDVA (logMAR)</td>
<td>0.73 ± 0.42</td>
<td>0.69 ± 0.40</td>
<td>0.74 ± 0.43</td>
<td>.209</td>
</tr>
<tr>
<td>Time between PPV and SOR (mo)</td>
<td>8.06 ± 5.64</td>
<td>9.30 ± 7.69</td>
<td>7.48 ± 4.29</td>
<td>.280</td>
</tr>
<tr>
<td>AL (mm)</td>
<td>24.84 ± 2.28</td>
<td>25.02 ± 2.21</td>
<td>24.75 ± 2.31</td>
<td>.416</td>
</tr>
<tr>
<td>Corneal power (D)</td>
<td>43.52 ± 1.51</td>
<td>43.55 ± 1.54</td>
<td>43.50 ± 1.51</td>
<td>.847</td>
</tr>
<tr>
<td>ACD (mm)</td>
<td>3.06 ± 0.39</td>
<td>3.05 ± 0.39</td>
<td>3.06 ± 0.39</td>
<td>.924</td>
</tr>
<tr>
<td>LT (mm)</td>
<td>4.52 ± 0.43</td>
<td>4.49 ± 0.49</td>
<td>4.53 ± 0.41</td>
<td>.566</td>
</tr>
<tr>
<td>CD (mm)</td>
<td>11.93 ± 0.39</td>
<td>11.92 ± 0.37</td>
<td>11.93 ± 0.40</td>
<td>.599</td>
</tr>
<tr>
<td>IOL power (D)</td>
<td>18.22 ± 5.26</td>
<td>17.94 ± 5.26</td>
<td>18.35 ± 5.36</td>
<td>.599</td>
</tr>
<tr>
<td>AL &gt;26 mm, n (%)</td>
<td>53 (25.12)</td>
<td>20 (29.85)</td>
<td>33 (22.92)</td>
<td>.280</td>
</tr>
</tbody>
</table>

ACD = anterior chamber depth, as measured from corneal epithelium to lens; AL = axial length; CD = corneal diameter; LT = lens thickness; PPV = pars plana vitrectomy; postop = postoperative; preop = preoperative; SOR = silicone oil removal

x² test
Independent t test
Statistically significant (P < .05)

### Table 2. Predictive Outcomes of Various Intraocular Lens Formulas in Total.

<table>
<thead>
<tr>
<th>Formula</th>
<th>ME</th>
<th>SD</th>
<th>MAE</th>
<th>MedAE</th>
<th>Max error</th>
<th>±0.25 D (%)</th>
<th>±0.50 D (%)</th>
<th>±1.00 D (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUII</td>
<td>0</td>
<td>0.86</td>
<td>0.55</td>
<td>0.33</td>
<td>3.83</td>
<td>40.76</td>
<td>64.93</td>
<td>87.20</td>
</tr>
<tr>
<td>EVO</td>
<td>0</td>
<td>0.85</td>
<td>0.54</td>
<td>0.32</td>
<td>3.54</td>
<td>42.18</td>
<td>65.40</td>
<td>86.26</td>
</tr>
<tr>
<td>Kane</td>
<td>0</td>
<td>0.84</td>
<td>0.55</td>
<td>0.35</td>
<td>3.63</td>
<td>39.81</td>
<td>65.88</td>
<td>85.78</td>
</tr>
<tr>
<td>LSF</td>
<td>0</td>
<td>0.89</td>
<td>0.57</td>
<td>0.34</td>
<td>4.05</td>
<td>36.49</td>
<td>64.45</td>
<td>85.31</td>
</tr>
<tr>
<td>Haigis</td>
<td>0</td>
<td>1.00</td>
<td>0.68</td>
<td>0.50</td>
<td>4.20</td>
<td>26.54</td>
<td>50.24</td>
<td>81.52</td>
</tr>
<tr>
<td>Hoffer Q</td>
<td>0</td>
<td>0.98</td>
<td>0.65</td>
<td>0.39</td>
<td>4.36</td>
<td>35.55</td>
<td>59.29</td>
<td>81.04</td>
</tr>
<tr>
<td>Holladay 1</td>
<td>0</td>
<td>0.98</td>
<td>0.65</td>
<td>0.39</td>
<td>4.36</td>
<td>35.55</td>
<td>59.29</td>
<td>81.04</td>
</tr>
<tr>
<td>SRK/T</td>
<td>0</td>
<td>0.93</td>
<td>0.61</td>
<td>0.39</td>
<td>4.32</td>
<td>35.07</td>
<td>56.40</td>
<td>81.99</td>
</tr>
</tbody>
</table>

±0.25 D (%), ±0.50 D (%), ±1.00 D (%) = percentage of eyes within ±0.25 D, ±0.50 D, or ±1.00 D of prediction error; BUII = Barrett Universal II formula; EVO = Emmetropia Verifying Optical formula; LSF = Ladas Super formula; MAE = mean absolute prediction error; Max error = maximum prediction error; ME = mean arithmetic spherical equivalent prediction error; MedAE = median absolute error; SD = standard deviation of arithmetic spherical equivalent prediction error
DISCUSSION

To the authors’ knowledge, it is the first study to investigate the prediction accuracy of new-generation calculators (BUII, EVO, Kane, and LSF) and WK adjustment in patients undergoing combined SO removal and cataract surgery, based on SS-OCT biometry and a large sample size. This study demonstrated that new-generation formulas (BUII, EVO, Kane, and LSF) were more accurate than traditional formulas (Haigis, Hoffer Q, Holladay 1, and SRK/T) in SO-filled eyes. For SO-filled long eyes, the hyperopic bias of Hoffer Q, Holladay 1, and SRK/T formulas could be corrected by WK adjustment. EVO formula displayed the highest prediction accuracy in this special population.

The highly variable refractive errors lead to unsatisfactory surgical outcomes in patients undergoing SO removal with phacoemulsification and IOL implantation. Previous studies have reported the postoperative refractive status of SO-filled eyes with high heterogeneity (30% to 85% within ±1.00 D of target refraction) based on relatively small sample size (12 to 117 eyes). 6,19–26 In this study, 81.04% to 87.20% of SO-filled eyes displayed a PE within ±1.00 D, and 64.15% to 84.91% achieved a PE within ±1.00 D in long eyes. However, for normal eyes undergoing cataract surgery, 47.0% of eyes were within ±0.25 D of refractive target, 79.1% of eyes were within ±0.50 D, and 97.2% of eyes were within ±1.00 D. 27 The results of the study indicate that even the newly developed SS-OCT biometric instrument and new IOL calculation formulas are applied, the refractive outcomes of SO-filled eyes still lag far behind the normal eyes.

The performance of new IOL calculation formulas in patients undergoing combined SO removal and cataract surgery remains largely unknown until this study. Most of the previous studies only evaluated SRK/T formula, based on small sample size and different biometry instruments including ultrasound, partial coherence interference (PCI), computed tomography, or magnetic resonance imaging scan. 19,23–26 Al-Habboubi et al. evaluated the refractive outcomes of 98 SO-filled eyes and compared only the performance of third-generation formulas including Hoffer Q, Holladay 1, and SRK/T formulas, based on PCI biometry. 6 The performance of traditional formulas in this study was consistent with previous studies based on PCI biometry and better than studies based on A-mode biometry. Furthermore, the Haigis formula showed relatively lower but not statistically significant
In this study with a larger sample size, we found that these new formulas disp

Unfortunately, even if the SS-OCT technology uses longer wavelength,

value with traditional formulas.

28,29

layed statistically higher

myopic eyes with or without previous vitrectomy.

observed that new-generation formulas and traditional

challenge in refractive prediction. Our previous study

SO-filled eyes (25.12% in this study), which poses another

that these new formulas disp

prediction accuracy compared with traditional formulas.

There is a relatively high percentage of high myopia in

SO-filled eyes (25.12% in this study), which poses another

challenge in refractive prediction. Our previous study

observed that new-generation formulas and traditional

formulas, WK1 version displayed lower prediction accuracy

population and observed that, for Holladay 1 and SRK/T

evaluations. Moreover, we also

There are some limitations that should be addressed.

First, the Holladay 2, Olsen, and radial basis function

formulas were not evaluated in this study. The Holladay 2

and Olsen formula are currently only available on LEN-

STAR LS900 (Haag-Streit AG). Moreover, a significant

portion of participants fell outside the target refraction

range within −2.50 D of the radial basis function formula.

Therefore, we evaluated BUII, EVO, and Kane formulas

and LSF because these formulas were available online and

easy to use in clinical practice. Second, the accuracy of

manifest refraction and the evaluation of IOL formulas

might be affected by the relatively worse visual acuity in

vitrectomized eyes. Third, 2 types of IOL were included.

To minimize the influence of this factor, we did a subgroup

analysis (Supplemental Digital Content 1, Table 1, http://

links.lww.com/JRS/A271) and observed similar outcomes.

In summary, the new-generation formulas exhibited

better performance than traditional formulas in patients

undergoing combined SO removal and cataract surgery.

For SO-filled highly myopic eyes, all traditional formulas

showed hyperopic bias except for the Haigis formula, and

this bias could be corrected by WK adjustment. The EVO

formula exhibited the highest prediction accuracy in this

special population.

Table 3. Predictive Outcomes of Various Intraocular Lens Formulas in Patients With Axial Length More Than 26 mm.

<table>
<thead>
<tr>
<th>Formula</th>
<th>ME</th>
<th>SD</th>
<th>P value*</th>
<th>MAE</th>
<th>MedAE</th>
<th>Max error</th>
<th>±0.25 D (%)</th>
<th>±0.50 D (%)</th>
<th>±1.00 D (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUII</td>
<td>0.20</td>
<td>0.93</td>
<td>.131</td>
<td>0.64</td>
<td>0.41</td>
<td>3.16</td>
<td>33.96</td>
<td>60.38</td>
<td>83.02</td>
</tr>
<tr>
<td>EVO</td>
<td>0.17</td>
<td>0.93</td>
<td>.193</td>
<td>0.61</td>
<td>0.33</td>
<td>3.09</td>
<td>41.51</td>
<td>60.38</td>
<td>83.02</td>
</tr>
<tr>
<td>Kane</td>
<td>0.14</td>
<td>0.86</td>
<td>.259</td>
<td>0.60</td>
<td>0.37</td>
<td>2.27</td>
<td>35.85</td>
<td>64.15</td>
<td>81.13</td>
</tr>
<tr>
<td>LSF</td>
<td>0.26</td>
<td>0.99</td>
<td>.060</td>
<td>0.67</td>
<td>0.44</td>
<td>4.05</td>
<td>32.08</td>
<td>60.38</td>
<td>81.13</td>
</tr>
<tr>
<td>Haigis</td>
<td>0.28</td>
<td>1.14</td>
<td>.083</td>
<td>0.80</td>
<td>0.56</td>
<td>4.20</td>
<td>28.30</td>
<td>45.28</td>
<td>73.58</td>
</tr>
<tr>
<td>Haigis-WK1</td>
<td>−0.06</td>
<td>1.15</td>
<td>.682</td>
<td>0.77</td>
<td>0.49</td>
<td>3.54</td>
<td>28.30</td>
<td>50.94</td>
<td>79.25</td>
</tr>
<tr>
<td>Hoffer Q</td>
<td>0.57</td>
<td>1.09</td>
<td>&lt;.001*</td>
<td>0.88</td>
<td>0.70</td>
<td>4.36</td>
<td>26.42</td>
<td>43.40</td>
<td>64.15</td>
</tr>
<tr>
<td>Hoffer Q-WK1</td>
<td>−0.10</td>
<td>0.96</td>
<td>.433</td>
<td>0.49</td>
<td>3.43</td>
<td>26.42</td>
<td>50.94</td>
<td>83.02</td>
<td></td>
</tr>
<tr>
<td>Holladay 1</td>
<td>0.65</td>
<td>1.06</td>
<td>&lt;.001*</td>
<td>0.88</td>
<td>0.70</td>
<td>4.36</td>
<td>26.42</td>
<td>43.40</td>
<td>64.15</td>
</tr>
<tr>
<td>Holladay 1-WK1</td>
<td>0.03</td>
<td>0.94</td>
<td>.798</td>
<td>0.65</td>
<td>0.50</td>
<td>3.05</td>
<td>30.19</td>
<td>52.83</td>
<td>83.02</td>
</tr>
<tr>
<td>Holladay 1-WK2</td>
<td>0.10</td>
<td>0.90</td>
<td>.440</td>
<td>0.87</td>
<td>0.39</td>
<td>2.78</td>
<td>35.85</td>
<td>56.60</td>
<td>81.13</td>
</tr>
<tr>
<td>Holladay 1-WKn</td>
<td>0.18</td>
<td>0.91</td>
<td>.166</td>
<td>0.63</td>
<td>0.43</td>
<td>2.78</td>
<td>35.85</td>
<td>56.60</td>
<td>81.13</td>
</tr>
<tr>
<td>SRK/T</td>
<td>0.36</td>
<td>1.04</td>
<td>.014*</td>
<td>0.75</td>
<td>0.50</td>
<td>4.32</td>
<td>28.30</td>
<td>50.94</td>
<td>71.70</td>
</tr>
<tr>
<td>SRK/T-WK1</td>
<td>−0.01</td>
<td>0.96</td>
<td>.939</td>
<td>0.65</td>
<td>0.43</td>
<td>3.26</td>
<td>26.42</td>
<td>54.72</td>
<td>83.02</td>
</tr>
<tr>
<td>SRK/T-WK2</td>
<td>0.06</td>
<td>0.92</td>
<td>.641</td>
<td>0.64</td>
<td>0.40</td>
<td>2.87</td>
<td>26.42</td>
<td>60.38</td>
<td>84.91</td>
</tr>
</tbody>
</table>

*Comparison between ME and zero

Statistically significant (P < .05)
WHAT WAS KNOWN
- The highly variable refractive errors lead to unsatisfactory surgical outcomes in patients undergoing silicone oil removal with phacoemulsification and IOL implantation.
- Only the third-generation formulas were evaluated in previous studies.

WHAT THIS PAPER ADDS
- New-generation formulas exhibited better prediction accuracy compared with traditional formulas in patients undergoing combined silicone oil removal and cataract surgery.
- For silicone oil-filled highly myopic eyes, the Wang-Koch axial length adjustment could correct the hyperopic bias of traditional formulas.
- Emmetropia Verifying Optical formula displayed the highest prediction accuracy in this special population.

REFERENCES

Disclosures: None reported.

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