



Carlo F Lovisolo

Devon Schuyler
in Las Vegas

VERY high frequency sonography appears to be a better method for sizing the implantable contact lens (Staar, ICL) than the conventional 'white-to-white' method, according to Carlo F Lovisolo MD, medical director of the Quattroelle Eye Center in Milan, Italy.

"The key factor for success in ICL placement is proper positioning of the lens compared to intraocular tissues. Only by choosing the correctly-sized ICL will the vault – the space between the posterior chamber ICL and the natural lens – be the right size," he told a session of the annual AAO meeting.

Dr Lovisolo explained that the ideal vault size depends on the age of the patient, but should range from 200 to 750 microns. An older patient will require a smaller vault, whereas a younger patient will require a larger vault. The ideal vault size also depends on the design of the ICL.

If the ICL is too small, the vault will also be too small. This can cause lack of nutrient flow to the lens, potentially leading to anterior subcapsular lens opacities. By contrast, an oversized ICL will lead to a too-large vault. This may lead to such problems as closed-

angle glaucoma, a "crowded" anterior chamber, iris chafing and pigment dispersion, breakage of the blood-aqueous barrier, and pain and tenderness.

Dr Lovisolo said that the standard way to size the ICL is to examine the eye with a slit-lamp and measure the white-to-white space using callipers.

"However, the evidence is strong in the literature that no statistical correlation exists between external and internal dimensions," he said, pointing to a retrospective study he presented at the 1998 ESCRS winter meeting. "We found that for 34 per cent of patients, the surface diameter was smaller, and for 66 per cent, the interior diameter was smaller."

In an effort to achieve more accurate measurements, Dr Lovisolo worked with Ultralink LLC (St. Petersburg, Florida) to develop a very high frequency sonography machine that works in conjunction with specialised software to determine intraocular biometry (the Artemis 2). He compared this sizing method with standard sizing in a 255 eye study.

Some 180 eyes were randomised to the sonography group; 151 of these were myopic and 29 were hyperopic. There were 75 eyes

in the white-to-white group; 68 of these were myopic and seven were hyperopic.

The study, which was published in *Survey of Ophthalmology* (Nov-Dec 2005;50:549-87), revealed an average vault size of 0.386 microns with sonography, versus 0.406 microns with white-to-white sizing. The standard deviation was far less with sonography than with white-to-white sizing (0.113 versus 0.667), and the minimum vault was larger (189 versus 0 microns).

This translated into better results with sonography than with white-to-white sizing. There was a lower incidence of both iatrogenic cataract (zero per cent versus eight per cent) and clinically significant pigmentary dispersion (zero per cent versus 9.3 per cent) with sonography.

Multivariate regression analysis revealed that measurements such as anterior chamber depth, sulcus-to-sulcus, angle-to-angle, and hand, nose, foot size did not produce more accurate results than white-to-white.

Dr Lovisolo explained that the prevention of ICL complications requires size customisation, as based on very high-frequency echographic intraocular biometry and finite element analysis-based software. He added that, because of its poor statistical

correlation with the intended vault height, the white-to-white measurement should be abandoned for sizing ICLs.

"This is an excellent study. I think it's such an important issue in doing ICLs," said Helen K Wu MD, one of the panellists at the AAO session.

In a follow-up interview with *EuroTimes*, she said that the study is important because of the variability in white-to-white measurements as they are conventionally performed today. She said that Dr Lovisolo also makes the important point that the optimal size of the vault varies between patients.

"In this study, he shows significantly less variability in ICL vaulting using high-frequency sonography with this software, as well as a decreased incidence of cataract and pigment dispersion. This will ultimately help surgeons choose the proper size of ICL for individual patients."

Dr Wu, who is an assistant professor of ophthalmology at Tufts University School of Medicine in Boston, Massachusetts, said that she would advise surgeons using ICLs to utilise high-frequency sonography if it is available to them.

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