



Luca Buzzonetti

'IntraBubble' technique delivers promising results in DALK procedures

Dermot McGrath
in Barcelona

A VARIATION of the big-bubble technique in deep anterior lamellar keratoplasty (DALK) procedures assisted by femtosecond laser has delivered promising early results with excellent graft adhesion and good refractive outcomes, according to Luca Buzzonetti MD.

"IntraBubble, linking all the advantages of femtosecond technology and big bubble DALK, represents a new possible application of IntraLase that could partially standardise big-bubble DALK and make the intraoperative conversion to penetrating keratoplasty (PK) easier, resulting in a better fit of the donor cornea and very good refractive outcomes," Dr Buzzonetti MD told delegates attending the XXVII Congress of the ESCRS.

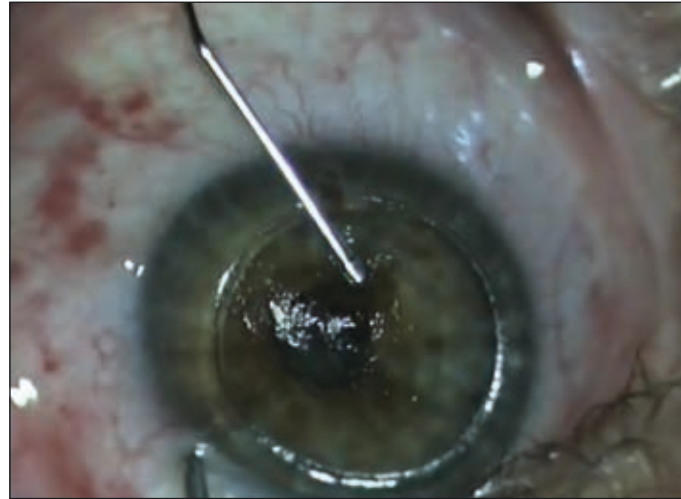
Dr Buzzonetti, chief of the Ophthalmology Department of the Bambino Gesù Hospital, Rome, Italy, presented the results of 15 eyes of 15 patients with keratoconus that had been treated with the IntraBubble technique.

Describing the technique in more detail, Dr Buzzonetti said that the first step is to create the donor lamella. For this, the cut is performed on the corneoscleral rim, analysed and then processed by an ocular tissue bank before being mounted on an artificial anterior chamber (Coronet Patient Artificial Anterior Chamber, Network Medical Products Ltd).

"After our initial experiences, we think that IntraLase can really help us to make this goal achievable because of the level of accuracy and precision that the laser delivers"

The femtosecond laser then makes a full lamellar cut of 8.2mm diameter, 100 microns above the thinnest corneal point as measured by Oculus Pentacam and creates a mushroom lamella with an anterior diameter of 9.0mm and posterior diameter of 8.0mm at the same depth. An original model was applied to calculate the donor thickness for each patient, said Dr Buzzonetti.

Dr Buzzonetti explained that the big-bubble approach, created by Dr



A smooth Fogla 27-gauge air injection cannula (Bausch & Lomb Storz Ophthalmic), flat with a hole facing down at the tip site, connected to a 5ml syringe filled with air is inserted into the channel created by IntraLase in the posterior residual stroma



The big-bubble has been achieved and the bubble test has been performed

Mohammad Anwar, offers surgeons a safe and efficient means of baring Descemet's membrane.

Using this approach, a 27-gauge bent needle is inserted deep into the corneal stroma and air is then forced into the pre-Descemet's plane creating a bubble between the stroma and Descemet's membrane.

After big-bubble formation, debulking of the anterior two-thirds of the corneal stroma is performed and the corneal stromal tissue excised. The donor lamella is then fitted into place using interrupted sutures.

In this series of patients, Descemet's separation using the bubble technique was successfully achieved in 13 out of 15 eyes. In one patient, the surgical procedure was intraoperatively converted to full thickness PK because of a large tear in Descemet's membrane, said Dr Buzzonetti.

Six months after surgery, the mean best-corrected visual acuity was 0.5 and the mean spherical equivalent was -2.75 D. The mean refractive astigmatism was approximately -2.50 D while the topographic astigmatism was approximately +2.0 D.

While these results were largely positive, Dr Buzzonetti and co-workers decided to explore ways of standardising, at least partially, the big-bubble technique, and thereby removing some of the unpredictability associated with this approach.

"After our initial experiences, we think that IntraLase can really help us to make this goal achievable because of the level of accuracy and precision that the laser delivers," he said.

Dr Buzzonetti explained that the enhanced version of the IntraBubble technique entails using the femtosecond

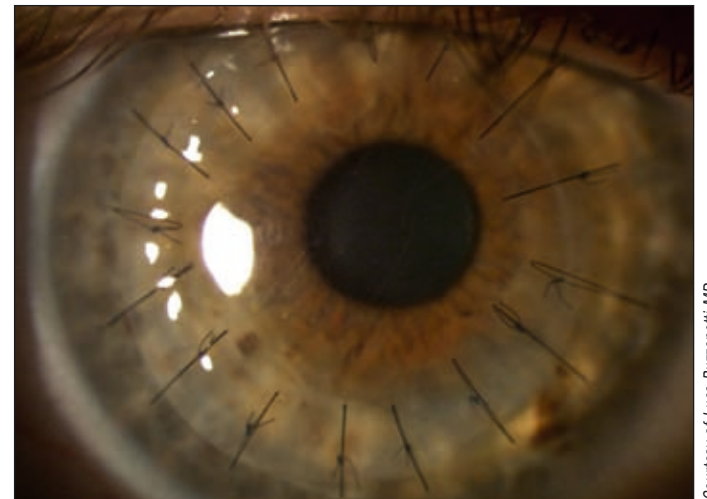
laser to create an intrastromal channel using a lamellar cut 0.6mm in diameter, with a side cut at a 45-degree angle and a 12-degree arc length positioned 50 microns above the thinnest corneal site measured by Pentacam.

He noted that the IntraLase laser can be reliably programmed to cut much closer to Descemet's membrane than is possible with a metal or mechanical trephine, where it might lead to unplanned perforation and necessitate conversion to PK.

Another benefit of this approach, as described by Frank Price MD, is that a deep femtosecond laser incision close to Descemet's membrane minimises air escape into the peripheral cornea and prevents peripheral opacification that may impair big-bubble visualisation.

After the intrastromal channel has been created, Dr Buzzonetti said that the laser then generates a full lamellar cut 9.5mm in diameter, 100 microns above the thinnest corneal site.

On the donor cornea, a zigzag incision, sized to match the recipient incision, is created with the femtosecond laser. The zigzag-shaped incision, popularised by Roger Steinert MD, helps to provide a smoother transition between host and donor and a hermetic wound seal. This particular cut profile results in



One month after the standardised big-bubble technique in DALK assisted by IntraLase femtosecond laser

an excellent anterior apposition and extremely smooth graft interface, he said.

"After the lamella is removed we can insert the cannula for air injection using the channel created by the IntraLase. We then inject the air and create the bubble and perform a bubble test to verify the baring of Descemet's membrane," he said.

Of the four eyes that have been treated using this technique, the results have been very promising, said Dr Buzzonetti.

"The big bubble was achieved in all cases. The mean best-corrected visual acuity was 0.5, with a mean spherical equivalent of +2.0 D and a mean topographic astigmatism of +3.7 D. Although we do need further long-term study of this approach, we believe that it could help to standardise the big bubble technique in DALK, reducing the risk of intraoperative complications, especially perforation which is the real risk with this procedure, and allowing good refractive outcomes."

lucabuzzonetti@yahoo.it