FEMTO SURGERY
Study calls into question benefit of femto-cataract surgery’s accuracy in capsulorhexis
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The supposed advantage of the more predictable capsulorhexis achieved with femtosecond laser-assisted cataract surgery may be based on a false assumption about its influence on the stability of an IOL’s position and orientation, according to Oliver Findl MD, Hanusch Hospital, Vienna, Austria and Moorfields Eye Hospital, London, UK.

“The rhexis effect is weak, and that brings into question whether femtosecond laser will actually result in a better and more predictable IOL positioning,” Dr Findl told Femto 2013, an international meeting on anterior segment surgery.

He reported the results of a study involving 254 eyes undergoing conventional phacoemulsification that compared the IOL position in eyes with ideal capsulorhexes to those of eyes with eccentric or small capsulorhexes. There was no statistical significance between the groups regarding the postoperative shift in anterior chamber depth or tilt. Moreover, although the difference in de-centration was statistically significant, it was too small as to be clinically relevant, Dr Findl said.

From a continuous cohort of 635 eyes that underwent cataract surgery by nine surgeons, ranging from experienced to trainees, retro-illumination photographs were taken one hour after surgery. Dr Findl and his associates measured capsulorhexis size and shape. They classified the capsulotomies as “controls” if they had optimal diameters of 4.5 to 5.5mm and overlapped the entire 360 degrees of the IOL’s edge. They classified them as small if they were smaller than 4.5mm, and those with more than 5.5mm or asymmetric overlap were classified as eccentric. All eyes that had small or large or eccentric rhexes were included as well as a randomly selected control (optimal) group of similar number, totaling in 254 eyes included into the study. All underwent implantation of standard IOLs with a good track record regarding postoperative stability.

Measurements with the AC-Master (Carl Zeiss Meditec) showed that the mean absolute shift in anterior chamber depth between one hour postoperatively and three months postoperatively was 0.24mm in the optimal capsulorhexis group, 0.25mm in the eccentric capsulorhexis group and 0.25mm in the small capsulorhexis group (p=0.352). Similarly, the mean amount of tilt as tested with a Purkinje-meter at one hour postoperatively was 3.8 degrees in the optimal group, 3.8 degrees in the eccentric group and 3.8 degrees in the small group (p=0.962). And although the Purkinje-meter measurements showed that the mean amount of decentration was statistically greater in the eccentric group (p=0.011) the difference from the control group was only 0.08mm.

Many of femto cataract’s benefits questionable
Dr Findl noted that the rhexis advantage of femtosecond laser surgery is just one of the predicted benefits of the new technology that does not really stand up to scrutiny. For example, the femtosecond laser’s performance of limbal relaxing incisions to reduce astigmatism may be slightly less variable than that of a surgeon with a diamond knife, but that will have no impact on the differences in elastic properties of the cornea or the healing response of the cornea, which are responsible for most of the variability of refractive outcomes with incisional techniques.

Similarly, the reduction in endothelial damage that femtosecond cataract surgery may provide during fragmentation of the nucleus may also be very modest as conventional phacoemulsification is already very safe in that regard, particularly given the low proportion of hard cataracts that surgeons in developed countries encounter nowadays. For those few eyes with cornea guttata or Fuchs’ endothelial dystrophy undergoing cataract surgery, they usually have impeded visual function already before decomposition. With the highly effective lamellar transplantation techniques such as descemetic stripping automated endothelial keratoplasty (DSAFEK) and descemet’s membrane endothelial keratoplasty (DMEK) at hand today, we are tempted to operate on these eyes before decomposition and, therefore, they would not really benefit when undergoing femtolaser-assisted cataract surgery.

Cataract surgery was at a different juncture when phacoemulsification began replacing extracapsular cataract extraction (ECCE) as the standard method of cataract extraction, Dr Findl said. Part of the motivation for the transition to phaco was the obvious safety advantages it had over ECCE. It remains to be seen whether with femtosecond laser cataract surgery the same will be true regarding comparison to conventional phaco.

“At present we have no evidence from large real-world trials showing that femtosecond laser-assisted cataract surgery reduces complications,” Dr Findl emphasised.

Future for younger surgeons
The wider adoption and continued evolution of femtosecond laser-assisted cataract surgery will most likely see future generations of cataract surgeons having much less experience with many surgical techniques. Already the adoption of phacoemulsification has meant that trainee surgeons are much less skilled at placing sutures than was the case when surgeons received training primarily for ECCE. Femtosecond laser cataract surgery is likely to reduce the need for a much wider set of surgical skills, Dr Findl said.

“We now that femtosecond laser cataract surgery is likely to develop rapidly over the next few years. We will probably be looking at the femtosecond laser doing all of the first parts of surgery. You will probably just need a soft I/A tip to remove these fragments. You may not even need phaco, and then you will put it preloaded IOL into the eye.

The trend is already emerging of trainees doing most of the laser part of femtosecond laser cataract surgery leaving only the final part of the procedure to the skilled surgeon. It seems likely that health regulators and politicians will favour the establishment of surgical centres in which trainees and ancillary staff perform the entire procedure while one surgeon supervises several teams and is on hand mainly for dealing with complications.