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Editorial

Cataract Surgery of Femtosecond Laser–Assisted Process

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DESCRIPTION

Femtosecond laser–assisted cataract surgery (FLACS) is a relatively new technology that created a broad interest among ophthalmic surgeons following its introduction. In 2011, I wrote an editorial titled "Femtosecond laser: The future of cataract surgery" [1]. My concluding statements in this editorial read "Only time will tell whether this laser technology will be adapted into standard ophthalmic practice in the same way that phacoemulsification supplanted ECCE (Extra Capsular Cataract Extraction) in the treatment of cataracts. The technology has several potential advantages in the performance of quality cataract surgery. Its adaptation to the field of cataract surgery must still be determined." In the 7 years since this editorial, there has been a period of excitement regarding this new technology among ophthalmologists followed by a period of less excitement and questioning of this technology. At the recent American Academy of Ophthalmology meeting in Chicago, there was a session titled "Cataract controversies on trial." One of the areas of controversy was a point-counterpoint presentation, which on one hand stated "FLACS will bring people flocking," and on the other hand, stated "FLACS will die a slow death." Following these two presentations, the audience was asked to vote on which of the two viewpoints they agreed with and the majority voted that FLACS will die a slow death.

Answers regarding the efficacy and safety of a relatively new technology require a large number of studies that can help to validate the advantages of a new technology. One of the problems with this issue was discussed well in an editorial by David F. Chang, MD, who found an overall lack of Level 1 evidence in the literature to support the superiority of laser cataract surgery over Conventional Phacoemulsification Surgery (CPS) in terms of patient outcomes [2]. Attempts have been made to try and answer these questions through meta-analyses of the literature, in which investigators review multiple published articles to attempt to come to a conclusion [3]. Published a large meta-analysis that comprised 14 567 eyes from 15 randomized controlled trials and 22 observational cohort studies. They concluded that there was no statistically significant difference in patient outcomes between laser cataract surgery and CPS. However, a valid criticism of this meta-analysis is that it included many early reports, published during the emergence of laser cataract surgery, and therefore did not account for surgeon experience or the learning curve involved in this new technology [4]. Again looked at a group of randomized control trials and concluded that "there is currently not enough evidence to determine the benefits and harms of laser-assisted cataract surgery compared with standard ultrasound cataract surgery. The evidence is uncertain because current studies have not been large enough to provide a reliable answer to this question."

Randomized, controlled, prospective studies utilizing a large number of patients are considered the gold standard when evaluating a new technology versus an accepted technology. Randomized controlled trial comparing FLACS with CPS. This is a prospective, randomized study, which comprised 400 eyes of 400 patients; 200 patients received CPS and 200 patients received FLACS. This study evaluated multiple different factors to try to assess any differences in these two technologies for the removal of cataracts. The authors evaluated the postoperative visual acuity, refraction, central corneal thickness, endothelial cell loss, central foveal thickness, and rates of intraoperative as well as postoperative complications. In addition, quality of life outcomes were measured using two different standardized questionnaires. FLACS was successfully performed in 96.5% of the patients enrolled. However, 7 patients were unable to receive the femtosecond treatment for various reasons and received CPS. The patients were evaluated at 4 weeks postoperatively when it was felt that the majority of postoperative edema and inflammation had settled down. Interestingly, this study found no difference in postoperative visual acuity between the two groups. In addition, authors did not find that the FLACS group had more predictive refractive errors then the CPS group. The overall mean refractive error was similar between the two groups. The authors also found no differences in central corneal thickness or endothelial cell loss at this 1-month postoperative evaluation. Similarly, they found no differences in intraocular pressure changes between the two groups. In addition, this study evaluated the rates of cystoid macular edema between the two groups and found no overall difference in the mean change in central foveal thickness. Surprisingly, this study did not find a statistically significant reduction in phacoemulsification energy between the FLACS group and the CPS group.

Another important area to evaluate when comparing FLACS to CPS is the incidence of surgical complications. This study did find a statistically significant increase in the rate of posterior capsular rupture in the CPS group. While the overall number of patients sustaining posterior capsule rupture was small, the authors felt that in part this was a reflection of the surgical case complexity in patients in the CPS arm of this study. The decreased incidence of posterior capsule rupture in the FLACS group shows a potential advantage of this technology. Interestingly, the anterior capsular tear rate was found to be greater in the FLACS group, but was

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not statistically significant. The postoperative quality of life questionnaires revealed significantly less visual difficulty following surgery in both groups as well as better quality of life outcomes postoperatively in each group.

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