

# THE LITERATURE



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## COMPLICATIONS OF FEMTOSECOND LASER-ASSISTED CATARACT SURGERY

*Nagy Z, Takacs A, Slade S, et al<sup>1</sup>*

Nagy et al retrospectively analyzed the intraoperative complications associated with laser cataract surgery (LenSx Laser; Alcon) for the first 100 patients undergoing the procedure. The investigators did not use optical coherence tomography for the first 45 cases. Of the 100 cases, 2% had suction breaks, 20% had capsular tags and bridges, 4% had anterior capsular tears, 32% had miosis, and 3% had endothelial damage from the laser.

Although the incidence of anterior capsular tears was high, none of the tears extended to the posterior capsule. This study suggests that laser cataract surgery has a learning curve during the first 100 cases, and the investigators concluded that, with cautious surgical technique, complications can be avoided.

## FEMTOSECOND LASER-ASSISTED CATARACT SURGERY VERSUS STANDARD PHACOEMULSIFICATION CATARACT SURGERY: OUTCOMES AND SAFETY IN MORE THAN 4,000 CASES AT A SINGLE CENTRE

*Abell R, Darian-Smith E, Kan JB, et al<sup>2</sup>*

Abell et al compared the intraoperative complications and safety of laser cataract surgery ( $n = 1,852$  eyes) and conventional phacoemulsification cataract surgery ( $n = 2,228$  eyes) performed between May 2012 and November 2013. The investigators reported that anterior capsular tears occurred in 1.84% of eyes in the laser group and in 0.22% of eyes in the phaco group ( $P < .0001$ ). There was no difference in the incidence of anterior capsular tears between the first and second half of the laser cases. Anterior capsulotomy tags occurred in 1.62% of study group eyes. There was no significant difference in posterior capsular tears between the two groups (0.43% vs 0.18%). The incidence of significant intraoperative corneal haze and miosis was higher, and the effective phaco time was significantly lower in the laser group ( $P < .001$ ).

## DISCUSSION

As the adoption of laser cataract surgery continues to gain momentum, the complications associated with the

procedure need to be critically assessed. The question of whether refractive outcomes are superior with laser cataract surgery as compared to traditional phacoemulsification has not yet been answered. At a minimum, ophthalmologists need to know that laser cataract surgery is at least as safe as phacoemulsification.

Nagy et al reported a miosis rate of 32% after pretreatment with the laser. Surgeons now know that the incidence of miosis can be dramatically reduced simply by using a nonsteroidal anti-inflammatory agent with dilating drops.<sup>3</sup> In contrast, the laser patients in the study by Abell et al did not have a lower rate of complications, but there were improvements in other areas like docking and treatment time duration.

In the early days of laser cataract surgery (2012), the incidence of anterior capsular tags, bridges, and anterior radial tears was unacceptably high.<sup>4</sup> If the industry had not improved the hardware and software, laser cataract surgery might not be as popular today. Thankfully, all of the manufacturers worked with physicians and end users to make changes to laser technology that significantly reduced the risk of complications.

The presence of any anterior capsular rim weakness that predisposes the eye to radial tears and possible posterior extension is undesirable. Here are our tips for the novice laser cataract surgeon to minimize the risk of complications:

- Ensure that the laser platform has the latest software and hardware upgrades.
- Ensure a good central concentric dock with minimal tilt. Although all of the laser platforms compensate for this, beyond a certain angle of tilt, the completeness of the laser's continuous curvilinear capsulotomy (CCC) may be compromised.
- Observe the symmetry and completeness of the laser as it is firing at the anterior capsule; the surgeon often gets an indication if there is poor laser penetration of the capsule.
- When the patient is moved to the phaco room for the second part of the procedure, perform a careful inspection of the CCC's edge on high magnification. Uncut areas of capsule and other similarly suspicious areas are often visible.
- When carefully removing the anterior capsular flap, you can spot microadhesions as the central capsule is pulled away from the peripheral capsule like a postage stamp from a sheet of stamps. Recognizing and remembering where these areas of microadhesions are means that

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you can be extra careful when performing I/A of cortical material.

- Phacoemulsification of the nucleus is usually not a problem. If you perceive an anterior radial tear at any time, then the use of lower flow and vacuum settings will mitigate the risk of posterior extension.
- During I/A, be mindful of the previously mentioned potentially problematic areas in the edge of the CCC, and carefully aspirate the cortex a little beyond the edge of the CCC's rim so that hidden tags will not be aspirated.
- After I/A, the completeness and smoothness of the CCC can be clearly seen, and if there is a tag, it can be easily and safely removed.

In the 3 years that we have been routinely performing laser cataract surgery, there is no doubt that the once feared issues of anterior capsular tags, bridges, and tears have become significantly less common. Based on our experience, in the past year or so in Singapore alone and with a variety of laser platforms, there has been a negligible incidence of these complications. We look forward to further enhancements of all of the laser platforms so that patients can benefit from this relatively new technology. ■

1. Nagy Z, Takacs A, Slade S, et al. Complications of femtosecond laser-assisted cataract surgery. *J Cataract Refract Surg.* 2014;40:20-28.

2. Abell R, Darian-Smith E, Kan JB, et al. Femtosecond laser-assisted cataract surgery versus standard phacoemulsification cataract surgery: outcomes and safety in more than 4,000 cases at a single centre. *J Cataract Refract Surg.* 2015;41:47-52.

3. Yeoh R. Intraoperative miosis in femtosecond laser-assisted cataract surgery. *J Cataract Refract Surg.* 2014;40:852-853.

4. Bali S, Hodge C, Sutton G, et al. Early experience with the femtosecond laser for cataract surgery. *Ophthalmology.* 2012;119:891-899.

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