Miosis Secondary to Femtosecond Laser-Assisted Cataract Surgery: Redilation as a Solution

To the Editor:

The use of the femtosecond laser in cataract surgery has increased exponentially since its introduction in 2009, and it is beneficial in routine and challenging cases. However, one disadvantage is the possible induction of significant miosis, which has been reported in up to 32% of eyes. Some factors have been shown to decrease the incidence of this complication, such as advances in the lasers’ software; increase in surgeon experience, reducing treatment time; and effective use of mydriatics and nonsteroidal anti-inflammatory drops. Nevertheless, despite all efforts, it still occurs.

Mechanical dilation devices, such as iris retractors and Malyugin ring (Microsurgical Technology, Redmond, WA), can be used to manage miosis secondary to the femtosecond laser application. However, because the anterior capsulotomy has already been done by the laser and the miosis hampers the visualization of the capsulotomy’s edge, care must be taken while verifying that the capsulotomy has no tags, and when inserting and positioning the hooks or ring, to avoid capsular damage and additional complications.

Our routine pupil-dilating regimen includes 1% tropicamide (Mydriacyl; Alcon Laboratories, Inc., Fort Worth, TX) and 10% phenylephrine (Fenilefrina; Allevergan, Irvine, CA) administered four times 1 hour before surgery and once between the laser application and the phacoemulsification. Also, we use 0.03% flurbiprofen (Ocufen; Allergan) one time 1 hour before surgery and 0.1% epinephrine solution intracameral after opening the corneal incisions. We managed our first case of miosis secondary to femtosecond laser treatment as described in the literature, using iris hooks. Care was taken to confirm that the anterior capsulotomy was free floating and to position each of the hooks, which resulted in a longer surgery but no further complication.

Starting with the second patient in whom we encountered miosis after laser application, we decided to attempt redilating the pupil using 1% tropicamide and 10% phenylephrine every 10 minutes for 30 minutes before proceeding with phacoemulsification. Although some reports of systemic adverse events related to the instillation of 10% phenylephrine drops into the conjunctival sac are found in the literature (i.e., rise in blood pressure, palpitation, sweating, and trembling), we agree with previous authors that these are uncommon events and it is not possible to determine whether they are related to drug overdose or to an individual idiosyncrasy unrelated to the phenylephrine. None of our patients presented adverse events. Furthermore, the redilation approach proved to be effective in achieving a second pupil dilation larger than the anterior capsulotomy edge (Figure 1), avoiding the need for a mechanical dilation device.

We had 15 cases of secondary miosis in our last 750 femtosecond laser-assisted cataract surgeries and overall we were able to successfully redilate the pupil and obtain a second dilation larger than the anterior capsulotomy’s edge, allowing sufficient visualization to proceed as if the miosis had not occurred. Thus, redilating eyes that develop miosis after femtosecond laser application is an effective and practical solution to manage the small pupil size and proceed as usual with the phacoemulsification after the laser application.

Figure 1. (A) Screenshot of the femtosecond laser display demonstrating the adequately dilated pupil. (B) Surgical microscope view after the femtosecond laser application and before the phacoemulsification, when the significant secondary miosis was noted. (C) After redilating the pupil with 1% tropicamide and 10% phenylephrine, the pupil reached a sufficient diameter for adequate surgical visualization with no need for a mechanical dilation device and phacoemulsification proceeded.
REFERENCES


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The authors have no financial or proprietary interest in the materials presented herein.

doi:10.3928/1081597X-20160204-02