Phenylephrine for IFIS

Injected intracamerally, the solution may be useful in cataract surgery patients who have floppy irides.

BY RICHARD B. PACKARD, MD, FRCS, FRCOPHTH

In 2004, Chang and Campbell[1] first described a new cause of small pupils and erratic intraoperative behavior of the iris. They called it the *intraoperative floppy iris syndrome* (IFIS) and attributed its cause to the use of tamsulosin, a drug indicated for the treatment of benign prostatic hypertrophy (BPH). Since their original description, there have been a number of letters in response[2-13] describing IFIS in patients with a history of taking a variety of other drugs, including less receptor-specific treatments for BPH and other therapies that block alpha adrenergic receptors. In addition, it has been found that drugs that block alpha adrenergic receptors, even if taken for a short length of time, can induce IFIS in some patients.[14] Although IFIS is not a universal result in all who have taken the aforementioned drugs, there may be a rapid and permanent effect on the iris muscle. What causes the floppy iris is unknown because there is no histology available on the syndrome.

Since the original article about IFIS was published, several surgical maneuvers have been described to minimize the effects of the syndrome.[15,16] The idea behind these procedures is to stabilize the iris and prevent its egress from the eye or into the phaco tip. Iris hooks, various combinations of viscoelastics, pupillary rings, and bimanual microincisional cataract surgery have all been suggested. I have pursued a different method when treating IFIS, however, based on a pharmacological approach using a diluted solution of preservative-free phenylephrine. The use of this drug can improve pupillary size when injected intracamerally in cataract patients.[17]

THE PROSTATE AND THE IRIS

The main cause of IFIS is tamsulosin.[1] By specifically blocking the alpha-1a adrenergic receptors that are found in the prostate, this drug minimizes the contraction of the enlarged muscle fibers in the gland. The action of tamsulosin enables BPH sufferers to delay prostate surgery for a long period. Unfortunately, the iris contains similar receptors, which are also targeted by this drug. As stated earlier, some but not all patients taking tamsulosin experience an abnormally functioning iris—particularly regarding the dilator pupillae—that leads to the lack of tone and poor dilation.

PHARMACOLOGICAL APPROACH

For some years, I have used a diluted solution of preservative-free phenylephrine (Minims phenylephrine 2.5%; Chauvin Pharmaceuticals Ltd., Surrey, UK) in eyes with an unsatisfactorily dilated pupil. In the majority of my small-pupil patients, unless they had synechiae that required breaking, I would enhance the pupil's dilation to a useful size. After becoming aware of IFIS, it seemed logical for me to try phenylephrine. In my first case, the patient was taking tamsulosin and had a poorly dilated pupil. Intracameral phenylephrine not only enlarged the pupil but, more importantly, increased the iris' tone sufficiently to minimize its billowing and lower the risk of its prolapse through the surgical incisions. Since then, all of my patients with a history of using tamsulosin or similar medication routinely receive intracameral injections of phenylephrine.

Part of a class of chemicals called *sympathomimetics*, phenylephrine is a strong stimulator of alpha adrenergic receptors, which include all the alpha-1 receptors that are blocked by tamsulosin. Thus, it seems that,

although all cataract surgery patients on tamsulosin or similar drugs for BPH will receive topical phenylephrine preoperatively, the effect of this ophthalmic drug on the relevant iris receptors is minimal dilation at the most. Intracamerally injected agonists overwhelm these receptors to achieve a response. Other receptors in the iris may react to this injection as well, but I do not know thatfor certain. In some cases, the iris' response only lasts for a few minutes, and then another injection of phenylephrine is required to redilate the pupil. For patients who are currently taking or who have received tamsulosin or similar drugs, I have not had to resort to any other surgical procedure to avoid difficulty with or a complication related to their floppy irides.

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HOW TO PREPARE AND USE INTRACAMERAL PHENYLEPHRINE

I add seven drops of 2.5% phenylephrine to 1mL of balanced salt solution and then draw the mixture up into a syringe. I intracamerally inject the phenylephrine after making the initial stab incision but prior to using any viscoelastic. Mydriasis visibly improves with the intracameral injection, even in eyes that have received numerous topical mydriatic drops. Colleagues have expressed concerns to me about the effect of intracameral phenylephrine on the cardiovascular system. Their concerns are unfounded, however, because the pulse rate and blood pressure are not affected by the direct use of this drug on the iris, according to the observations of my anesthetist. Often, both the pulse rate and blood pressure are reduced intraoperatively as a patient relaxes from his initial anticipation of the procedure.

CONCLUSION

Now that ophthalmologists are aware of IFIS and the number of medications in general use that may cause it, a careful account of each patient's past medical and drug history becomes very important. After establishing that a patient may be at risk for IFIS, it is prudent to anticipate problems and take proper precautions. To me, this means having a couple of single-dose containers of phenylephrine 2.5% for appropriate dilution and intracameral use. ■

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