

Original Research Article

Intraoperative Floppy Iris Syndrome in patients on alpha 1 blocker tamsulosin: incidence and predictability

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ABSTRACT

Background: Intraoperative Floppy Iris Syndrome (IFIS) was first described by Chang and Campbell in year 2005 in male patients undergoing phacoemulsification surgery who were on Tamsulosin, an alpha 1 blocker drug for their urinary symptoms for enlarged prostate. This condition was characterized by excessive floppiness of iris, prolapse of iris tissue through phaco and sideport incisions and progressive intraoperative miosis, resulting in increased surgical time and various major surgical complications compromising visual outcome.

Methods: This study of 78 patients was undertaken to know the incidence and severity of IFIS as well as to predict its occurrence by observing maximum pupil dilation achieved preoperatively.

Results: It was observed that majority of patients on tamsulosin dilated poorly and severe IFIS occurred in those with pupil dilation of 5 mm or less after putting mydriatic eye drops preoperatively.

Conclusions: It was concluded that if IFIS was predicted and necessary precautions taken, postoperative complications can be reduced significantly with improved visual outcome.

Keywords: Alpha 1 blocker drugs, Intraoperative Floppy Iris Syndrome, Miosis, Poor pupil dilation, Tamsulosin

INTRODUCTION

For the first time in the year 2005, Chang and Campbell described that cataract surgery was becoming prolonged and difficult due to flaccid iris stroma in male patients who were on oral alpha-1 blocker tamsulosin, for treatment of their lower urinary tract symptoms caused by enlarged prostate. They observed excessive floppiness and billowing of iris, tendency of iris to prolapse through main and side port incisions and intraoperative progressive miosis. This was termed as Intraoperative Floppy Iris Syndrome (IFIS).^{1,2} Poor preoperative pupil dilation was also found to be common in a majority of these patients.³⁻⁶ Tamsulosin causes hypotonicity of iris dilator muscles with atrophic changes.^{7,8} Some other non-selective alpha blockers being used for urinary symptoms

and systemic hypertension along with a few anti psychotic drugs were also responsible for causing a milder form of IFIS.^{9,10} In this study, we observed the incidence and severity of IFIS in a group of patients who were already on tamsulosin treatment. To predict the severity of IFIS during surgery, we gave special attention to the size of undilated pupils and maximum pupil dilation achieved during preoperative assessment.

METHODS

A total of 78 male patients, aged 55 years and more, who underwent phacoemulsification surgery between October, 2016 to September, 2019 and were on tamsulosin therapy for varying periods of time were enlisted for this study. Special attention was paid to the size of undilated pupils

as well as maximum pupillary dilatation achieved during preoperative assessment in such patients. In patients where the other eye was also operated subsequently, only data of the first eye was considered.

Several patients with an unusually small pupil size during routine examination (before dilation) divulged a history of being on oral medications for their urinary problems only after repeated and direct interrogation.

Exclusion criteria

For this study, patients with pre-existing ocular morbidities including trauma, uveitis, proliferative diabetic retinopathy and operated cases of trabeculectomy or vitrectomy were excluded.

In 2 persons where maximum pupil dilation was not more than 5 mm and where their urinary symptoms were not very severe, tamsulosin therapy was stopped for 4 weeks after consultation with their urologist. The pupillary behavior was observed once again before planning for surgery. We recorded various difficulties observed during surgery as well as various complications occurring in these patients. Preoperatively, maximum pupillary dilatation was achieved with tropicamide 0.8%, phenylephrine 5% and ketorolac 0.4% eye drops. In cases where pupillary dilatation was less than 7 mm on preoperative assessment, atropine 1% eye drops 3 times daily for 2 days was also used.

During surgery, we ensured that the main corneal incision and side port incisions were of only adequate size (to prevent leakage). The incision started anterior to limbus and tunnel depth was elongated. Intra cameral epinephrine was used in smaller pupillary sizes.

Anterior capsular staining with Trypan Blue dye was done to facilitate adequate size capsulorhexis. Viscoelastic and viscoadaptive substances were used to mechanically dilate the pupil and protect corneal endothelium. Low fluidics were used during phacoemulsification surgery with 10% lower vacuum and aspiration parameters and by reducing bottle height. Surgeons were ready with iris hooks and other pupil dilating devices if required.

Grading of IFIS

Originally, a triad of components were described by Chang and Campbell for defining IFIS - excessive floppiness and billowing of iris, tendency of iris to prolapse through phaco and sideport incisions, and progressive intra-operative miosis.¹

If one of these components was found to be present, it was considered score-1 or mild IFIS, if two of these were present score-2 or moderate, and if all three were present it was termed score-3 or severe IFIS.

RESULTS

Table 1 shows the predilation pupil sizes. Out of 78 patients, 8 (10%) had very small and 38 (49%) had small pupils. After maximal pharmacological pupil dilation preoperatively, 9 (10%) patients did not dilate more than 5mm and 38 (49%) showed only moderate dilation (Table 2). In 2 patients where preoperative maximum pupil dilation was not more than 5 mm, tamsulosin therapy was stopped for 4 weeks. But pupil dilation after that period remained the same.

Table 1: Pupil size before dilation.

Pupil size	Comments	Number of patients (n-78)	Percentage
Less than 2 mm	Very small pupil	8	10%
2 mm - 3 mm	Small pupil	38	49%
More than 3 mm	Nearly normal size pupil	32	41%

Table 2: Pupil size after dilation.

Pupil size	Comments	No. of patients (n- 78)	Percentage
Less than 5 mm	Poor dilation	9	12%
5 mm to 7 mm	Moderate dilation	38	49%
More than 7 mm	Adequate dilation	31	39%

Table 3: Incidence of developing IFIS.

	Number of patients (n-78)	Percentage
No IFIS	28	36%
IFIS (all grades)	50	64%

Table 4: Severity of IFIS observed during surgery.

Severity of IFIS	Number of patients (n-50)	Percentage
Mild IFIS (Score-1)	20	40
Moderate IFIS (Score-2)	22	44
Severe IFIS (Score-3)	8	16

During surgery, 50 (64%) patients out of 78 developed IFIS (Table 3). About 8 patients developed severe IFIS, and these were those patients who had poor pupillary dilation of less than 5 mm preoperatively (Table 4).

In majority of these patients (62%) surgical time was prolonged. Posterior capsular rent occurred in no patient, but one patient had descemet’s membrane detachment and developed significant corneal oedema (Table 5).

Table 5: Difficulties and complications.

Nature of complications	Number of patients (n-78)	Percentage
Increased surgical time	48	62%
Iris prolapse through corneal incisions	9	12%
Entanglement of iris in phaco and aspiration port	40	51%
Pupillary deformity post-operatively	6	8%
Damage to anterior capsulorhexis margin	1	1%
Posterior capsule rent	0	0%
Nucleus fragment in vitreous cavity	0	0%
Significant post-operative corneal oedema needing surgical intervention	1	1%

DISCUSSION

Tamsulosin is a selective alpha1 blocker and causes relaxation of smooth muscles of the urinary bladder and prostate and relieves urinary symptoms. It also relaxes the dilator muscles of iris and reduces its tonicity by bonding with post synaptic nerve endings.^{1,2} Prolonged hypotonicity of dilator muscles results in its atrophic changes. It has been reported that the iris dilator muscle mass was thinner by 23% in patients using tamsulosin.^{7,8} Other drugs causing lesser degree of IFIS include alfuzosin, doxazosin, terazosin, labetalol, chlorpromazine, donepezil and other antipsychotic and antihypertensive agents.^{9,10}

In our study, it was seen that 68% patients who were on tamsulosin developed IFIS. We also observed that pre-dilation pupil size was also smaller than normal in patients on tamsulosin, and stopping the drug for 4 weeks did not change the pupillary behaviour. In various studies the incidence of IFIS has found to be 57 to 100%.^{1,11,12} It is to be noted that patients with small pupils, who dilated poorly with maximal drugs developed severe IFIS. According to Casuccio et al, pupil size was inversely related to IFIS incidence and severity. A dilated pupil of 7.0 mm or smaller had 73% sensitivity and 95% specificity for predicting IFIS.¹³ Stopping this medicine has not shown any significant benefit in relieving IFIS. IFIS was still observed in patients who discontinued this drug for several months.¹⁴ In cases where pupil dilatation is less than 7 mm on preoperative assessment, atropine eye drops 3 times daily for 2 days can also be used to minimize IFIS.¹⁵

It is a common observation by most ophthalmic surgeons that IFIS increases the difficulty level of surgery.^{1,2} A significant prolongation of operating time was also observed by Goyal et al, which can result into

compromised surgical outcome with adverse effects.¹⁶ In initial studies, the rate of major complications was reported to be 7-12%.

With growing understanding of IFIS and with adequate precautions taken, the complication rate had reduced to 0.6% for posterior capsular rent and vitreous loss and then to zero percent as reported by various authors.¹⁶ In our study also, as we were already expecting and prepared for IFIS in selected cases, posterior capsular rent was avoided. However, one patient developed gross corneal oedema due to descemet’s membrane detachment, which was managed subsequently. Therefore, recording the maximum pupil dilation achieved during preoperative assessment in all patients can help us in preventing major complications.

CONCLUSION

Usage of tamsulosin poses significant difficulties and complications during cataract surgery. Surgeons’ awareness and expectation for IFIS prepares him for forthcoming difficulties and can significantly reduce the occurrence of complications and thus improve surgical outcome. It is evident that patients with unusually small pupil size who do not dilate adequately during preoperative examination are prone for developing IFIS and related complications. It is also our recommendation that patients be informed beforehand towards increased risk in such scenario.

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