INTRAOPERATIVE OCULAR SIDE EFFECTS OF THE ALPHA-BLOCKERS USED IN THE THERAPY OF LOWER URINARY SYNDROMES

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Abstract: *The alpha-blockers are used in men to treat the symptoms of benign prostatic hyperplasia and in women for urinary retention. Purpose: to determine the type and the incidence of ocular side effects during cataract phacoemulsification. Method: prospective nonrandomized observational study, 259 eyes of 257 patients who had undergone phacoemulsification by the same surgeon with the same technique; patients with traumatic cataract, previous uveitis or glaucoma surgery were excluded. Results: Side effects occurred in approximately 4% of the cases; all patients were on alpha1AR-antagonist treatment, in some cases even after a very short period of time. These side effects lead to the intraoperative floppy iris syndrome (IFIS). The iris features were well controlled by using intracameral epinephrine. In one case, iris hooks were needed. There were no major intraoperative complications. Conclusions: All patients with IFIS were on alpha1AR-antagonist treatment. Intraoperative measures are available, which significantly reduce the incidence of major complications.*

Keywords: *cataract surgery-alpha blockers-floppy iris*

Rezumat: *Alfablocantele se utilizează în tratamentul simptomelor adenomului de prostată la bărbaţi, respectiv ale retenţiei urinare la femei. Scopul studiului a fost de a determina tipul şi incidenţa efectelor adverse oculare din timpul facoemulsificării cataractei. Metodă: studiu prospectiv observaţional nonrandomizat ce include 259 ochi (257 pacienţi) operaţi de un chirurg, utilizându-se aceeaşi tehnică; nu s-au inclus în studiu cataractele complicate din traumatisme, uveite, glaucoame operate. Efecte adverse s-au semnalat la aproximativ 4%, toţi aceşti pacienţi urmând un tratament alfa1 blocant, unii dintre ei chiar pentru o perioadă foarte scurtă. Aceste efecte adverse alcătuiesc sindromul floppy iris (IFIS). Fenomenele iriene au fost bine controlate prin utilizarea adenalinei intracamerular. Într-un singur caz a fost nevoie de retractoare iriene. Nu s-au înregistrat complicaţii majore intraoperatorii. Toate cazurile de IFIS intraoperator s-au înregistrat la pacienţii cu tratament alfa1 blocant. Există măsuri intraoperatorii accesibile ce reduc semnificativ amploarea sindromului, scăzând astfel rata complicaţiilor.*

Cuvinte cheie: *chirurgia cataractei, alfablocante, floppy iris*

INTRODUCTION

Alfa1-blockers (Tamsulosin, Flomax, Omnic, Tamsol 0,4mg) are known in the urology practice in the treatment of urinary retention symptoms due to benign prostatic hyperplasia. Type 1 Alpha receptors are both found at the level of smooth muscle prostate and bladder, and also at the level of iris dilator muscle. This may explain why the urinary tract muscle relaxation is accompanied by an atony of the iris muscle at the administration of Tamsulosin. This relaxation tendency of the smooth iris muscle is manifested by a more difficult and insufficient pupil dilation either during routine ophthalmologic examinations, either during preoperative preparation of the patient. On the other hand, there is a typical intraoperative iris behaviour (first described by Chang in 2005) (1) which is manifested in the clinical triad: floppy iris (flaccid iris who flutters due to intracamerular raised currents during surgery), the tendency for iris prolapse through corneal wound even very small, 3 mm or 1.2 mm, and a progressive miosis of the pupil. For a more complex description of the syndrome, recently a stadialization of its own was introduced in: mild IFIS (floppy iris without prolapse or miosis), moderate (floppy iris, significant miosis and reduced tendency to prolapse) and severe IFIS (floppy iris, marked miosis and severe prolapse through wounds) (Chang, 2007).(2) All of these symptoms aggravate the progress of phacoemulsification surgery, increasing the rate of intraoperative complications as the posterior capsule rupture or iris lesion, both potentially disadvantageous in the evolution of the patient. The floppy iris syndrome management includes a pharmacological approach and a mechanical one. The most commonly used substance is intracamerular epinephrine, in combination with other substances or not. The method of introduction into the anterior chamber, as well as the concentration, varies according to each author's experience of the specialty literature. Thus, some recommend adding epinephrine to the irrigation fluid in concentrations of 0.5-0.6 μg/ml (Backstrom Bending, Shugar),(3,4) others prefer intracamerular injection in concentrations of 1:2500 combined with preoperative administration of atropine sulphate 1% (Masket, Belani).(5) It is assumed that atropine and epinephrine

would act synergistically on iris dilator. Shugar prefers epinephrine combination (4ml, 1:1000) with lidocaine without preservative (3ml, 4%) diluted in 9ml of BSS.

Mechanical stabilization and dilation of the iris can be obtained by intraoperative usage of iris hooks, preferably before capsulorhexis (Grieshaber or Malyugin hooks). The disadvantage of using iris hooks lies primarily in their high cost and increased duration of surgical intervention.

Viscoelastics, cohesive and dispersive substances are another mechanical way of dilation of the pupil. Sodium hyaluronate 2.3%, known as Healon 5, is a pseudodispersive substance, according to the new classification of Arshinoff (6) which allows a relatively useful iris dilation and a stable anterior chamber in conditions of reduced phacoemulsification parameters (aspiration rate under 22 ml/min and vacuum below 200 mmHg).

MATERIAL AND METHOD

Our nonrandomized, observational, prospective study was conducted over a period of 6 months including interventions of cataract surgery via phacoemulsification method performed by a surgeon in 257 patients (259 eyes). Patients with traumatic cataract, previous uveitis or glaucoma surgery were excluded. Patients with open-angle glaucoma under topical treatment were included in the study.

The preoperative dilation was performed with tropicamide 0.5% and phenylephrine 10%, 30 minutes before the intervention. We performed para ocular anesthesia. The main incision was 3.2 mm and the secondaries were 1.2 mm. The technical fragmentation of the nucleus was quick chop, burst mode, with the aspiration rate of 30ml/min and vacuum of 300 mmHg. The surgeon was not informed preoperative or intraoperative of the existence of an alpha1AR-antagonist therapy for urinary symptoms. In all the cases a weak dilution of adrenaline, approximately 0.0002‰ was used in the irrigation liquid (BSS), this being a usual maneuver regardless of the operated cataract type. With an insufficient pupil diameter for capsulorhexis, at the beginning of the intervention it was injected in the anterior chamber a quantity of 0.1-0.2 ml of diluted adrenaline 1:10000. In some cases, proper pupil dilation was obtained with a viscous dispersive substance (Discovisc) from the dispersive class with increased viscosity, Class II of the Arshinoff. Healone 5 wasn't available for the surgeon. In one case iris hooks were needed.

The following aspects were pursued: the IFIS incidence, the correlation with alpha1AR-antagonist treatment, the incidence of intraoperative complications.

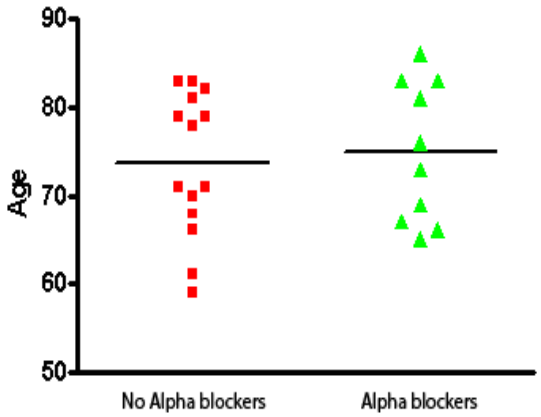
RESULTS

The treatment with alpha1AR-antagonist medication for benign prostatic hyperplasia has been reported in 12 eyes from the 259 cataract surgeries. Tamsulosin treatment duration varies from a few years up to a month. One patient used alpha blockers therapy for a month and he interrupted it because of the systemic side effects one year before the cataract surgery. Of these 12 eyes, in 11 eyes we noticed intraoperative floppy iris syndrome, moderate and mild form. In one case four iris hooks were needed. There were no major intraoperative complications (posterior capsule rupture, iris lesions).

Table no. 1 – The alpha1AR antagonist - floppy iris relation

	IFIS	NO IFIS	Total
Alpha1AR antagonist	11	1	12
No alpha1AR antagonist	0	247	247
Total	11	248	259

Diagram no. 1 – The comparison of the 2 groups of patients

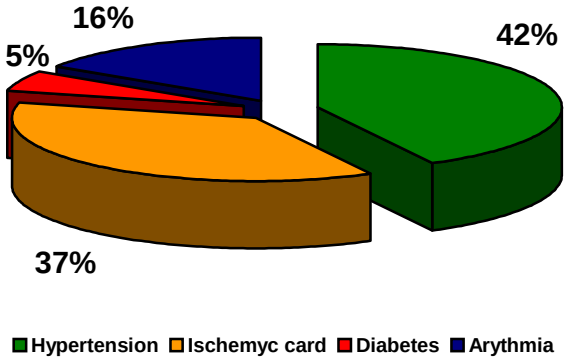


We analyzed 2 groups of patients, the first one being represented by patients who have not followed the alpha 1AR antagonist treatment before the operation and the second group of patients who reported the administration of alpha blockers therapy. It is determined that there are no statistically significant differences between the two groups studied, they are comparable. ($p>0.05$ ns)

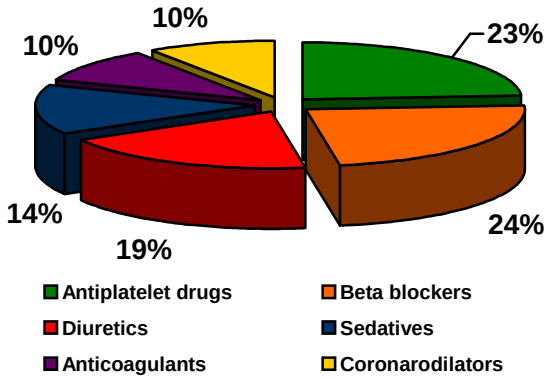
IFIS occurred in approximately 4% of the cataract surgeries and appears to be caused by systemic alpha1AR-antagonist medication. The average age of these patients was 74.90, Dev STD 7.96.

In 5.4% of cases (patients both men and women) with no history of alpha1AR-antagonist medication, we noticed an intraoperative iris behaviour that imitates the one from the mild floppy iris syndrome. The average age was 73.64, Dev STD 8.16. This IFI-like syndrome included patients with diabetes mellitus who were under oral anti diabetic or insulin treatment, hypertensive patients with selective beta-blockers, diuretics, antiplatelet drugs and patients with sedative therapy.

Picture no. 1. Associated systemic diseases of the patients included in our study



Picture no. 2. Systemic treatment of the patients who underwent cataract surgery



DISCUSSIONS

The incidence of IFIS in our study is slightly elevated (4%) compared with the incidence reported in the specialty literature (1.1-2.7).(7) This aspect is probably correlated with the short period (6 months) of our study. The results demonstrate the correlations between intraoperative floppy iris syndrome and alpha blocker treatment.

IFIS appeared even after a very short time of treatment (1 month), and in one case IFIS was noticed despite of the treatment discontinuation.

There were patients who underwent cataract surgery of both eyes, but despite of the Tamsulosin treatment, IFIS was recorded only in one eye.

The use of diluted epinephrine (1:1000) in BSS solution significantly reduced the floppy iris behaviour, especially in the stages of nuclear cracking and nuclear phacoemulsification. Few cases needed epinephrine 1:10000 in the anterior chamber, smaller dilutions than those from the specialty literature. We always preferred to inject epinephrine behind the iris plane, because of the intense mydriatic effect of this procedure. The viscoelastic substances are a real progress in the cataract surgery, especially in the phacoemulsification procedure where the lack of an adequate protection of the corneal endothelium and the instability of the anterior chamber could compromise the success of the operation. In our study, a useful and sufficient mydriasis was obtained by injecting a dispersive substance with high viscosity (Discovisc) in the anterior chamber of the eye. The administration of Discovisc followed the endothelial protection of a dispersive substance with medium viscosity (Viscoat). The iris hooks were needed when the use of diluted epinephrine and viscoelastic substances couldn't dilate the pupil for more than 2.5 mm. The instrumental stretching of the pupil was avoided by the surgeon because of the possibility of iris lesions, in such cases the iris being very atrophic. Although the iris hooks didn't cause evident rupture of the iris, in these cases lesions of the pupil's margins were noticed, but the postoperative size of the pupil was approximately equal to the pupil of the other eye.

The most difficult surgeries were recorded in cases of eyes with corneal degenerations, small anterior chamber (hypermetropia) or in those with massive lens, chamber oscillations of myopic eyes and although in cases with dense nucleus. Despite the insufficient dilated pupils, quick-chop method was useful in the nuclear safe fragmentation, the manoeuvres being performed in the central part, avoiding the difficult and dangerous parts such as the equatorial region of the nucleus. In the cases with low visibility and small pupil the surgeon preferred phacoemulsification of the nuclear fragments in the iris plane under the viscoelastic endothelial protection. Only one patient developed a corneal edema that needed treatment for 2 weeks, complete recovery being recorded after 6 weeks.

We described an IFI-like syndrome in cases without alpha1AR antagonist treatment (men and women). We assumed that the male patients didn't mention the urologic treatment (forgetfulness or shame), but in women are most unlikely such aspects. In their study, Schwinn et al.(8) developed the idea that this syndrome is possible to appear in other systemic diseases (especially in diseases with endothelial dysfunction-diabetes). IFI really seems to be "the tip of the iceberg". We noticed IFI-like behavior in 5.4% of our cases, many patients suffered from diabetes mellitus, cardiovascular diseases, the frequent systemic therapy being antiplatelet drugs, oral anti diabetics and beta-blockers. Few patients were under sedative treatment. At the moment we can't establish a correlation between IFIS and systemic therapy other than alpha blockers.

CONCLUSIONS

In our study the incidence of IFIS is close to the incidence reported in the specialty literature. All patients with IFIS were on alpha1AR-antagonist treatment for benign prostatic hyperplasia. There were no major intraoperative complications. Because of the difficulties and possible complications of these surgeries, it is recommendable to inform the surgeon upon the alpha blockers used by the patients, even when the treatment

was long ago interrupted. The urologist prescribes alpha blockers for benign prostatic hyperplasia, but the therapy could be postponed if in the near future the patient will suffer a cataract surgery. In other words, the moment, the benefits and the risks of alpha blockers treatment should be evaluated interdisciplinary by urologists and ophthalmologists.

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