

# Intraoperative Floppy Iris Syndrome in Association with Tamsulosin-Hydrochloride Medication: A Case Study

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## ABSTRACT

Intraoperative floppy iris syndrome (IFIS) is a complication that can result from cataract extraction surgery causing immediate and postoperative complications, which has been found to be commonly associated with current or prior usage of alpha1 receptor antagonists. These medications inhibit smooth muscle contraction, particularly targeting the smooth muscle of the bladder and the prostate. Alpha1 receptor antagonists have also been reported to relax the iris dilator muscle and subsequently lead to IFIS.

We report a case of an 81 year-old male patient who was on a regular dose of Duodart for his prostatic hyperplasia management who underwent a cataract extraction which resulted in postoperative complications. He was diagnosed with IFIS as well as a subluxed lens, an initially undiagnosed capsulorhexis tear and a posterior vitreous haemorrhage, which required a secondary repair procedure.

This paper reviews the effects of an alpha1 receptor antagonist on an ophthalmic patient undergoing cataract extraction and discusses how orthoptists can be involved in mitigating the risk of IFIS.

**Keywords:** intraoperative floppy iris syndrome, tamsulosin-hydrochloride, alpha blockers, cataract surgery complications

## INTRODUCTION

Intraoperative floppy iris syndrome (IFIS) is a complication which can arise during cataract extraction surgery<sup>1</sup> and is highly variable, occurring in 0.8% to 12.6%<sup>2</sup> of all cataract surgeries performed. It is characterised by an array of physiological observations which include a soft, loosely hanging iris stroma, irregular movement of the iris which can lead to the outward flow of the iris, the tendency of the iris to prolapse through surgical incisions and progressive pupil constriction intraoperatively despite prior mydriatic therapy.<sup>3</sup>

In 2005, Chang and Campbell<sup>4</sup> were the first to associate the development of IFIS with the use of tamsulosin-hydrochloride. Since then, a number of studies have supported this correlation<sup>1-3,5,6</sup> and it is suggested that between 2 and 9.09%<sup>2</sup> of patients using tamsulosin-hydrochloride develop IFIS.<sup>7-9</sup>

Tamsulosin-hydrochloride, commercially available in Australia as Flomaxtra or Silodosin (monotherapy medication) or Duodart (combination therapy of dutasteride and tamsulosin), is an alpha1 receptor antagonist, used to treat symptoms of benign prostate hyperplasia (BPH). BPH affects men aged 60 years and older with 3 in 4 men affected by the age of 70.<sup>10,11</sup> Of those who develop BPH it is reported that approximately 10% require pharmacological intervention, such as alpha1 receptor antagonists, to improve symptoms and quality of life.<sup>6</sup>

This paper presents a case of a male patient who was being treated for BPH with tamsulosin-hydrochloride who developed postoperative cataract complications. The aim of this paper is to review the effects of tamsulosin-hydrochloride on ophthalmic patients and to discuss how orthoptists, through the use of thorough history-taking and clinical investigation, can play an important part in mitigating the risk of IFIS occurrence.

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## CASE REPORT

An 81 year-old male patient presented to a vitreoretinal clinic for a specialist postoperative B-scan of the left eye, due to the lack of visibility of the posterior segment after complicated cataract surgery and a secondary procedure. Initially, he had undergone a phacoemulsification procedure for a left posterior subcapsular cataract at another ophthalmology clinic. Postoperatively, he was diagnosed with left IFIS, a peripheral capsular tear and lens displacement. At the time of surgical intervention, he was on a regular dose of Duodart for the management of BPH. His general health was complicated by non-insulin dependent diabetes mellitus, hypercholesterolaemia, hypertension and he had a pacemaker. He was taking numerous medications for these conditions, including blood thinners, anti-hypertensives and blood glucose lowering drugs.

Due to the postoperative complications, he was returned to theatre to remove the subluxated lens and to insert a new sulcus lens. This secondary procedure was difficult and posed a significant risk due to surgical manipulation of the iris to add iris hooks for lens displacement rectification. With this manipulation, a left hyphaema and vitreous haemorrhage developed and a vitrectomy was performed to clear the haemorrhage. Postoperatively, he was prescribed a course of Acular and Prednefrin Forte drops and he was then referred to a vitreoretinal surgeon in our clinic for opinion related to his postoperative complications.

Postoperatively, his visual acuity was RE 6/9 (plano/-1.75 x 90°) and LE 6/36 (+4.50/-5.00 x 150°) which improved to 6/18 with pinhole. Whilst there was no indication in the patient's notes related to the refractive outcome of his left eye, it is worth noting that he had a history of left amblyopia which was most likely refractive and due to his poor acuity, an intraocular lens to correct the astigmatism may not have been indicated. Intraocular pressure was recorded as RE 14 mmHg and LE 27 mmHg. A pupil assessment revealed significant constriction of the left pupil, the left hyphaema had cleared and the intraocular lens was in central position. Optical coherence tomography was performed but could not be interpreted due to a poor view.

The ocular history of the right eye was unremarkable, other than a phacoemulsification procedure for a right posterior capsular cataract prior to the left cataract surgery, with no resultant complications. The patient was taking Duodart for a significant amount of time prior to both cataract surgeries, yet complications only occurred after surgery to his left eye.

## DISCUSSION

This case highlights the surgical complications that can arise when a patient is receiving pharmacological intervention for BPH. The principal drug classes employed in the management of BPH are alpha1 blockers and 5α-reductase inhibitors.<sup>12</sup> This patient was on a regular dose of Duodart for the management of his benign prostate enlargement. Duodart is a combination therapy, consisting of dutasteride and tamsulosin-hydrochloride. Dutasteride is a 5α-reductase inhibitor and works by specifically decreasing the production of dihydrotestosterone and in turn reducing the rate of prostate enlargement or the prostate volume.<sup>5</sup> Tamsulosin-hydrochloride is an alpha1 adrenoceptor blocking agent which demonstrates selectivity for alpha1 receptors which have been shown to mediate the contraction of prostatic smooth muscle.<sup>13</sup> In the treatment of BPH, alpha1 blockers relax the smooth muscle of the bladder and prostate thereby decreasing the resistance along the bladder neck, prostate and urethra and improving the patient's symptoms. Ocular complications can arise when the alpha1 adrenergic receptors are blocked in the iris dilator muscle, preventing mydriasis during ophthalmic surgery. Research suggests that 5-alpha reductase inhibitors, however, do not appear to cause IFIS to any significant degree.<sup>6</sup>

In this particular case, Duodart most likely led to IFIS by causing relaxation of the iris dilator. As a consequence, his small pupils would have made it difficult for the surgeon to perform cataract surgery successfully and increased the risk of complications. The chain reaction of events also made it difficult to identify the peripheral capsular tear that occurred during the surgery leading to a delayed diagnosis of this condition. It is likely that this peripheral tear caused migration of the lens inferiorly, causing the subluxated lens and the need for a secondary procedure to address the tear and lens dislocation. The left hyphaema and vitreous haemorrhage noted during this second procedure were also likely related to the patient's medications. Hyphaema can be a complication due to iris trauma caused by IFIS, additionally his blood thinner usage would have exacerbated the bleeding.

The patient's postoperative complications are consistent with the literature.<sup>1,3,4,6</sup> Interestingly, a recent study of 39,144 cataract surgeries in a population of male patients with a history of tamsulosin-hydrochloride use, and of 378,611 patients not exposed to tamsulosin-hydrochloride, found that there has been a decrease in adverse events from the years 2003 to 2013.<sup>1</sup> Campbell et al<sup>1</sup> suggested that this improvement is likely due to the continuing education of ophthalmologists, increased awareness of the risks and of risk-modifying techniques and technological advancements.

Overall, the literature suggests that screening is essential in mitigating the risk of IFIS.<sup>2,3</sup> Taking a thorough medical history is considered the most effective way to identify at-risk patients and this case highlights the instrumental role of the orthoptist.<sup>2,5,6</sup> History taking should explore the use of alpha1 blockers for BPH or related conditions such as stones in the urinary tract. In addition, populations at risk, such as older men, should always be asked preoperatively if they have received any such intervention. It is also important to enquire about previous, as well as current treatment, as discontinuing alpha1 blockers has not been found to decrease the risk of IFIS completely.<sup>6</sup> Indeed because of this, and the questionable value of ceasing treatment, patients are not always asked to terminate their use of alpha1 blockers before a cataract extraction procedure.<sup>3</sup>

By orthoptists clearly identifying high-risk patients during medical history-taking, complications that arise from IFIS can be mitigated if orthoptists identified patients at higher risk by careful history taking in combination with surgeons planning prophylactic intraoperative measures. For example, mechanical pupil examination devices, viscoadaptive ophthalmic viscosurgical devices, fluidic parameter optimisation and intensive pharmacological pupil dilation can be used intraoperatively to avoid the complications of IFIS.<sup>1,14</sup> Whether used alone or in combination, these types of techniques are reported to improve the surgical success rate in patients with a history of tamsulosin-hydrochloride use.<sup>14</sup>

## CONCLUSION

Alpha1 receptor medications, such as tamsulosin-hydrochloride, are recognised to increase the risk of IFIS. Commonly used alpha1 receptor drugs used in Australia are Duodart, Silodosin and Flomax. Given that the development of cataracts, the incidence of BPH and stones in the urinary tract, the use of alpha1 receptors increases with age in men, it is important to identify patients on tamsulosin-hydrochloride and other similar medications who are scheduled for a cataract extraction. A comprehensive medical history taken by an orthoptist may identify the use of any alpha1 receptor antagonist medications. It is important to ask about any prior medications the patient was taking to minimise complications with ophthalmic treatment. The use of previous medications can make the difference between an uneventful or a problematic outcome.

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