

## Case Report

# Pupillary capture of implantable collamer lens after oral antidepressants

Rui Wang, BD,<sup>a\*</sup> Mengjun Fu, MD,<sup>a\*</sup> Giacomo Savini, MD,<sup>b</sup> Jingjing Zhao, MD,<sup>a</sup> and Haorun Zhang, BD<sup>a</sup>

Author affiliations: <sup>a</sup>Weifang Eye Hospital, Shandong, China;

<sup>b</sup>IRCCS G. B. Bietti Foundation, Rome, Italy

## Summary

We report the case of a 26-year-old man under treatment with the antidepressant drugs olanzapine and buspirone, which are associated with anticholinergic effects, in whom an implantable collamer lens (ICL) became spontaneously dislocated. ICL dislocation and pupil capture occurred 10 months postoperatively. The lens was successfully repositioned. The possible role of these drugs in the dislocation of the ICL is discussed.

## Introduction

The Visian implantable collamer lens (ICL; Staar Surgical Co, Monrovia, CA) is the most commonly used posterior chamber phakic lens. Approved for correction of moderate-to-high myopia by the US Food and Drug Administration in 2005,<sup>1</sup> the Visian ICL has gained in popularity in China since 2006. ICL implantation is not limited by corneal thickness and therefore has become an attractive surgical alternative in patients who are not good candidates for corneal refractive procedures. The latest model (Visian ICL V4c) has a 360  $\mu\text{m}$  hole in the center, which allows aqueous flow from the posterior to the anterior chambers and obviates the need for iridotomy or iridectomy required with earlier ICL models. Serious postoperative complications of ICL implantation, including cataract, pupillary block, or lens dislocation, can occur, but the incidence is low.<sup>2,3</sup> We report the case of spontaneous ICL dislocation and pupillary capture and discuss the possible association with intake of oral antidepressants.

## Case Report

A 26-year-old man underwent ICL implantation in May 2018 at Weifang Eye Hospital, Shandong, China. Ophthalmic history was significant for laser photocoagulation 4 years earlier for a retinal break in the left eye. One

year before ICL implantation surgery, he was diagnosed with depression, which had been treated during the preceding 3 months with oral olanzapine and buspirone hydrochloride tablets. The patient received a 13.2 mm long ICL in each eye:  $-14.50$  D in the right eye and  $-15.00$  D in the left eye. Preoperatively, his distance corrected visual acuity was 20/20 in the right eye (refraction,  $-13.25 -1.00 \times 5$ ) and 12/20 in the left eye (refraction,  $-13.75 -1.50 \times 180$ ). On slit-lamp examination, pupils were round in both eyes and mildly dilated. No obvious abnormalities were found on anterior and posterior segment examination. Corneal thickness was 549  $\mu\text{m}$  in the right eye and 552  $\mu\text{m}$  in the left eye on measurements by rotating Scheimpflug camera (Pentacam HR, Oculus Optikgeräte GmbH, Wetzlar, Germany). Corneal diameter was 11.9 mm in each eye. Pentacam (Oculus Optikgeräte GmbH) examination revealed that the distance from the endothelium to the lens was 3.42 mm in the right eye and 3.56 mm in the left eye. The scotopic entrance pupil ranged from 8.2 mm to 8.69 mm on anterior segment optical coherence tomography (Cirrus HD-OCT; Carl Zeiss Meditec AG, Jena, Germany) in the right eye and from 8.2 mm to 8.33 mm in the left. Posterior pole optical coherence tomography did not show any obvious abnormality. Postoperatively, slit-lamp microscopy showed a regular

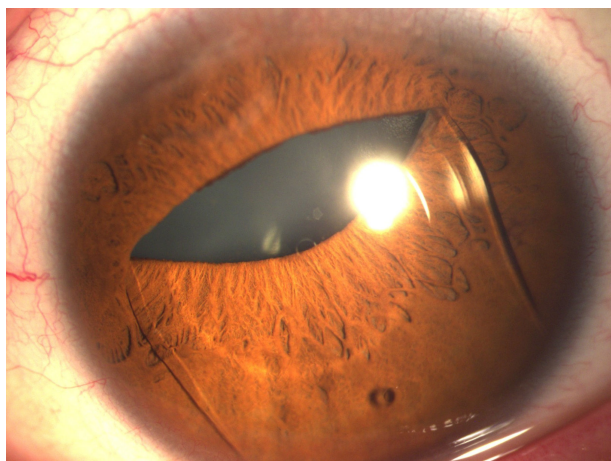
Published December 11, 2019.

Copyright ©2019. All rights reserved. Reproduction in whole or in part in any form or medium without expressed written permission of the Digital Journal of Ophthalmology is prohibited.

doi:10.5693/djo.02.2019.09.002

Correspondence: Haorun Zhang, Weifang Eye Hospital, Shandong 261000, China (email: Zhrun2519@sina.com).

\*These authors contributed equally to this work.



**Figure 1.** Anterior segment photograph showing partial dislocation of the implantable collamer lens (ICL) into the anterior chamber with pupillary capture.

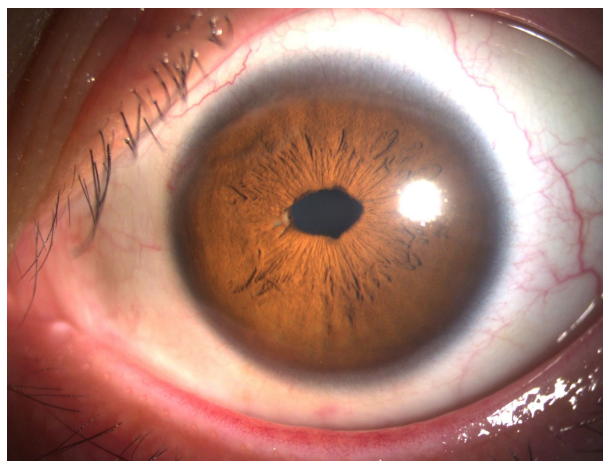
course and a good vaulting (550  $\mu\text{m}$  in the right eye; 500  $\mu\text{m}$  in the left eye).

Ten months after ICL implantation, the patient returned to our clinic because of asymptomatic pupil deformation in his left eye (Figure 1). Distance visual acuity (corrected) in this eye was 16/20 with a refraction of  $+0.75 +0.75 \times 170$ . Intraocular pressure (IOP) was 17 mm Hg. Slit-lamp microscopy of the left eye showed a clear cornea and partial dislocation of the ICL into the anterior chamber, with pupillary capture. No iris atrophy was observed. The patient denied history of trauma or strenuous activity. The ICL was successfully repositioned. On the first day after surgery, distance visual acuity (corrected) was 12/20, and IOP was 15 mm Hg. Slit-lamp microscopy revealed a clear cornea, a slightly oval pupil and clear ICL in position (Figure 2). Vaulting was 310  $\mu\text{m}$  on anterior segment optical coherence tomography. One month later, (corrected) distance visual acuity was 16/20, IOP was 15 mm Hg, and vaulting was 442  $\mu\text{m}$  (Figures 3 and 4).

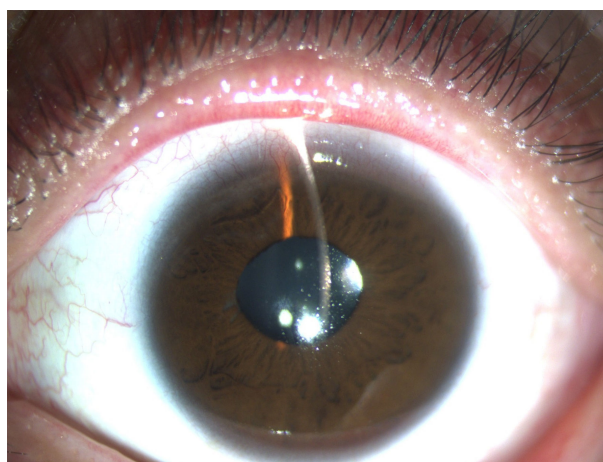
## Discussion

Only 6 cases of postoperative ICL dislocation have been reported in the literature. In 4 cases, dislocation occurred after blunt trauma to the eye<sup>4-7</sup>; in 1 case, after occipital trauma.<sup>8</sup> The only reported case of spontaneous ICL dislocation was described in 2005 and was related to the rupture of the zonules in the inferior quadrants, with no displacement in the anterior chamber.<sup>9</sup>

To our knowledge, this is the first case of spontaneous dislocation of an ICL into the anterior chamber. Since



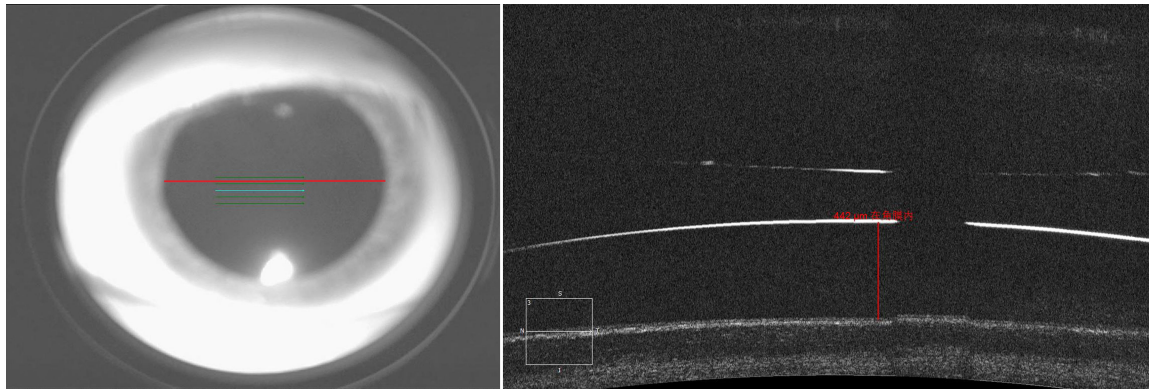
**Figure 2.** Anterior segment photographs of the left eye on postoperative day 1 showing a slightly oval pupil after ICL repositioning.



**Figure 3.** Anterior segment photographs of the left eye 1 month after surgery showing the well-positioned ICL with normal pupil.

neither direct nor indirect trauma was reported by the patient, the mechanism of dislocation had to involve a maximum pupillary dilation. We believe that drug-induced mydriasis may have played a role in this instance of ICL dislocation.

Olanzapine belongs to the class of benzodiazepines and is a new type of antipsychotic drug, whose main mechanism of action is to block serotonin 5-hydroxytryptamine (5-HT)<sub>2a</sub> and deoxyadenosine (DA) receptors. Buspirone is a nonbenzodiazepine anxiolytic agent that has a high affinity for serotonin 5-HT<sub>1a</sub>-receptor. Both drugs show an anticholinergic activity,<sup>10-12</sup> which can induce pupil dilation and cycloplegia. We speculate that both pupil dilation and cycloplegia may trigger ICL dis-



**Figure 4.** Anterior segment optical coherence tomograph of the left eye (Cirrus HD-OCT, Carl Zeiss Meditec AG, Jena, Germany) 1 month after surgery showing the normal vault.

location into the anterior chamber in combination with other factors, such as face-down head lowering and dark-induced mydriasis. This case suggests that systemic drugs with anticholinergic activity may represent a relative contraindication to ICL implantation.

## Literature Search

PubMed was searched on December 7, 2019, for English-language results, using the following terms and combinations: *pupillary capture* AND *ICL*.

## References

- Sanders DR, Vukich JA, Doney K, et al. U.S. Food and Drug Administration clinical trial of the implantable contact lens for moderate to high myopia. *Ophthalmology* 2003;110:255-66.
- Packer M. The implantable collamer lens with a central port: review of the literature. *Clin Ophthalmol* 2018;12:2427-38.
- Alfonso JF, Lisa C, Fernandez-Vega L, Almanzar D, Perez-Vives C, Montes-Mico R. Prevalence of cataract after collagen copolymer phakic intraocular lens implantation for myopia, hyperopia, and astigmatism. *J Cataract Refract Surg* 2015;41:800-805.
- Morshifar M, Stagg BC, Muthappan V, Vasavada SA. Traumatic dislocation of implanted collamer phakic lens: a case report and review of the literature. *Open J Ophthalmol* 2014 May 30;8:824-6.
- Song JS, Moon HS. Pupillary capture of implantable contact lens after blunt trauma. *J Cataract Refract Surg* 2005;31:1831-3.
- Schmitz JW, McEwan GC, Hofmeister EM. Delayed presentation of traumatic dislocation of a visian implantable collamer lens. *J Refract Surg* 2012;28:365-7.
- Espinosa-Mattar Z, Gomez-Bastar A, Graue-Hernandez EO, et al. DSAEK for implantable collamer lens dislocation and corneal decompensation 6 years after implantation. *Ophthalmic Surg Lasers Imaging* 2012;43:e68-72.
- Kong J, Qin XJ, Li XY, Zhang JS, Qu B. Implantable collamer lens dislocation. *Ophthalmology* 2010;117:399.e1.
- Kaufer RA, Kaufer GJ. Late subluxation of an ICL. *J Cataract Refract Surg* 2005;31:1254-5.
- Chew ML, Mulsant BH, Pollock BG, et al. A model of anticholinergic activity of atypical antipsychotic medications. *Schizophr Res* 2006;88:63-72.
- Mulsant BH, Gharabawi GM, Bossie CA, et al. Correlates of anticholinergic activity in patients with dementia and psychosis treated with risperidone or olanzapine. *J Clin Psychiatry* 2004;65:1708-14.
- Kolasa K, Fusi R, Garattini S, Consolo S, Ladinsky H. Neurochemical effects of buspirone, a novel psychotropic drug, on the central cholinergic system. *J Pharm Pharmacol* 1982;34:314-7.