

# Clinical observations of iridociliary cysts and their changes after implantable collamer lens implantation in myopic patients

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## Abstract

• **AIM:** To observe the characteristics of iridociliary cysts in myopic patients and evaluate the influences on the position and safety of implantable collamer lens (ICL) after surgery.

• **METHODS:** Totally 270 eyes of 135 patients who underwent ICL surgery for the corrections of myopia were included in this study. Preoperative and postoperative morphology of iridociliary cysts were observed in ultrasonic biomicroscopy (UBM) image.

• **RESULTS:** A total of 138 iridociliary cysts were found in 88 eyes of 50 patients among 270 eyes of 135 patients before surgery (37%). Twenty-five patients had cysts in one eye (50%) and 25 had cysts in both eyes (50%). The prevalence of iridociliary cysts was negatively correlated with age, but no gender difference ( $P>0.05$ ). The incidence of iridociliary cysts was much less in eyes with myopia greater than -9.00 D ( $P<0.05$ ). The diameter of the largest cyst was 1.96 mm and the smallest cyst was 0.24 mm, with a majority within the range of 0.5 to 1.0 mm. Most of the cysts were located in the inferior temporal quadrant. One year after ICL implantation, 51 iridociliary cysts (37%) remained unchanged, 47 cysts (34%) decreased in size, and 40 cysts (29%) disappeared. Most of cysts that changed after surgery were smaller than 1.0 mm ( $P<0.05$ ) and located in the nasal and temporal sides around the haptics of implantable lens. All the ICL were in their original position.

• **CONCLUSION:** Iridociliary cysts are commonly seen in myopic eyes. The cysts have no impact on the safety of ICL surgery. Some cysts may decrease in size or disappear after ICL implantation.

• **KEYWORDS:** iridociliary cysts; implantable collamer lens; myopic

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## INTRODUCTION

Primary iridociliary cysts are common uveal benign tumors, the most common sites being the ciliary sulcus and the ciliary body crown<sup>[1-8]</sup>. The pathogenesis, progression and prognosis of primary iridociliary cyst have been unclear so far<sup>[9]</sup>. It has been observed that the primary iridociliary cyst is stable in the eye<sup>[1]</sup>, but there are also some studies reported that the growth of iridociliary cyst caused narrow angle and angle-closure glaucoma, uveitis, even affect their own crystals<sup>[8,10-13]</sup>. Implantable collamer lens (ICL) implantation is currently one of the mainstream operations for the treatment of high myopia<sup>[14-17]</sup>. In recent years, the number of surgeries in the world has been increasing. Therefore, the safety after many years of implantation is a focus of concern. The footplate of ICL is located in the ciliary sulcus. Are the iridociliary cysts affecting the position of the ICL? Or will ICL affect the prognosis of the iridociliary cyst after ICL implantation? There is no report yet. This study first observed the incidence and characteristics of iridociliary cysts in myopic people, and observed the impact on the safety of ICL implantation, as well as the iridociliary cysts itself.

## SUBJECTS AND METHODS

**Ethical Approval** The principles outlined in the Declaration of Helsinki (2008) were followed for all investigators. All patients had signed the informed consent before surgery.

**Patients** Totally 135 patients with myopia underwent ICL V4c implantation at Hankou Aier Eye Hospital during the period of

May 2015 and May 2016, including 70 males and 65 females. All patients met the following criteria: over 18 years of age, depth of anterior chamber greater than 2.8 mm obtained by Pentacam (Oculus, Germany), stable refraction at least 12mo, corneal endothelial cell count greater than 2000/mm<sup>2</sup>, clear lens and no pre-existing ocular pathology. Exclusion criteria were history of previous ocular surgery or trauma, uncontrolled systemic disease, corneal scarring or vascularisation, and pregnancy. Calculation of the selected ICL V4c was based on the nomogram suggested by the company, using the refraction obtained by the surgeon and the preoperative information including the white-to-white measurement obtained by Pentacam (Oculus, Germany) and calipers measured by the same doctor (Chen Q).

**Preoperative Examinations and Postoperative Visits** The preoperative examination included uncorrected visual acuity (UCVA), best corrected visual acuity (BCVA), slit lamp examination, intraocular pressure (IOP) measurement, anterior segment measurement (Pentacam, Oculus, Wetzlar, Germany), lens thickness and axial length (A-ultrasonic examination), and diameter of ciliary sulcus (ultrasonic biomicroscopy, UBM). Optical coherence tomography (OCT) and UBM were conducted 1mo and 1y after operation.

**Ultrasound Biomicroscopy** UBM examinations were conducted on all patients preoperatively and at 1y after the operation. The examinations were performed using a high-resolution UBM (SW-3200, SUOER, China) with a 68-MHz transducer-probe allowing 5×5 mm<sup>2</sup> tissue penetration and approximately 50-μm resolution. All procedures were performed by the same experienced examiner in constant ambient lighting conditions.

**Observation of Ciliary Cysts** The size (average of the horizontal and vertical diameters in radial position), number and location of iridociliary cysts were recorded at preoperative and postoperative UBM examination.

Cysts are categorized according to the size. Small cysts are defined as cyst ≤0.5 mm, middle cysts are defined as ≤1.0 mm but >0.5 mm, large cysts are defined as >1.0 mm.

**Determination of Implantable Collamer Lens Position One Year After Implantation** The position of ICL was determined by: 1) we compared the axial position of intraocular lens at the end of surgery and 1y after surgery, the changes within 5 degrees was considered as axial stable; 2) central vault measured by OCT (TOPCON, 3DOCT-2000), at 1mo and 1y after surgery; 3) peripheral vault of the four footplates positions of the implantable lens was measured by UBM at 1mo and 1y after surgery, compare the difference of peripheral vault between the two time points, and the difference less than 30 μm is regarded as positional symmetry. Peripheral vault was the average value of 4 points of footplates in UBM image which detected at 1mo and 1y after surgery.

**Surgical Technique** All surgeries were performed by the same surgeon (Zeng QY). All patients were administered with dilating and cycloplegic agents (2.5% phenylephrine and 1% tropicamide, Alcon, China). After a marking at 0° and 180° was performed, the procedure was performed by first making corneal incisions at 6 or 12 o'clock under topical anesthesia (0.4% oxybuprocaine hydrochloride, Santen, Japan), injecting of viscoelastic substance (1.7% sodium hyaluronate; Bausch & Lomb, China) into the anterior chamber and making a 2.75-mm tunnel incision in temporal cornea. Then the ICL was placed into anterior chamber *via* the tunnel incision in temporal cornea with the injector (STAAR Surgical) and placed in the posterior chamber and the lens footplate was adjusted to ciliary sulcus. At last the viscoelastic surgical agent removed completely using balanced salt solution. All surgeries were uneventful and no intraoperative complications were observed. After surgery, tobramycin-dexamethasone (Tobradex; Alcon, USA) and levofloxacin (Cravit; Santen, Osaka, Japan) medications were prescribed topically four times daily for 7d, and artificial tears four times daily for 1mo.

**Statistical Analysis** All statistical analyses were performed using SPSS 19.0 software. The results were expressed as means±standard deviation (SD). Mann-Whitney *U* tests were performed to explore statistical differences for refractive index, IOP, vault among different time point, and differences between each group or each size of the cysts. *P*<0.05 was considered statistically significant.

## RESULTS

**Detection Rate and Distribution Characteristics of Iridociliary Cysts with Myopia Patients** One hundred and thirty-five cases (70 male and 65 female patients) were reviewed in this study. Table 1 shows the patients' baseline demographic data. Iridociliary cysts were reported in 50 cases, representing 37% of total cases, 27 cases in male patients (46 eyes) and 23 in female patients (42 eyes). There is no gender difference in the occurrence of cysts (*P*>0.05; Table 2). The patient age range was 18-46y, with an average age of 25.4±4.14y. The prevalence of iridociliary cysts was 36.7% (11 eyes) in patients under 20y; 33.3% (58 eyes) in patients of 20-29y; 30% (15 eyes) in patients of 30-39y; and 25% (4 eyes) in patients over 40y. The prevalence of iridociliary cysts was negatively correlated with age (Table 3).

The average spherical equivalent refraction (SER) was -13.25±3.25 D (range, -3.50 to -21.50 D). The eyes of 28 patients had an SER less than -6.00 D, which corresponded to 42.8% (12 eyes) of cases with iridociliary cysts; the eyes of 84 patients had an SER between -6.00 D and -9.00 D, which corresponded to 38% (32 eyes) of cases with iridociliary cysts; 118 eyes had an SER between -9.00 D and -15.00 D, which corresponded to 29.7% (35 eyes) with iridociliary cysts; 40

eyes had an SER greater than -15.00 D, which corresponded to 22.5% (9 eyes) cases with iridociliary cysts (Table 4). No correlation was found between the incidence of iridociliary cysts and the SER ( $P>0.05$ ).

Overall, 25 patients had cysts in one eye (50%) and 25 patients has cysts in both eyes (50%). In 67% (59 eyes) of cases single cysts were observed, while 33% (29 eyes) of cases had multiple cysts. Fifteen eyes had two iridociliary cysts (51.7%), eight eyes had three iris cysts (27.6%), and six eyes had more than three iridociliary cysts (20.7%).

#### Size and Location of Iridociliary Cysts in Myopia Patients

A total 138 iridociliary cysts were found before surgery (the number of cysts exceeds the number of eyes because many eyes had multiple cysts in various sectors). The mean size of cysts was  $0.65\pm 0.23$  mm (range 0.24-1.96 mm). The largest cyst was 1.96 mm and the smallest cyst was 0.24 mm. Fifty-three cysts had a diameter less than 0.5 mm (38.4%); 68 cysts had a diameter between 0.5 and 1.0 mm (49.6%); and 17 cysts had a diameter greater than 1.0 mm (12%). Most cysts are between 0.5 and 1.0 mm in diameter ( $P<0.05$ ; Table 5).

In terms of location, 58 cysts were in the temporal side (42%), 30 cysts were located in the nasal side (21.8%), 28 cysts in the lower side (20.2%), and 22 cysts were located in the upper side (16%). Most iridociliary cysts were in temporal quadrant (42%;  $P<0.05$ ).

#### Change in Iridociliary Cysts One Year After ICL

**Implantation** One year after surgery, the largest cysts was 1.96 mm and that of the smallest cysts was 0.24 mm. The size of 51 ciliary cysts remained unchanged (37%), 47 cysts decreased in size (34%), and 40 cysts were no longer present (29%). The size and outcome are shown in Table 5.

Among the cysts that changed after ICL implantation, most were greater than 1.0 mm ( $P<0.05$ ). No difference in the change of size in cysts smaller than 0.5 mm and cysts 0.5 to 1.0 mm after ICL implantation was observed ( $P>0.05$ ). No accretion of iridociliary cysts was observed in any case. We considered a change within 0.05 mm to be measurement error. Further analysis revealed the relationship between the outcome and the location of the cyst (Table 6). Cysts that did not change in size after ICL implantation were most found in the superior or inferior areas. Cysts that were not longer present or decreased in size after ICL implantation were located on the nasal side or temporal sides mostly.

#### Implantable Lens Position One Year After ICL

**Implantation** The average central vaults were  $489\pm 224$   $\mu$ m measured by OCT and peripheral vaults were  $207\pm 287$   $\mu$ m measured by UBM. Symmetry was perfect in the peripheral vaults. The difference of peripheral vault between the two time points (1mo and 1y after surgery) were less than 30  $\mu$ m, so we believed no patient have any changes in ICL location. The

**Table 1 Preoperative patient characteristic**

Variables	Mean $\pm$ SD (range)
Age (y)	25.4 $\pm$ 4.14 (18 to 46)
Spherical refraction (D)	-11.94 $\pm$ 3.51 (-7.5 to -21.50)
Cylinder refraction (D)	-2.87 $\pm$ 1.71 (0 to 7)
Manifest spherical equivalent (D)	-13.25 $\pm$ 3.25 (-3.50 to -21.50)
Preoperative logMAR UDVA	1.65 $\pm$ 0.4 (1 to 2.3)
Preoperative logMAR CDVA	0.11 $\pm$ 0.12 (0 to 0.39)

**Table 2 Relation of incidence of cyst and sex**

Sex	No. of patients with cysts	Percentage of patients with cysts (%)	Chi-square value	P
Male	27	38.5	2.24	0.1
Female	23	35.4		

**Table 3 Relation of incidence of cyst and age**

Group of ages (y)	Total eyes	No. of eyes with cyst	Percentage of eyes with cyst (%)
<20	30	11	36.7
20-29	174	58	33.3
30-39	50	15	30
$\geq 40$	16	4	25

**Table 4 Relation of incidence of cyst and diopter**

Peripheral equivalent refraction (D)	Total eyes	No. of eyes with cyst	Percentage of eyes with cyst (%)
<-6.00	28	12	42.8
-6.00 to -9.00	84	32	38.0
-9.00 to -15.00	118	35	29.7
>-15.00	40	9	22.5

four footplates were in the original position in all patients as assessed by UBM examination.

**Refractive and Visual Outcomes** Table 7 shows the 1y postoperative clinical outcomes. There was a statistically significant improvement between the preoperative and 1-year postoperative logMAR UDVA ( $P<0.001$ ). All eyes had UDVA of 0.5 (20/40) or better at 1-year visit. There was a statistically significant improvement between the preoperative and 1-year postoperative logMAR CDVA ( $P<0.001$ ). There is a significant difference between manifest refractive spherical equivalent preoperatively and 1-year postoperatively ( $P<0.001$ ).

There were no perioperative complications, and no eye required ICL explantation or repositioning. No pigmentary glaucoma, pupillary block, cataract, or other vision threatening complications occurred during the follow-up.

#### DISCUSSION

The detection rate of iridociliary cysts, based on the observation of our 135 myopic patients, was 37%, which was consistent with patients with normal vision<sup>[18]</sup>. In the past, the presence

**Table 5 Relation of cyst size and outcomes**

Parameters	<0.5 mm	Percentage to total number (%)	0.5-1.0 mm	Percentage to total number (%)	≥1.0 mm	Percentage to total number (%)
No. of cysts	53	38.4	68	49.6	17	12
Unchanged after ICL implantation	21	41	21	41	9	18
Decreased in size after ICL implantation	17	36	24	51	6	13
No present after ICL implantation	15	37.5	23	57.5	2	5

**Table 6 Relation of cyst position and outcomes**

Parameters	Nasal and temporal sides	Percentage to total number (%)	Upper and lower sides	Percentage to total number (%)
No. of cysts	88	63.8	50	36.2
Unchanged after ICL implantation	3	2	48	34.8
Decreased in size after ICL implantation	45	32.6	2	1.4
No present after ICL implantation	40	29	0	0

**Table 7 One year postoperative clinical outcomes**

Parameters	1mo after surgery	1y after surgery
Manifest spherical equivalent (D)	-0.02±0.32 (-0.625 to 0.75)	-0.07±0.29 (-0.625 to 0.75)
UDVA (logMAR)	0.085±0.215 (0.000 to 0.275)	0.136±0.104 (0.000 to 0.301)
CDVA (logMAR)	0.087±0.035 (-0.525 to 0.168 )	0.055±0.065 (-0.792 to 0.222)
IOP (mm Hg)	14.9±2.0 (11 to 20)	14.9±2.0 (11 to 20)
Central vault (µm)	524±324 (187 to 1200)	489±224 (115 to 1112)
Peripheral vault (µm)	215±237 (87 to 863)	207±287 (38 to 754)

of cysts was thought to be inherited and more frequent in adult females<sup>[1]</sup>. However, our findings suggested that the incidence in male and female patients was the same. In our study, the percentage of single ciliary cysts and multiple iridociliary cysts were 67% and 33%, respectively, which were consistent with the findings in patients with normal vision<sup>[18]</sup>. The finding that most iridociliary cysts were in temporal quadrant (42%) was also consistent with previous studies<sup>[18]</sup>. This suggested that both the incidence rate and position of iridociliary cysts with myopia group were not significantly different from emmetropic eyes. Our study also suggested that the incidence rate of iridociliary cysts has no obvious correlation with SER. However, patients with SER less than -9.00 D had a significantly higher prevalence than those with extremely high myopia (SER greater than -9.00 D). This suggests the possibility of lower occurrence in patients with extremely high myopia. Or that the occurrence of iridociliary cyst is not associated with the SER of myopia.

In theory, the ICL was implanted in ciliary sulcus and was likely to be in contact with ciliary cysts. So iridociliary cysts supposed to have an impact on ICL location. A relative paucity of studies on the safety of postoperative ICL surgery in myopia patients with iridocyclitis cysts exist in the literature of Aman-ullah *et al*<sup>[19]</sup> believes that cysts have no effect on the location of ICL, but his observation time is short and it is a case report.

As time progresses, it will be questionable whether iridociliary cysts and ICL will interfere with each other. One case of ICL dislocation due to iridociliary cyst was reported in our previous study<sup>[20]</sup>.

To further evaluate the impact of cyst size on ICL position, we followed the patients who had iridociliary cysts in this study one year after surgery. We found all the patient has a stable postoperative position of ICL lens, which was consistent with Aman-ullah *et al*<sup>[19]</sup>. Furthermore, we found that 37% iridociliary cysts did not change, 29% iridociliary cysts were not present, and 34% iridociliary cysts decreased in size one year after ICL implantation. All iridociliary cysts that did not change in size were located in the superior or inferior areas, while cysts that decreased in size or disappeared were located in nasal and temporal areas. This suggested that the iridociliary cysts may have been affected by the increased pressure induced during the ICL implantation and long-term postoperative contact, which may have led to a decrease in size or complete absence of iridociliary cysts. The iridociliary cysts are mostly pigmented epithelial types, and the histological characteristics of the cysts are a layer of tissue fluid surrounded by pigment epithelial cells. The normal position of ICL footplates after implantation is on the nasal and temporal side. So the reduction in size of cysts may be related to the intraoperative rotary motion and the pressure of the ICL footplates on the wall of

the cyst, resulting in rupture of the cyst wall or compression of the wall.

Usually we have the following considerations in surgery: 1) For patients with preoperative cysts, appropriate rotation will be made when the ICL is implanted to determine its correct placement. 2) For larger cysts (greater than 1.0 mm), the ICL is rotated as far as possible to avoid the cysts. 3) For the Toric implantable collamer lens (TICL) implantation in eyes with cysts, the axis of the TICL is customized according to the size of the cyst before surgery, in order to avoid footplates from the cysts. The study also showed that patients with myopia of primary iridociliary cysts had good vision for one year after ICL/TICL implantation. All patients had normal IOP and none had uveitis, shallow anterior chamber, cataracts, and other adverse reactions. The present study illustrates the safety of ICL/TICL implantation in patients with high myopia of primary iridociliary cysts.

In conclusion, both the incidence and position of occurrence of iridociliary cysts with myopia group are not significantly different with those of normal group, and the incidence of iridociliary cysts has no obvious correlations with the degree of myopia. Under the adjustment of our surgical design, the cysts seem to have no impact on the ICL position and safety. Some cysts may decrease in size or disappear after ICL implantation. However, a larger sample size study and a longer observation of iridociliary cysts were needed. At the same time, the histological classification of iridociliary cysts are not clear, in the later studies, more specific histological classification may be more instructive.

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#### REFERENCES

- 1 Shields JA, Shields CL. Cysts of the iris pigment epithelium. What is new and interesting? The 2016 Jose Rizal international medal lecture. *Asia Pac J Ophthalmol* 2017;6(1):64-69.
- 2 Kunimatsu S, Araie M, Ohara K, Hamada C. Ultrasound biomicroscopy of ciliary body cysts. *Am J Ophthalmol* 1999;127(1):48-55.
- 3 Rotsos T, Diagourtas A, Symeonidis C, Papaconstantinou D, Georgopoulos G. Phacoemulsification in a patient with small pupil and a large iris cyst. *Eur J Ophthalmol* 2012;22(2):278-279.
- 4 Pathak-Ray V, Ahmed II. Phaco-endocycloplasty: a novel technique for management of ring iridociliary cyst presenting as acute angle closure. *Oman J Ophthalmol* 2016;9(1):63-65.
- 5 Kaushik S, Ichhpujani P, Kaur S, Singh Pandav S. Optic disk pit and

- iridociliary cyst precipitating angle closure glaucoma. *J Curr Glaucoma Pract* 2014;8(1):33-35.
- 6 Seki M, Fukuchi T, Yoshino T, Ueda J, Hasebe H, Ueki S, Oyama T, Fukushima A, Abe H. Secondary glaucoma associated with bilateral complete ring cysts of the ciliary body. *J Glaucoma* 2014;23(7):477-481.
- 7 Wang BH, Yao YF. Effect of primary iris and ciliary body cyst on anterior chamber angle in patients with shallow anterior chamber. *J Zhejiang Univ Sci B* 2012;13(9):723-730.
- 8 Xue KC, Hu DD, Zhao L, Li N, Shen HY. Correlation between presence of primary iris- and ciliary body cysts and intraocular pressure. *Eur Rev Med Pharmacol Sci* 2017;21(18):3985-3989.
- 9 Rao A, Gupta V, Bhadange Y, Sharma R, Shields JA. Iris cysts: a review. *Semin Ophthalmol* 2011;26(1):11-22.
- 10 Pujari A, Swamy DR. Iridociliary epithelial cyst. *BMJ Case Rep* 2017:bcr-2017-222126.
- 11 Rivero V. Use of optical coherence tomography and ultrasound biomicroscopy in the diagnosis of iridociliary cysts. *Arch Soc Esp Ophthalmol* 2016;91(6):300.
- 12 Rivero V, Aparicio MJ, Suárez-Leoz M, Fernández A. Vitreous hemorrhage secondary to iridociliary cyst. *Arch De La Sociedad Española De Ophthalmol Engl Ed* 2015;90(12):600-603.
- 13 Vila-Arteaga J, Díaz-Céspedes RA, Suriano MM. Plateau iris secondary to iridociliary cysts. *Arch Soc Esp Ophthalmol* 2015;90(11):542-545.
- 14 Kocová H, Vlková E, Michalčová L, Rybářová N, Motyka O. Incidence of cataract following implantation of a posterior-chamber phakic lens ICL (implantable collamer lens) - long-term results. *Cesk Slov Ophthalmol* 2017;73(3):87-93.
- 15 Repplinger B, Kohnen T. Intraocular pressure after implantation of an ICL with aquaport: development of intraocular pressure after implantation of an ICL (model V4c) with aquaport without iridotomies. *Ophthalmologie* 2018;115(1):29-33.
- 16 Tian Y, Jiang HB, Jiang J, Wen D, Xia XB, Song WT. Comparison of Implantable Collamer Lens Visian ICL V4 and ICL V4c for high myopia: a cohort study. *Medicine (Baltimore)* 2017;96(25):e7294.
- 17 Shimizu K, Kamiya K, Igarashi A, Kobashi H. Long-term comparison of posterior chamber phakic intraocular lens with and without a central hole (hole ICL and conventional ICL) implantation for moderate to high myopia and myopic astigmatism: consort-compliant article. *Medicine (Baltimore)* 2016;95(14):e3270.
- 18 Kunimatsu S, Araie M, Ohara K, Hamada C. Ultrasound biomicroscopy of ciliary body cysts. *Am J Ophthalmol* 1999;127(1):48-55.
- 19 Aman-Ullah M, Gimbel HV, Camoriano GD. Toric implantable collamer lens implantation in a case with bilateral primary peripheral iris cysts. *Ophthalmic Surg Lasers Imaging* 2012;43(Online):e18-e21.
- 20 Zeng QY, Xie XL, Chen Q. Prevention and management of collagen copolymer phakic intraocular lens exchange: causes and surgical techniques. *J Cataract Refract Surg* 2015;41(3):576-584.