CASE REPORT

Surgical removal of a giant iris stromal cyst: an intraoperative optical coherence tomography-guided approach

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SUMMARY

An 11-year-old girl was brought with the chief complaint of progressive diminution of vision in her right eye for the past 3 months. There was no history of ocular trauma or any ocular surgery. Systemic and family history was insignificant. Visual acuity was 20/20 in her left eye and counting finger close to face with projection of rays being accurate in her right eye. Slit lamp examination of her right eye showed large cystic lesion filling almost entire anterior chamber. With the help of various imaging modalities like anterior segment optical coherence tomography (OCT) and ultrasound biomicroscopy diagnosis of iris stromal cyst was confirmed. Right eye surgical removal of the iris stromal cyst was done under real-time imaging of intraoperative OCT (iOCT). Best-corrected visual acuity at 6 months follow-up was 20/20 without any recurrence. iOCT-guided approach for complete removal of the iris cyst seems more promising.

BACKGROUND

Iris cysts are not uncommon in clinical practice; they vary in their size, location and presentation. Cysts are epithelial-lined, fluid-filled cavities. Iris cysts are mainly classified into two main categories as primary and secondary iris cysts. Primary iris cyst is congenital and it is further classified into iris pigment epithelial (IPE) cyst and iris stromal cyst. Secondary iris cyst may be secondary to trauma, intraocular surgery, drug use, chronic inflammation, infection and others. Diagnosis and management of iris cyst remain a challenge until now.¹ Herein, we report a case of iris stromal cyst filling the anterior chamber being removed safely under the intraoperative optical coherence tomography (iOCT) guidance.

CASE PRESENTATION

An 11-year-old girl was brought to our clinic with the chief complaint of progressive diminution of vision in her right eye for the past 3 months. There was no history of ocular trauma or any ocular surgery in the past. Systemic and family history was not significant. The corrected distance visual acuity (CDVA) in her right eye was counting finger close to face with projection of rays being accurate and 20/20 in left eye. Slit lamp examination showed a large translucent cystic lesion of iris filling almost entire anterior chamber, measuring about 8 mm × 10 mm × 4 mm. The lesion was covering the

pupil entirely with fine vessels on its surface. Lower two-thirds of the cyst was in direct contact with the corneal endothelium with overlying corneal oedema (figure 1). There was no rubeosis iridis. Intraocular pressure (IOP) on applanation tonometry was 24 mm Hg in oculus dexter (OD) and 12 mm Hg in oculus sinister (OS). Fundus and slit lamp findings in the left eye were normal.

On B-scan ultrasonography of right eye, the posterior segment was anechoic with no optic nerve head cupping. Endothelial touch of the lower two-thirds of the cyst was confirmed with the help of anterior segment optical coherence tomography (ASOCT) (figure 2). On ultrasound biomicroscopy (UBM) examination a large, single, thin-walled cyst with regular surface arising from the inferior iris stroma, filled with fluid and suspended particles without any echogenic heterogeneity was noted. Entire cyst was confirmed to the iris stroma and laterally it was not extending beyond iris root (figure 3).

The patient underwent right eye iOCT-guided surgical removal of the iris stromal cyst under general anaesthesia. Intraoperatively, complete viscodissection of the anterior cyst wall from endothelium was performed under the guidance of iOCT (figure 4), followed by complete removal of

Figure 1 Slit lamp biomicroscopic images showing large cyst filling almost entire anterior chamber with endothelial touch.

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Figure 2 Horizontal and vertical anterior segment optical coherence tomography scans showing endothelial touch of lower two-thirds of cyst.

the anterior wall of the cyst with the help of 23G vitrectomy cutter under the direct guidance of iOCT.

INVESTIGATIONS

1. ASOCT: Horizontal and vertical scans revealed endothelial touch of the lower two-thirds of the cyst.
2. UBM: Revealed thin-walled cyst arising from the inferior iris stroma, filled with fluid and few suspended particles.

DIFFERENTIAL DIAGNOSIS

1. IPE cyst
2. intracameral cysticercosis
3. medulloepithelioma.

Figure 3 Ultrasound biomicroscopy showing thin-walled cyst arising from inferior iris stroma.

Figure 4 Intraoperative optical coherence tomography showing cyst wall separation from endothelium after successful viscodissection.

TREATMENT

Right eye iOCT-guided surgical removal of the iris stromal cyst done with the help of vitrectomy cutter under general anaesthesia.

OUTCOME AND FOLLOW-UP

Initially, follow-up was done more frequently at every 2 weeks until the end of 6 weeks then every 2 months for 6 months. Slit lamp examination, IOP measurement and UBM were done to look for any recurrence. At the end of 6 months follow-up, the CDVA in the right eye was 20/20 with few pigment deposition at lower corneal endothelium but without any corneal oedema or raised IOP (figure 5).

DISCUSSION

Cystic lesion of the iris is around 21% of all iris tumours.² It may be primary or secondary. Among them, the secondary cystic lesion is more common.³ Primary cystic lesions are congenital without any definite cause and are further classified into the IPE cyst (50%–60%), iris stromal cyst (20%–30%) and free-floating cyst

Figure 5 Postoperative slit lamp biomicroscopic and anterior segment optical coherence tomography images showing atrophic inferior iris stroma with few pigment deposition on endothelium.

(5%–10%). Primary IPE cyst is further classified on basis of its anatomical location into central at pupillary margin, mid-zonal at the iris root and peripheral at the iridociliary sulcus. Among these peripheral is the most common type.^{4–6}

Primary IPE cyst is mostly asymptomatic, stationary, diagnosed accidentally and generally does not need any treatment. Primary stromal iris cyst may be progressive especially in children less than 10 years of age and may need surgical intervention.^{4,7}

It is very crucial to differentiate iris cyst from any underlying solid or cystic tumour. Ciliary body medulloepithelioma is one of the common conditions found in this age group. In vivo investigations like ASOCT and UBM are very useful for proper anatomical characterisation of these lesions. Anatomical origin of the cyst can be confirmed with UBM. Certain features on UBM like thin, regular reflective wall, fluid-filled cavity with or without suspended particles help to differentiate it from solid or cystic tumours of iris. Medulloepithelioma on UBM characterised by echogenic heterogeneity, multiple cysts in tumours and irregular surface with stalk-like projection. These features were absent in our case on UBM. Under rare instances, CT scan may be considered for delineation of the posterior extension.^{5,8–11}

Iris cyst can be managed either conservatively or surgically. A case of the small non-progressive cyst, not affecting vision and without any secondary complications may be kept under observation. Indication for surgical removal includes large-sized cyst affecting the vision or causing amblyopia in children. Further, cysts causing complications like glaucoma, corneal decompensation, cataract and other sight-threatening complications also require surgical intervention. Surgical management includes the cyst wall puncture using argon or neodymium-doped yttrium aluminium garnet (Nd:YAG) laser with or without needle aspiration, use of sclerotic agents, deroofing of iris cyst with vitrectomy cutter and cyst removal along with iris tissue excision. As there was no sign suggestive of underlying malignancy neither on slit lamp examination nor on investigations, thus surgical intervention was preferred.^{12,13}

In general, recurrence is higher in cases of secondary cyst due to trauma or ocular surgery as compared with the primary cyst. Large cyst occupying more than half of anterior chamber, cyst required extensive surgical manipulation during surgery and in cases of incomplete removal, chances of recurrence will be there.^{14,15} iOCT is being used for various anterior and posterior segment surgery like Descemet's stripping automated endothelial keratoplasty, deep anterior lamellar keratoplasty, inner limiting membrane peeling during various retinal surgery and

others.¹⁶ In this case, we separated the anterior cyst wall from the endothelium by viscodissection under the guidance of iOCT, which revealed the definite separation of the cyst wall from the endothelium. After creating enough space between cyst and endothelium, cyst deroofing was done using vitrectomy cutter. Removal of the cyst was confirmed by iOCT at the end of surgery (video 1). Direct guidance of iOCT helped complete removal of the anterior cyst wall without causing any damage to the cornea.

To conclude, iOCT is now a very useful tool for safe and complete removal of the giant iris cyst plastered to the endothelium with minimal complication.

Learning points

- ▶ Until now, iris cyst remains a diagnostic as well as therapeutic challenge in ophthalmic practice.
- ▶ Various imaging modalities like anterior segment optical coherence tomography and ultrasound biomicroscopy are very helpful to confirm the diagnosis.
- ▶ Intraoperative optical coherence tomography is a very useful real-time imaging modality for better surgical outcomes in a case of giant iris cyst plastered to endothelium.

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Video 1 Iris cyst removal.

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