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Case report

Two cases of very late-onset capsular bag distension syndrome

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ABSTRACT

Purpose: We present two cases of late-onset capsular bag distension syndrome (CBDS).

Observations: Two female patients were referred with decreased visual acuity and blurred vision. They had both undergone uncomplicated phacoemulsification and intraocular lens implantation into the capsular bag, seven and 13 years prior.

Slit-lamp biomicroscopy and anterior segment optical coherence tomography demonstrated milky fluid between the intraocular lens and posterior capsules, consistent with late-onset capsular bag distension syndrome. A 25-gauge pars plana vitrectomy surgery was performed on each patient.

This turbid retrolental fluid was successfully aspirated with posterior capsulotomy using 25-gauge pars plana vitrectomy surgery.

Conclusions and importance: Late-onset capsular bag distension syndrome may occur up to 13 years following cataract surgery; the longest reported duration of onset. Anterior segment optical coherence tomography is useful in aiding diagnosis. Management with vitrectomy surgery has the advantages of complete clearance of the turbid fluid and microbial and pathological testing.

1. Introduction

Capsular bag distension syndrome (CBDS) is a rare complication following cataract surgery with continuous curvilinear capsulorhexis, phacoemulsification, and intraocular lens (IOL) implantation. It is characterised by the presence of turbid fluid between the IOL and posterior capsule, which may be mistaken for vitritis. We present two cases of very late-onset capsular bag distension syndrome that highlight the efficacy of anterior segment optical coherence tomography to differentiate CBDS for correct diagnosis and pars plana vitrectomy surgery in treatment and prevention of endopthalmitis. One of our cases is the longest reported duration between cataract surgery and development of CBDS.

2. Case report

2.1. Patient 1

A 73-year-old female was referred with possible left vitreous opacity. Over the last 6-months she had noticed left hazy, blurred vision and glare. Thirteen years earlier she underwent uncomplicated phacoemulsification surgery using acrylic IOL implants (Alcon® SA60AT, +25.5 dioptres). There was no other significant ophthalmic history.

Uncorrected visual acuities were 6/6 OD and 6/9 (pinhole 6/7.5 + 1 OS). The left intraocular pressure was 17 mmHg. Slit-lamp examination demonstrated a milky opacity between the left well-positioned IOL and posterior capsule, as well as retained cortical material (Fig. 1A). Fundus view was partially obscured but otherwise normal. Diagnosis of CBDS with anterior chamber shallowing was confirmed using AS-OCT imaging (Visante™ OCT, Carl Zeiss Meditec AG, Jena, Germany), which showed distension of the posterior capsule and hyperreflective material between it and the IOL (Fig. 1A). Anterior chamber depth as measured by optical biometry (IOLMaster® 700, Zeiss Meditec AG, Jena, Germany) was less in the left eye (3.52mm) than the right (4.51mm). Refractive error prior to vitrectomy surgery was plano/+0.50DC x 150° in the right eye, and plano/+1.00DC x 135° in the left eye.

A left 25-gauge pars plana vitrectomy with posterior capsulotomy was performed. Aspiration of the retained cortical material and milky fluid was achieved using the vitrector cutter. Intracameral cephazolin

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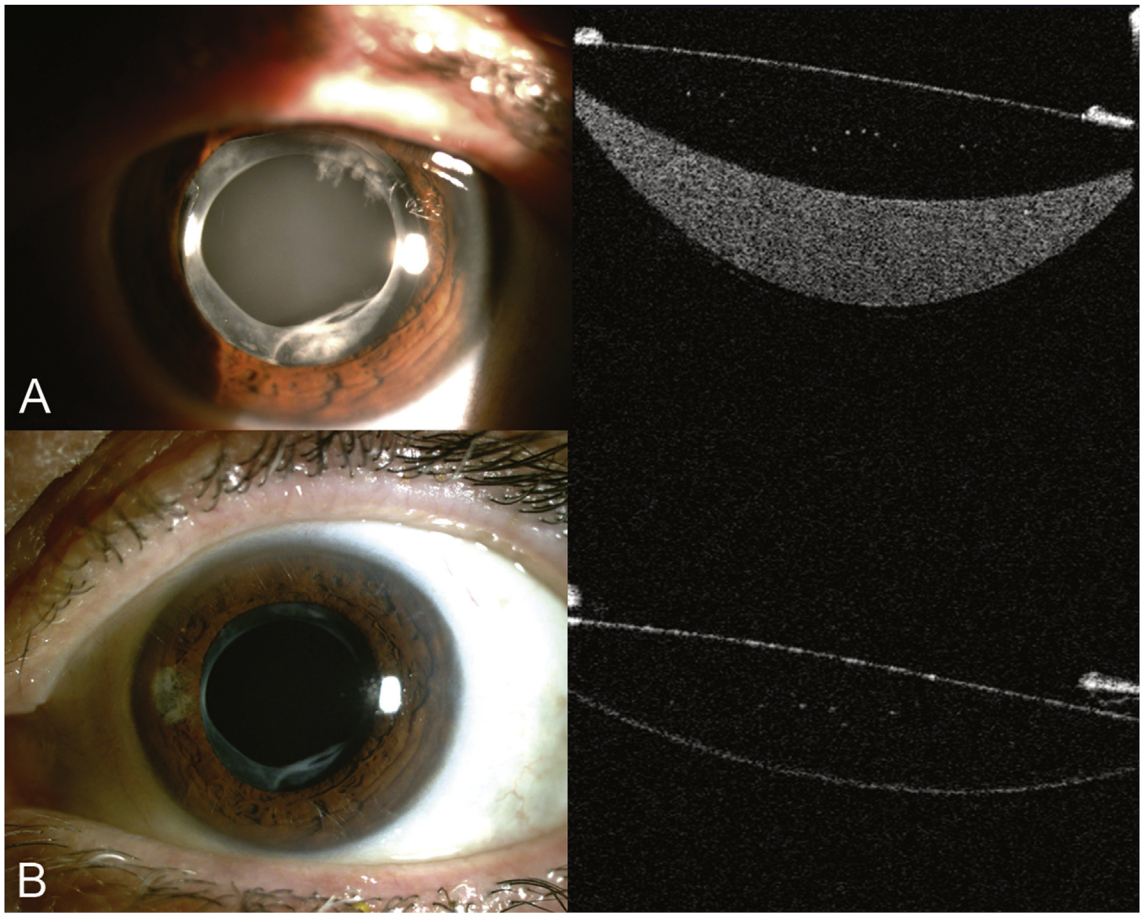

Fig. 1. A. Left eye demonstrating milky fluid behind the intra-ocular lens. Retained cortical material is visible superotemporally and inferotemporally. Anterior segment optical coherence tomography (AS-OCT) shows hyper-reflective material between the intraocular lens and posterior capsule. **B**. One-month following posterior capsulotomy and pars plana vitrectomy, there is a clear view through the intraocular lens and no cortical material. The AS-OCT now shows a clear intraocular lens, with no retro-lental hyper-reflective material.

1mg/0.1ml and subconjunctival dexamethasone were administered. Microbiological and histopathological analysis of the milky fluid showed a few leucocytes but no growth even after 3-weeks of culture. One-month post-operatively the patient's symptoms had resolved, the vision had improved to 6/6 with pinhole and the eye was quiet with no signs of turbid fluid (Fig. 1B). The left anterior chamber depth increased by +0.79 mm from the pre-operative measurement.

2.2. Patient 2

A 68-year-old female presented with a 5-day history of a black-spot and blurring of her left vision. Seven years earlier she underwent uncomplicated bilateral phacoemulsification using acrylic IOL implants (left Rayner® 573T, +24.5 dioptres).

Uncorrected visual acuities were 6/7.5–2 OD and 6/18-1 OS, improved by pinhole to 6/9-2 OS. The left intraocular pressure was 10 mmHg. Slit-lamp examination showed a milky substance between the IOL and posterior capsule of her left eye, visualised as hyper-reflective material on AS-OCT imaging (Visante™ OCT). Anterior chamber depth was 2.98mm (IOLMaster® 700) in the left eye. Refractive error prior to vitrectomy surgery was −0.25DS/+1.00DC x 146° in the right eye, and −3.00DS/+1.00DC x 121°) in the left eye, demonstrating a myopic shift in the left. Fundus examination revealed mild-moderate hypertensive retinopathy and a posterior vitreous detachment.

A diagnosis of CBDS was made and a left 25-gauge pars plana vitrectomy with posterior capsulotomy was performed. Removal of calcific cortical material was achieved using the vitrector cutter, and milky fluid was aspirated from behind the IOL. Intracameral cephazolin 1mg/0.1ml and subconjunctival dexamethasone were administered. Microbiological examination of the specimen failed to show any leucocytes, bacteria or growth after 1 month, and the patient's left vision improved to 6/12, pinhole 6/7.5. There was no longer any turbid fluid behind the IOL and the anterior chamber had deepened by 1.58mm from the pre-operative value. There was less myopia in the left eye postoperatively (−2.00 DS).

3. Discussion

Capsular bag distension syndrome (CBDS) has been classified into intraoperative, early-onset postoperative, and late-onset postoperative.[1] Early-onset CBDS is associated with an inorganic cause such as retained viscoelastic materials. In contrast, late-onset CBDS is thought to occur from the incomplete removal of cortical cells which provides a reservoir for organic substances. Post-operatively, the anterior opening created by the continuous curvilinear capsulorhexis can adhere to the IOL as the capsular bag shrinks, causing stasis of fluid behind the IOL. Residual cortical cells undergo metaplasia and proliferation, secreting alpha crystalline proteins which creates a turbid milieu and may also cause posterior capsule opacification (PCO).[2,3] Intra-operative and early-onset CBDS are often associated with high intraocular pressures, anterior chamber shallowing and myopic shift, but these features sometimes normalise in late-onset CBDS.[4,5]

Both of our patients had unusually late presentations of CBDS. Whilst the mean is 3.8 years post-operatively,[1] one of our patients

presented with CBDS 13-years post-cataract surgery. To our knowledge, this is the latest presentation of CBDS reported in the literature.

The use of anterior-segment OCT to diagnose CBDS has been previously reported.[6–8] This quick, simple test demonstrates the location of the pathology between the IOL and posterior capsule, not just posterior capsular opacification. In our first case it was able to differentiate between the initial referred diagnosis of vitritis and the true diagnosis.

More severe cases of CBDS often require treatment to improve visual symptoms. Traditional treatment has relied on neodymium:yttrium–aluminum–garnet (Nd:YAG) laser posterior capsulotomy.[5,9] However, this risks posterior spread into the vitreous cavity of any proteins causing intra-ocular inflammation and any bacteria causing endophthalmitis. In particular, *Propionibacterium acnes* has been cultured in other cases of CBDS.[10] Slit-lamp needling is another approach, however, this has been limited to treating early-onset CBDS which is characterised by a low bacterial load.[11] In contrast, evacuation of the turbid fluid using anterior chamber aspiration has been reported as an effective treatment for late-onset CBDS.[12] In theory however, this procedure also carries the risk of posterior spread of turbid material into the vitreous cavity.

Use of pars plana vitrectomy with posterior capsulotomy has been described once before.[10] We employed this technique and believe it has several advantages over Nd:YAG laser posterior capsulotomy and anterior surgical approaches. Complete removal of the milky fluid, retained cortical material and any posterior capsular opacification is achieved. This leads to a theoretical lower risk of intra-ocular inflammation or endopthalmitis as the entire vitreous contents are removed. The specimen can be sent for microbiological identification in the event of chronic endophthalmitis. Finally, intracameral antibiotics can be administered at the time of surgery. Disadvantages include a more invasive procedure, risks associated with vitrectomy surgery, greater cost and time.

4. Conclusions

In summary, our cases highlight the importance of considering CBDS even several years following cataract surgery, the utility of AS-OCT in assisting diagnosis and the advantages of vitrectomy surgery in managing this rare condition.

Patient consent

Both patients consented to publication of the case in writing, and verbally.

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Conflicts of interest

None to disclose.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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Appendix A. Supplementary data

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