Pseudophakic pupillary block after posterior chamber intraocular lens (PC-IOL)

Sutee Ananprasert, M.D.[1], Prapaporn Tienamporn, M.D.[2]

[1]Department of Ophthalmology, Faculty of Medicine, Thammasat University Hospital
[2]Sena Hospital

Purpose: To report a case with pseudophakic pupillary block after lens removal with posterior chamber intraocular lens (PC-IOL), which is rarely found. And the benefits of anterior segment imaging (UBM) in helping diagnosis

Method: A Case report

Result: A 30-year-old Thai female presented with sudden right eye pain for 2 weeks. She had undergone uncomplicated cataract surgery on her right side for 6 years. The initial intraocular pressure (IOP) was 60 mmHg. The slit-lamp examination on the right eye revealed diffused marked corneal edema with un-uniformly shallow anterior chamber (AC) and non-reactive corectopia. The diagnosis was pseudophakic pupillary block with 360-degree posterior synechiae accommodated by anterior segment ultrasound biomicroscope (UBM). The symptoms disappeared after doing a laser peripheral iridotomy. Four weeks after laser treatment, the IOP was well controlled with only medical treatment.

Conclusion: The diagnosis of angle closure in the pseudophakic eye was challenging because it is infrequent. However, with meticulous clinical examination and assistance of anterior segment ultrasound biomicroscope (UBM) could facilitate the diagnosis and guide the suitable treatment.

Conflicts of Interest: None.

Keywords: Pseudophakic pupillary block, Posterior chamber intraocular lens (PC-IOL) Ultrasound biomicroscopy (UBM)

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Background

Generally, the pupillary block occurs when aqueous flow from the posterior chamber to the anterior chamber is interrupted by the apposition of the pupillary margin with the anterior surface of the lens. In the author's opinion, this phenomenon should not happen following routine cataract removal with posterior chamber intraocular lens (PC-IOL) owing to the relatively large distance between the pupillary margin and the anterior surface of PC-IOL. There are many papers showing that most cases of pseudophakic pupillary block were anterior chamber intraocular lens (AC-IOL) or iris-support lens.[1-3] The anterior chamber or iris support lens could induce the pupillary block due to the close proximity between the iris and the lens creating an complete apposition. However, some research demonstrated that the placement of PC-IOL in the capsular bag could also potentially induce pupillary block.[4]

Causes of pupillary block after cataract surgery include postoperative iridocyclitis with seclusio pupillae, dense and impermeable anterior hyaloid membrane (malignant glaucoma), adhesion between the pupil and IOL (pupillary block glaucoma), adhesion among the capsule

Correspondence to:
Sutee Ananprasert, M.D., *Department of Ophthalmology, Faculty of Medicine, Thammasat University Hospital*
Email: sutee_bird13@hotmail.com
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IOLs-iris complex (posterior pupillary block glaucoma), pupillary obstruction by air or silicone, inadequate iris openings, swollen lens material behind the iris, and free vitreous block.[5,6] Therefore, it is crucial to differentiate the source to find a proper management.

Kobayashi H, et al. show the usefulness of ultrasound biomicroscopy (UBM) to diagnose and differentiate the cause of pupillary block.[6]

The author presents a case of pseudophakic pupillary block and how ultrasound biomicroscopy (UBM) facilitates diagnosis and follow-up.

Case report

A 30-year-old Thai female presented with a sudden right eye pain for 2 weeks. This patient had undergone uncomplicated cataract surgery with PC-IOL on her right eye for 6 years with good postoperative visual gain. She had no history of ocular trauma, drug use, or systemic illness in the past.

The patient was referred with very high intraocular pressure (IOP). The initial IOP at our setting was around 60 mmHg by goldmann applanation tonometer. She had already used oral acetazolamide and some topical anti-glaucoma medications before arriving at our hospital. Her right best corrected visual acuity (BCVA) was 10/200. Initial slit-lamp biomicroscopy of the right eye revealed diffused marked corneal edema with un-uniformly shallow anterior chamber (AC) and nonreactive corectopia (Figure 1(a) and (b)) with posterior synechiae. Superfield non contact lens ophthalmoscopy revealed a cup-to-disc ratio of 0.8 on the right and 0.4 on the left. A gonioscopy on the right eye revealed a convex iris and closed angles. Examination of the other eye revealed a clear cornea and well-formed, deep AC with a clear crystalline lens.

Ultrasonography revealed no choroidal effusion iris and a normal posterior segment. Ultrasound biomicroscopy (UBM) showed iris bombe and peripheral anterior synechiae and aqueous pockets posterior to the iris (Figure 2). The IOL was in the normal place, with no mass posterior to the iris.

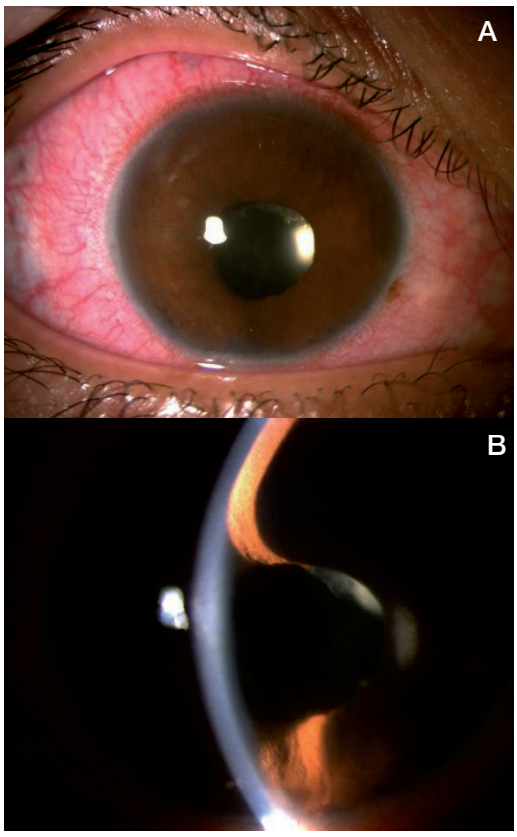

Figure 1: Right eye, showed (a) non-reactive corectopia with ciliary injection. (b) Un-uniform shallow anterior chamber with posterior synechiae.

Therapeutic laser iridotomies (L-PI) were performed at 7 o'clock to connect anterior and posterior chambers. The author selected the area of the iris to perform the laser iridotomy whose elevation is in the middle to avoid damage to the endothelium along with the suspicion that there is some fluid posterior to that area. After L-PI, fluid passed through the hole from posterior to anterior and the iris became flatter suddenly. Immediately repeated IOP was 30 mmHg and the anterior chamber was formed (Figure 3. (a) and (b)). Gonioscopy revealed peripheral anterior synechia (PAS) 180 degree superiorly, open grade 3 inferior with scatter PAS (Figure 4.). UBM was repeated and no aqueous pockets posterior to the iris was observed (Figure 5).

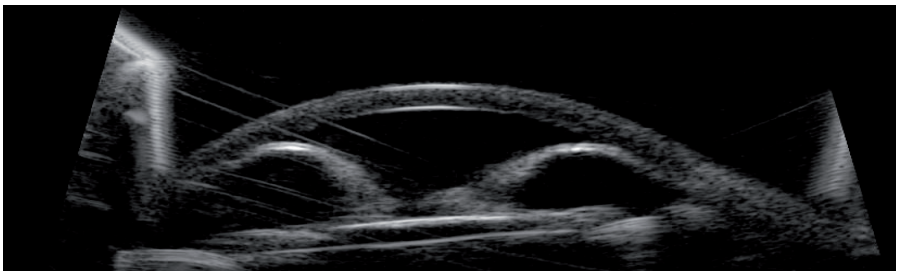

Figure 2: shows iris bombe (pupillary block) and aqueous pockets posterior to the iris.

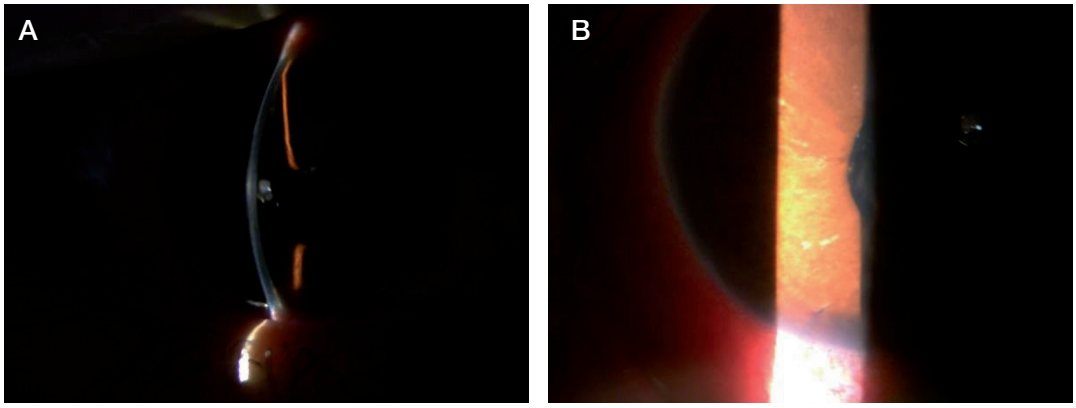

Figure 3: (a) immediately after L-PI revealed deepening AC (b) L-PI at 7 o'clock

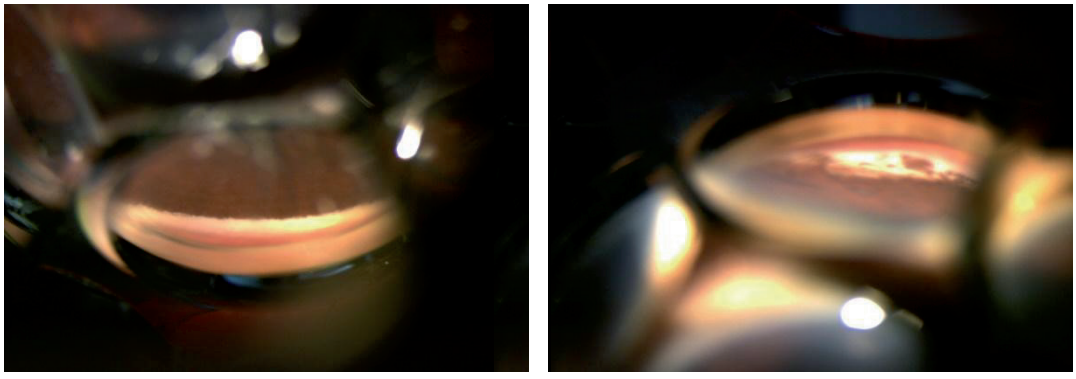

Figure 4: Gonioscopy revealed PAS 180 degrees superiorly, open grade 3 inferior with scatter PAS

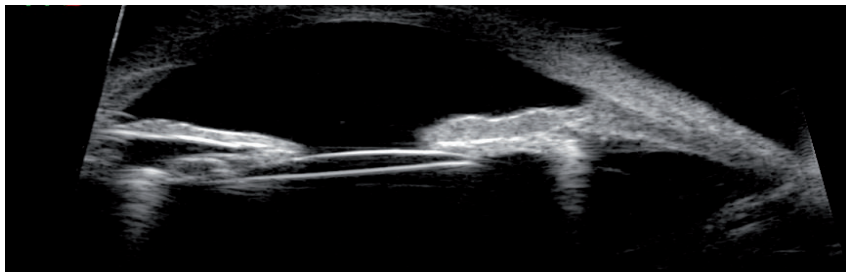

Figure 5: After L-PI, UBM showed iris configuration became flat and no aqueous pockets posterior to the iris was observed.

One week after L-PI, the right BCVA was 20/200 and IOP was 12 mmHg without medication.

On the last follow-up 4 weeks post L-PI, although the anterior chamber was deep and the L-PI site was patent (Figure 6), the right eye pressure had increased to 22 mmHg. Therefore, one fixed combination of aqueous suppressants was given.

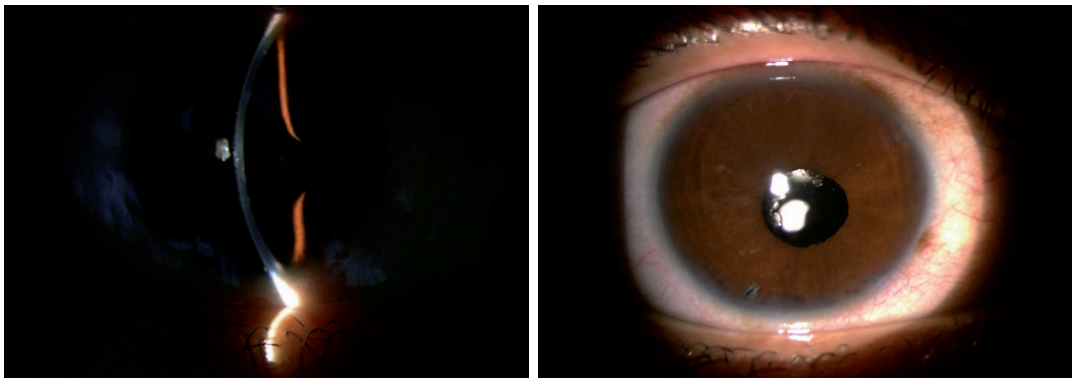

Figure 6: After L-PI 4 weeks, shows deep anterior chamber and patent LPI at 7 o'clock

Discussion

Pseudophakic pupillary block can occur when aqueous flow through the pupil is blocked by various mechanisms. It is an infrequent complication of posterior chamber intraocular lenses (PC-IOL) because of the greater distance between the anterior surface of the PC-IOL and the iris. Pupillary block in the posterior chamber intraocular lens may be related to excessive postoperative inflammation, with the formation of posterior synechiae and adhesions between the pupillary margins and the anterior IOL plane.[7,8] In our patient, we believe the pathogenesis of pseudophakic pupillary block was a 360-degree posterior synechiae causing corectopia and a subsequent pupil that is non-reactive to light.

The use of UBM to assist in diagnosis and identification of the possible causes in this case is highly beneficial because we cannot visualize through the iris to rule out mass posterior to the iris. Nevertheless, UBM can. So it is recommended in all cases of pseudophakic glaucoma for better evaluation of the underlying cause, which helps in subsequent management selection.[9]

There is a recommendation to perform prophylaxis laser or surgical iridotomy in all patients who undergo extracapsular cataract extraction with the implantation of posterior chamber intraocular lenses.[4] Nevertheless, from the author's point of view, if the distance between pupillary margin and the anterior surface of IOL

is very close, or posterior synechiae formation that has started, or the patient had a history of inflammation in the eye, the prophylaxis iridotomy might be considered.

After the initial medical treatment, peripheral neodymium YAG laser iridotomy was used to relieve the block.[10-13] Naveh N, et al. [8] and Melamed S, et al. [14] reported that neodymium YAG peripheral iridotomy does not easily resolve pseudophakic pupillary block because the fibrinous inflammatory reaction tends to occlude the opening, but more than half of the patients in their study responded to peripheral iridotomy.[15]

Conclusion

Pseudophakic pupillary block is a rare condition which can occur and with the even with the placement of the intraocular lens in capsular bag (PC-IOL). The definite treatment is still laser or surgical iridotomy. Therefore, meticulous clinical examination and assisting of anterior segment ultrasound biomicroscope (UBM) could facilitate the diagnosis and guide the suitable treatment.

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