CASE REPORT

Optimising the surgical outcome in a case of post-traumatic cataract using ultrasound biomicroscopy

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SUMMARY

A 12-year-old boy was brought with the chief complaint of diminution of vision in his left eye for the past 1 month. History revealed a blunt trauma to his left eye with a wooden stick 6 weeks ago. Visual acuity was 20/20 and hand movement close to face in right and left eye, respectively, without any relative afferent pupillary defect. Slit-lamp examination showed a total cataractous lens with signs suggestive of suspected posterior capsular (PC) defect. The PC defect was screened initially using B-scan ultrasound of the posterior segment, followed by confirmation of the same using ultrasound biomicroscopy. Left eye lens aspiration along with limited anterior vitrectomy followed by placement of multipiece intraocular lens in the sulcus was performed. Best-corrected visual acuity at 6 months of follow-up was 20/20.

BACKGROUND

Blunt trauma to the eye leading to lens complications is a common entity. Lens changes commonly associated with blunt trauma are cataract, subluxation, dislocation and others.¹ Anterior or posterior lens capsular rupture after blunt trauma is rare. Among them, posterior capsular (PC) rupture is more common.² Rupture of the posterior lens capsule following blunt trauma is usually discovered accidentally during surgery. Herein, we describe a case of post-traumatic total cataract with ruptured PC in which the defect was better assessed preoperatively using ultrasound biomicroscopy (UBM). UBM was used not only to confirm the PC defect but also to define the extent and the orientation of PC defect, which was vital for the proper management of the case.

CASE PRESENTATION

A 12-year-old boy was brought to our outpatient care unit with the chief complaint of diminution of vision in his left eye for the past 1 month. On further questioning, parents revealed a history of significant blunt trauma to his left eye about 6 weeks ago with a wooden stick, in the absence of any other significant ocular or systemic history. On examination, visual acuity in the left eye was hand movement close to face and in the right eye was 20/20 with accurate projection of rays in both the eyes. There was no relative afferent pupillary defect. Slit-lamp examination revealed a total cataractous lens in the left eye with a deep anterior chamber, flat and intact anterior lens capsule along with liquefied sinking

cataractous lens material. There was no evidence of corneal or scleral laceration (figure 1). B-scan ultrasonography and UBM were done preoperatively for the evaluation of posterior segment and posterior lens capsule (figures 2, 3A,B). Similarly, ocular biometry values were measured using immersion A-scan and auto keratometer.

On the basis of history, slit-lamp examination findings and investigations, a diagnosis of the post-traumatic cataractous lens with PC defect was made.

INVESTIGATIONS

1. B-Scan Ultrasonography (E-Z Scan^{TM} 5500⁺, SONOMED, New York, New York, USA): Revealed floating vitreous echoes of moderate amplitude just behind the PC suspicious of PC defect. Rest of the scan was anechoic.
2. Ultrasound biomicroscopy (SONOMED VuMax II UBM and B-Scan, New York, New York, USA): Revealed normal zonular attachment, flat anterior capsule and discontinuity in posterior lens capsule along with posterior herniation of the lens matter.
3. Immersion A-Scan (OCUSCAN RXP, Alcon, California, USA): Right eye axial length 23.27 mm and left eye axial length 23.20 mm.
4. Autokeratometry (TRK-2P, TOPCON, Tokyo, Japan): Right eye keratometry 43.00/42.75 dioptres @ 93°/3° and left eye keratometry 42.50/43.00 dioptres @ 97°/7°.

DIFFERENTIAL DIAGNOSIS

Partially absorbed cataractous lens.

Figure 1 Total white cataract, deep anterior chamber, flat anterior capsule and sinking cortex suspicious of a posterior capsular defect.

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Figure 2 B-scan ultrasonography showing floating vitreous echoes of moderate density just behind the posterior capsule (PC) suggestive of suspected PC defect.

TREATMENT

Left eye lens aspiration followed by limited anterior vitrectomy with multipiece intraocular lens (IOL) (MA60AC, Alcon) implantation in the sulcus was done under general anaesthesia. Intraoperatively, large vertical PC defect (figure 4) was confirmed and multipiece IOL was placed in the sulcus. IOL power was 22.5 dioptre using Sanders-Retzlaff-Kraff II formula.

OUTCOME AND FOLLOW-UP

At 6-month follow-up, patient's best-corrected visual acuity was 20/20 without any ocular complications.

DISCUSSION

Blunt ocular trauma leading to clear lens injury is a major concern. The lens changes usually manifest as contusion cataract, lens dislocation from the patellar fossa, which may be partial or total and capsular rupture.¹ Capsular tear is a rare kind of injury, which may involve anterior or posterior

Figure 3 (A) Ultrasound biomicroscopy of normal right eye showing normal clear lens with intact posterior capsule (PC; white arrow). (B) Ultrasound biomicroscopy of left eye confirmed the PC defect with its exact extent (white arrows—intact PC, blue arrows—a defect in PC and yellow arrows—lens matter herniating from the defect into the anterior vitreous).

Figure 4 Intraoperative pictures showing large vertical PC defect with small circular anterior rhexis with multipiece intraocular lens in sulcus (blue arrows-PC defect, red arrows-anterior capsular rhexis).

capsule, where the latter is more common.² For the diagnosis of an isolated PC tear, it needs meticulous history, clinical examination followed by appropriate imaging because these cases are difficult to be diagnosed preoperatively and usually diagnosed intraoperatively.³⁻⁵

To understand the nature of forces leading to capsular tear, Por and Chee have proposed that the combined equatorial stretching-pulling force on the zonules along with backward push of the lens due to anteroposterior forces lead to capsular tear.⁵ Similarly, stronger anatomical attachments of the Wieger's ligament at the mid-peripheral posterior capsule leaves the central weaker area vulnerable to anteroposterior forces.⁶

Clinical signs on slit-lamp examination such as a deep anterior chamber, a flat anterior capsule of the lens and sinking cortex are important. Few clinically relevant investigations such as B-scan ultrasonography, UBM, anterior segment optical coherence tomography and Scheimpflug imaging have been used to know the status of PC. Among these, UBM is found to be more helpful in PC evaluation. In this case report, we have used UBM to delineate the PC defect in detail.⁷⁻⁹

Preoperative awareness about pre-existing PC defect is very crucial for intraoperative management. An accurate diagnosis of PC defect helped us in proper counselling of parents regarding the surgical difficulties. Similarly, it also helped the surgeon in making a proper-sized anterior capsulorhexis for ciliary fixation of the IOL. Intraoperatively, hydro procedures were avoided and the principle of closed chamber technique was followed to minimise the vitreous loss and hence the posterior segment complications.

The optimal time for surgery is still being debated. There are advantages and disadvantages of early and late surgical interventions. In a case of early intervention, PC defect may behave like a fresh intrasurgical PC rupture which has the tendency to get enlarged during surgery.¹⁰ It is reported that hyperplastic epithelial cells migrate and collect on the margins of the PC break and undergo fibrous metaplasia, approximately 6 weeks after trauma. Hence, surgical intervention after 6 weeks is likely to prevent the enlargement of the PC defect.¹¹

To summarise, our case illustrates the importance of UBM to confirm the pre-existing PC defect in a case of post-traumatic total white cataract. Although it is very rare to have an isolated PC defect in a case of traumatic cataract, preoperative

confirmation is very helpful for better management of these cases.

Learning points

- ▶ In the presence of deep anterior chamber, a flat anterior capsule of the lens and sinking cortex, a high index of suspicion should be kept for a pre-existing posterior capsular (PC) defect.
- ▶ Ultrasound bio-microscopy is a better tool to confirm and to know the exact extent of the PC defect.
- ▶ Preoperative knowledge of pre-existing PC defect is crucial for better surgical and visual outcomes.

Contributors MHC, AP, NA and NS has evaluated the case in detail followed by lens aspiration with intra ocular lens implantation. MHC, AP, NA and NS have critically evaluated the educational value of the case and wrought the report.

Competing interests None declared.

Patient consent Obtained.

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