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An Unexpected Shift: Rare Cases of Spontaneous Capsule Rupture and Lens Displacement

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Abstract: ***We report two cases of spontaneous anterior capsular rupture with anterior dislocation of hypermature cataractous nuclei in otherwise healthy individuals without any history of trauma or systemic disease. Both patients presented with long-standing, painless visual decline and were found to have lens nuclei dislocated into the anterior chamber. Surgical management involved cataract extraction, anterior vitrectomy, and implantation of retro-pupillary iris-claw intraocular lenses, resulting in improved postoperative vision. These cases highlight the rarity of spontaneous capsular rupture without identifiable predisposing factors and emphasize the importance of careful evaluation and prompt surgical intervention to achieve favourable outcomes.***

Keywords: spontaneous capsular rupture, hypermature cataract, anterior chamber dislocation, iris-claw lens, zonular instability

1. Introduction

Anterior capsular ruptures of the crystalline lens can occur due to penetrating, surgical, or blunt trauma. It is commonly seen in penetrating ocular injuries where an object directly impacts the lens capsule. In contrast, posterior capsule rupture is more frequently observed after blunt trauma [1]. In the absence of trauma, lens dislocation or subluxation should prompt investigation for hereditary systemic conditions, such as Marfan syndrome, Ehlers-Danlos syndrome, or associated ocular disorders. Spontaneous subluxation, on the other hand, typically results from zonular rupture due to degenerative and inflammatory conditions like long-standing glaucoma, high myopia, hypermature cataract, retinal detachment, and pseudoexfoliation syndrome. Additionally, spontaneous capsular rupture can occur after cataract extraction in the fellow eye [2] and is frequently associated with hypermature cataracts [3]. We describe two cases of spontaneous rupture of the lens capsule in patients with hypermature cataracts, which led to the dislocation of the lens nucleus into the anterior chamber. This rare and unusual occurrence carries clinical significance, as it can complicate the evaluation and interpretation of the underlying causes of nucleus dislocation. In particular, the absence of a trauma history in such cases can pose diagnostic challenges and may lead to uncertainty in identifying the precipitating factors. Understanding this phenomenon is critical for accurate diagnosis and management.

2. Case Presentation

Case 1

A 50-year-old female presented to the OPD with a history of diminution of vision in her left eye since 3 years. The right eye was pseudophakic and had undergone surgery 10 years ago. There was no history of frequent eye redness or discomfort. She denied any history of eye injuries or surgery of the left eye. The uncorrected visual acuity (UCVA) of the left eye was counting fingers close to face. A slit-lamp examination revealed a clear cornea in the left eye. The nucleus was small and had been dislocated inferiorly into the anterior chamber of the left eye (Figure 1).

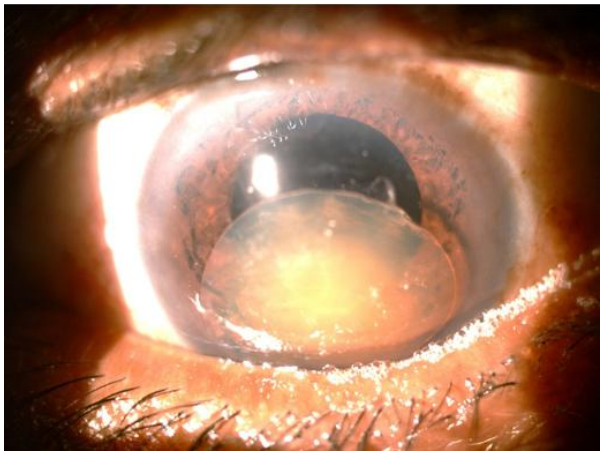

Figure 1: Inferiorly dislocated lens in the anterior chamber

Mild inflammation (+1 cell) was seen in the anterior chamber. The pupil was fixed and mid dilated. Her intraocular pressure was 14 mm Hg in right eye and 16 mm Hg in the left. B-scan ultrasound of the left eye was within normal limits. Our patient had normal stature, with cardiovascular and skeletal assessments showing no abnormalities, and normal results from the hearing tests. The patient was advised to have cataract extraction and intraocular lens implantations in the left eye. Intraoperatively, significant generalized zonular laxity was noted (Figure 2),

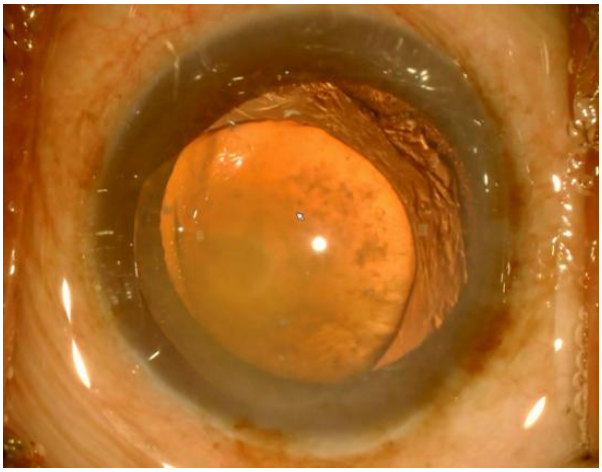

Figure 2: Intraoperative photo showing generalised zonular laxity

which made it challenging to place the intraocular lens in the capsular bag. Consequently, the nucleus was extracted, and the capsular bag was entirely removed. An anterior vitrectomy was then performed with an anterior vitrector at 900 cuts per minute. A retro-pupillary iris claw lens was implanted (Figure 3).

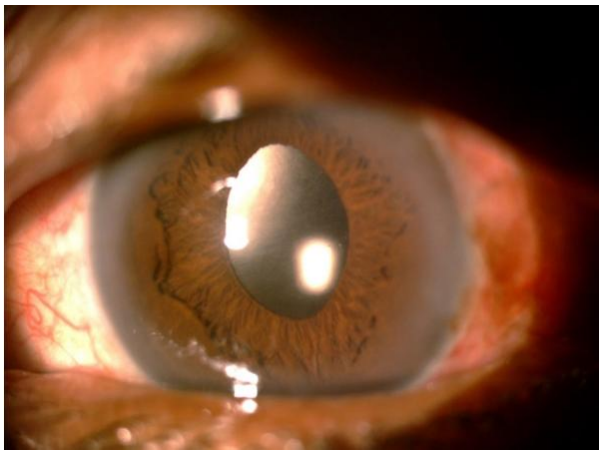

Figure 3: Post operative slit lamp photo following iris claw implantation

The post-operative vision in the left eye was 6/18 on the first post-operative day. Upon examination, the 3 of 7 cornea was clear with no signs of inflammation, and the iris claw lens was in situ. The patient was treated with topical corticosteroids in a tapering regimen.

Case 2

A 75-year-old female presented with a nine-year history of progressively diminished vision in her right eye. Her left eye was pseudophakic, having undergone cataract surgery 10 years ago. She reported no episodes of recurrent eye redness, pain, trauma, or use of corrective glasses. On and implantation of a retro-fixated iris-claw lens. On the first post-operative day, her visual acuity in the right eye improved to 6/18.

3. Discussion

Hypermature or Morganian cataracts are a type of cortical-nuclear cataract characterized by the enzymatic degradation

examination, the visual acuity in the right eye was limited to light perception with accurate projection of rays. Slit-lamp evaluation revealed a brown cataractous lens nucleus with calcification spots dislocated into the anterior chamber (Figure 4).

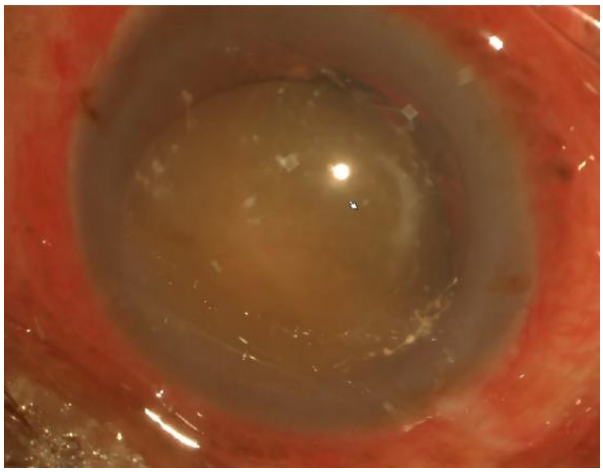

Figure 4: Anteriorly disloated lens nucleus with calcification spots

The fundus examination was unremarkable. The intraocular pressure was 14 mmHg in both eyes. A B-scan ultrasound of the right eye confirmed an attached retina. A physical assessment of the patient revealed no abnormalities. Cataract extraction with intraocular lens (IOL) implantation was advised for the right eye. During the procedure, after removal of the nucleus, remnants of the capsule were found to be ruptured, which had allowed the nucleus to extrude. Calcification spots were noted on the capsule, indicating that a hypermature cataract was likely responsible for the lens extrusion. The patient underwent nucleus extraction, anterior vitrectomy (Figure 5),

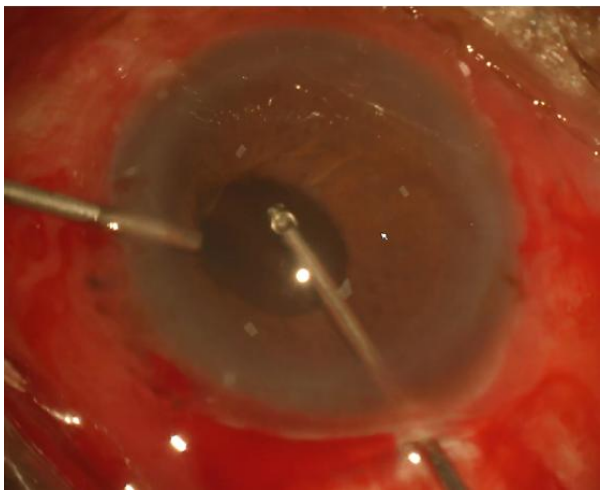

Figure 5: Anterior vitrectomy done after removal of lens

of membrane components and crystalline fibers, leading to the liquefaction and reabsorption of cortical fibers [4]. The nucleus remains relatively stable, floating within the capsular sac. Lenticular fluid can escape into the anterior chamber through increased lens capsule permeability or small dehiscences in the anterior capsule [5]. Guan et al. hypothesized that the hypermature cataract causes the capsule to shrink and degenerate to form a tiny rupture hole [6]. Spontaneous rupture of the anterior capsule is an

exceptionally rare condition, documented in very few cases [7]. It has been reported after cataract extraction in the fellow eye and is associated with hypermature cataracts. In 2012, Hemalatha C. et al. reported a similar case involving a 52-year-old patient with bilateral hypermature cataracts who experienced bilateral spontaneous rupture of the anterior crystalline capsule, attributed to minor dehiscences in the anterior crystalline lens capsule [8]. Additionally, Gaviria JG et al. reported a case of a long-standing anterior polar cataract that led to spontaneous capsular rupture and lens-induced uveitis [9]. Spontaneous rupture of the anterior crystalline capsule has also been reported in a chronic steroid user following a renal transplantation [10], as well as in patients with Marshall syndrome and Alport syndrome [11-12]. A thorough clinical examination is crucial when systemic diseases are suspected. Our patients presented with a spontaneous dislocation of the nucleus into the anterior chamber of the left eye. There were no systemic or metabolic abnormalities to explain their condition, and a genetic work-up was not performed due to financial constraints. The diagnosis was based on the clinical presentation of an anteriorly dislocated hypermature cataract, with remnants of the posterior capsular bag retained and generalized zonular laxity, all occurring without any history of trauma. These cases appear to be the first documented instances of spontaneous capsular rupture occurring without any identifiable predisposing factors. The condition was effectively managed through cataract extraction, followed by visual rehabilitation achieved with the implantation of an iris-claw lens. This surgical approach demonstrated successful restoration of vision and structural integrity.

4. Conclusion

Spontaneous rupture of the anterior capsule is an uncommon occurrence in otherwise healthy individuals. In such cases, a comprehensive systemic evaluation is vital to exclude any underlying conditions. The absence of a trauma history complicates the identification of the cause, making meticulous history-taking and examination even more critical. Prompt management is essential for achieving favourable outcomes and for preventing complications, including lens-induced glaucoma.

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