

Late Opacification of PCIOL

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Abstract

A 63 year male presented with diminished vision in right eye from the past 6 months. The patient had undergone cataract surgery in both eyes. The right eye was operated in 5 years back and left eye was operated in 6 years back. The patient was asymptomatic for 4.5 years postoperative when he started to notice glare in his vision in the right eye. The glare gradually progressed to diminished vision in the right eye. On slit lamp biomicroscopy, a well centered foldable PCIOL was seen with multiple crystalline opacities. On examination at higher magnification, the opacities were found to be within and around the optic substance. Patient underwent IOL exchange with acrylic hydrophobic PCIOL. The Explanted IOL was found with very large calcified deposits on the surface of the lens, as well as smaller multiple calcified deposits within the subsurface of the lens, in both optic and loop components.

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Introduction

The opacification of hydrophilic acrylic intraocular lenses (IOLs) is a rare complication, usually occurring in the late postoperative period¹. The exact causes and pathomechanisms leading to hydrophilic IOL opacification are unknown. There have been sporadic reports about high incidences of IOL opacification affecting whole batches of IOLs of individual manufacturers irrespective of secondary surgical interventions or comorbidities,²⁻⁴ so that material impurities and faulty manufacturing or storage as well as interactions with the packaging material have been suggested as causative factors in these cases. Individual factors, such as ocular inflammation or ocular and systemic comorbidities that affect ocular metabolism, may contribute to the process.³

Case report

A 63 year male presented with diminished vision in right eye for the past 6 months. The diminution in vision was of insidious onset, gradually progressive, and painless. The patient did not have any history of pain, redness, photophobia, flashes, floaters, trauma or any systemic illness. However, he gave a history of some glare in initial days of the complaint. The patient had undergone cataract surgery in both eyes. The right eye was operated in 5 years back and left eye was operated in 6 years back and on documentation the implanted IOLs were hydrophilic acrylic. The pre, intra-, and post operative period was uneventful. The surgeries had good visual outcome. The patient did not undergo any other ocular surgical procedure. The patient was asymptomatic for 4.5 years postoperative when he noticed glare in the right eye. The glare gradually progressed to diminished vision in the right eye. On presentation, the patient could barely perceive hand motions close to face with his right eye. On torch light examination, there was presence of white pupillary reflex in right eye appearing to be white mature cataract. The vision in right eye was <1/60 with accurate projection of rays. Pupillary reactions were within normal limits. On slit lamp biomicroscopy, a well centered foldable IOL placed in bag was seen with multiple crystalline opacities (Figure 1A). On examination at higher magnification, the opacities were

found to be within and around the optic substance (Figures 1B). The left eye was pseudophakic with a vision of 6/6 (unaided). No abnormalities were found in the left eye. Patient's right eye underwent IOL exchange with

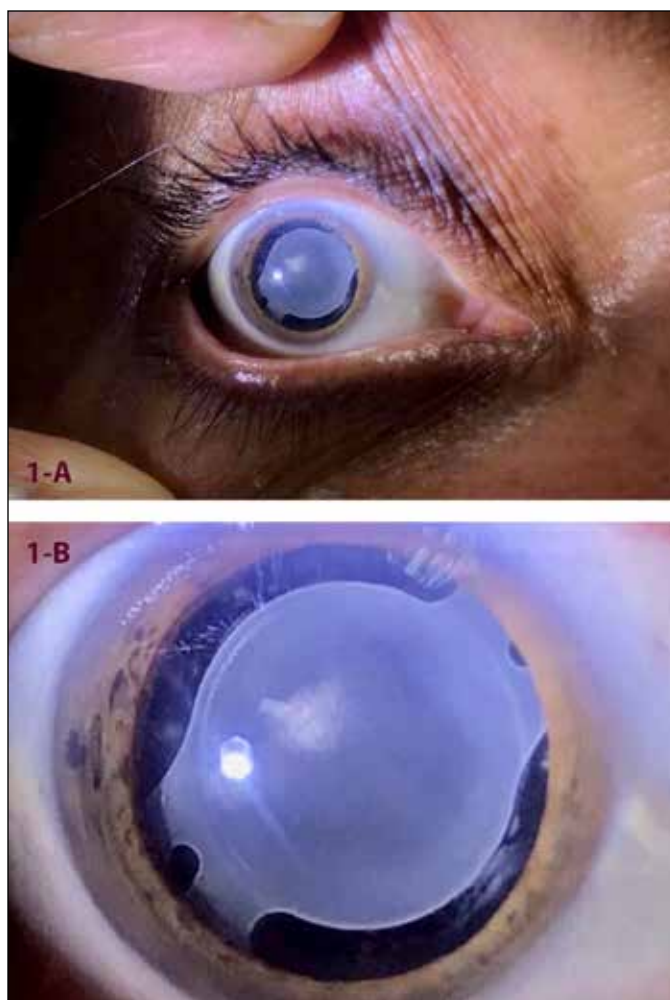


Figure 1: Anterior segment photograph on dilated examination, showing opacification of whole of the PCIOL (including optic and both haptics).

acrylic hydrophobic PCIOL. Viscoelastic injected 360 degree under the edge of capsular rim till complete dissection from IOL, viscodissection was performed to separate iol from capsular bag, IOL prolapsed in anterior chamber with the help of second instrument, iol was bisected with vannis scissor and was removed from the main port. The patient had uneventful pre, intra and postoperative period with good visual recovery. The Explanted IOL was found with very large calcified deposits on the surface of the lens, as well as smaller multiple calcified deposits within the subsurface of the lens, in both optic and loop components. The confluent nature of the deposits compromised the vision of the patient largely.

Discussion

Various pathologic processes may lead to clinically significant opacification or discoloration of the optic component of intraocular lenses manufactured from different biomaterials and in different designs. Factors such as the patient's associated conditions, the manufacturing process, the method of IOL storage, the surgical technique and adjuvants, or a combination of these may be involved. Hydrophobic materials are specially opacified by excess influx of water, while hydrophilic IOLs are mostly affected by the formation of deposits/precipitates on the IOL surface or within the IOL substance.⁵ Furthermore, direct discoloration by capsular dyes or medications, coating by substances such as ophthalmic ointment and silicone oil, and a slow, progressive degradation of the IOL biomaterial may be involved in the different designs of IOL opacification process.

According to the literature, hydrophilic acrylic IOLs are likely to develop calcification when the concentrations of calcium, phosphate and albumin in the aqueous humor fluctuate due to blood-aqueous-barrier breakdown or other factors. Because the aqueous humor turns over every 90 minutes, it is significantly affected by concentrations of elements in the blood.⁶ That is why long-term observation is necessary after implantation of hydrophilic acrylic IOLs, especially in cases in which blood-aqueous barrier breakdown is suspected, as may occur in diabetes, uveitis and vitrectomy.^{7,8}

In our case, we believe calcification of the hydrophilic acrylic lens lead to the IOL opacification . In our patient, IOL opacification developed at 4.5 years after the cataract surgery according to the clinical history and eye examination, and the interval between cataract surgery and IOL explantation was 5 years. It is possible that the process of IOL opacification in this case started before the patient's vision decreased. However, the process of calcification in this case may take longer than that with other hydrophilic IOLs. We hypothesize that the residual lens epithelial cells on the posterior capsule might slowly secrete crystalline. It then took a long time for the deposition of calcium and phosphorus on the protein film, which covers the posterior surface of IOL.⁹ Several studies have demonstrated that the eventual reaction to an IOL implanted into the eye significantly depends on protein adsorption, especially in the presence of microdefects on the polymer surfaces.¹⁰ After absorption, the formation of tightly bound complexes of

protein and calcium could be promoted by long-chain fatty acids. The adsorption of such macromolecules could provoke the formation of a calcification nucleus.¹¹ The exact causes and patho mechanisms are still unknown.^{12,13} However, our case did not have any form of known ocular pathology in his eye. Such cases compromise the visual outcome even in uneventful cataract surgery cases, and we do not have enough data to prevent such occurrences.^{14,15} The best line of management in such cases will be explant of the IOL in question and proceed with a secondary IOL implant in the same sitting or a later date.¹⁶

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