

# Delayed posterior dislocation of silicone plate-haptic lenses following anterior and posterior Nd:YAG laser capsulotomy

*K I Papageorgiou, A Ioannidis, A J Sinha, P S Andreou*

Department of Ophthalmology, Broomfield Hospital, Middlessex NHS Trust, Chelmsford, Essex, UK

**Correspondence to:** Konstantinos I Papageorgiou. Department of Ophthalmology, Broomfield Hospital, Middlessex NHS Trust, Court Road, Chelmsford, CM1 7ET, Essex, UK. papageorgiouk@doctors.org.uk

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## Abstract

• **AIM:** To observe the stability of silicone plate-haptic intraocular lenses implanted following cataract surgery and analyze the reasons related to decentration and dislocation into the posterior segment.

• **METHODS:** We report 3 cases of posterior dislocation of silicone plate-haptic lenses (Bausch and Lomb C11UB and Chiron C11UB) in patients who underwent uneventful phacoemulsification.

• **RESULTS:** One occurred 4 years following sectoral anterior capsulotomy for advanced anterior capsular contraction, the other in the early post-operative period following posterior capsulotomy and the third is a delayed (3 months), dislocation following uneventful posterior capsulotomy. None of the cases were associated with a history of trauma or other precipitating event.

• **CONCLUSION:** Silicone plate haptic IOLs seem to be prone to dislocation due to poor capsular adherence as they are only held in place by the fibrotic fusion of the haptics. If either the posterior or anterior capsules are disrupted, the forces created by capsular contraction may cause extension of radial tears, with subsequent posterior dislocation of the implant. Though the use of silicone plate-haptic lenses has been surpassed by other models, there are patients who had implantation of such lenses that may undergo YAG laser capsulotomy. It is important to inform them about the potential risk of posterior dislocation as an early or late complication following this procedure.

• **KEYWORDS:** silicone plate-haptic intraocular lenses; dislocation; Nd:YAG laser; capsulotomy

posterior Nd:YAG laser capsulotomy. *Int J Ophthalmol* 2008;1 (4): 374-376

## INTRODUCTION

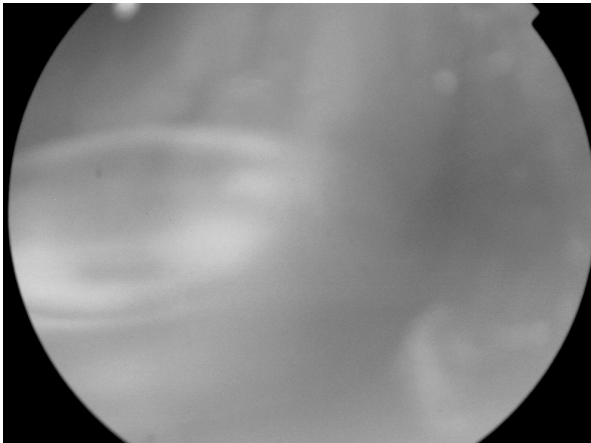
The most common changes in the lens capsule following cataract surgery are the development of posterior capsular opacification, shrinkage with decentration and tilting of the intraocular lens and the contraction of the anterior capsule with decrease in size of the capsulotomy opening<sup>[1,2]</sup>. The frequency of IOL dislocation ranges from approximately 0.2% to 1.8%, while clinically significant decentration is more common, occurring in about 3% of cases<sup>[3]</sup>.

Silicone plate haptic intraocular lenses have gained popularity in the 90's following FDA approval at 1991 and have been associated with good visual and refractive results. However there have been reports of decentration and dislocation into the posterior segment after Nd:YAG laser capsulotomy<sup>[4]</sup>.

We report 3 cases of posterior dislocation of silicone plate-haptic lenses. One occurred 4 years following anterior Nd:YAG capsulotomy, the other in the early post-operative period following posterior capsulotomy with associated severe anterior capsular contraction and the third is a delayed dislocation following uneventful Nd:YAG posterior capsulotomy. None of the cases were associated with a history of trauma or other precipitating event.

## CASE REPORT

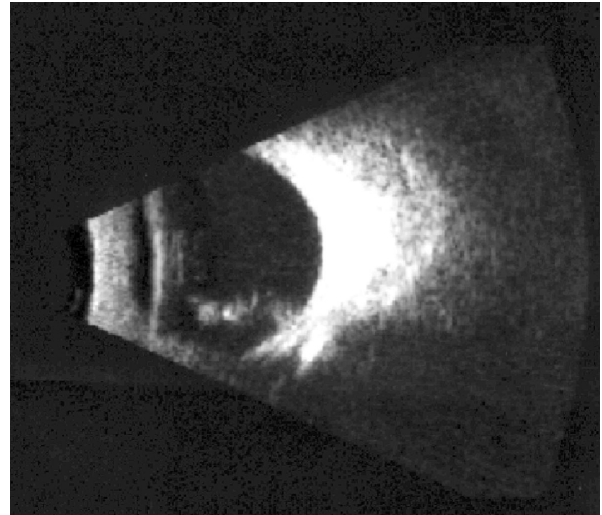
**Case 1** An 82 year-old Caucasian female, underwent uncomplicated right phacoemulsification with placement of a Bausch and Lomb C11UB silicone large hole plate-haptic IOL (d:10.5mm). Following surgery, progressive anterior capsular fibrosis occurred, causing decrease of the visual acuity to 6/18 with pinhole. Nine months later she underwent Nd:YAG-laser capsulotomy to the inferior aspect of the anterior capsule and visual acuity improved to 6/9. Her post operative course was unremarkable until four years later, when the patient noted acute loss of vision and was found to have dislocation of the IOL into the vitreous cavity (Figure 1). There was no history of trauma or other precipitating event. The patient is due to have vitrectomy and lens exchange.



**Figure 1** Photograph of the fundus of the right eye in case 1, showing the silicone plate-haptic IOL dislocated in the inferior part of the vitreous cavity

**Case 2** A 51 year-old Caucasian male underwent uneventful right phacoemulsification and implantation of a Chiron C11UB silicone plate-haptic IOL (d:10.5mm). One month post-operatively he developed uveitis with high intraocular pressure, vitritis and reduction of the visual acuity to 6/36. He was treated with steroids and intraocular pressure lowering drops and the inflammation resolved uneventfully within 2 months. On the third month he developed right anterior capsular phimosis and posterior capsule opacification with a visual acuity 6/18 on pinhole. He was listed for Nd:YAG laser posterior capsulotomy, which was performed uneventfully. One month later, he presented with sudden reduction of the right visual acuity. His vision in that eye was CF improving to 6/60 with pinhole. On examination extensive anterior capsular opacification with severe capsular phimosis were noted. The patient underwent anterior surgical capsulotomy. During the procedure it became evident that the implant was displaced into the vitreous cavity. The B scan ultrasound confirmed the posterior dislocation of the IOL (Figure 2). He underwent uneventful vitrectomy with secondary anterior chamber implant and the post operative acuity was 6/9.

**Case 3** A 74 year-old female underwent uneventful left phacoemulsification and implantation of a Bausch and Lomb C11UB silicon large hole plate haptic IOL (d:10.5mm). The post-operative course was unremarkable, until 3 years later, when she was listed for Nd:YAG laser posterior capsulotomy. Her vision was 6/24 on pinhole. The procedure was uneventful, however 3 months later she presented with a sudden reduction of the visual acuity. Her vision was reduced to hand movements in the left eye, without any associated history of trauma or other precipitating factors. The IOL was found to have dislocated in the vitreous and the patient underwent uneventful vitrectomy with IOL replacement.



**Figure 2** B scan ultrasound in case 2 showing the silicone plate-haptic IOL dislocated in the vitreous cavity

## DISCUSSION

Posterior capsular opacification (PCO) is frequently seen following cataract surgery and is due to fibrous metaplasia of the lens epithelial cells (LECs) where they are in contact with the IOL material and can also result in shrinkage of the anterior capsulotomy<sup>[5]</sup>. This fibrotic process can stabilize the capsular bag and improve centration of the implant (fibrotic fusion). It is believed that factors associated with IOL decentration are the incongruence between an empty capsular bag, IOL length, capsular bag fibrosis and the size of the capsulorhexis<sup>[6]</sup>.

A particularly serious complication after single piece silicone IOL implantation is dislocation of the lens into the vitreous cavity, which may occur especially after Nd:YAG laser capsulotomy<sup>[4,7,8]</sup>. The hypothetical mechanism is based on the design of the plate-haptic silicone IOL, in particular the lack of fibrotic reaction between the capsules and the silicone material, thus preventing effective fixation of these lenses<sup>[7]</sup>.

Furthermore it has been suggested that increasing the diameter of the positioning holes would allow more space for the lens epithelial cells to proliferate on to the posterior capsule, thus enhancing capsular bag fixation<sup>[9]</sup>. However this proliferative process can lead to a greater contracture of the anterior capsulotomy.

Shrinkage of the anterior capsule exerts centripetal forces on the ends of the plate haptics, causing the optic to bow posteriorly and exert pressure against the posterior capsule. Defects in capsular integrity provide a potential avenue for release of the increasing tension placed on the implant by fibrosis and contracture of the capsular bag. If any portion of the capsular bag is compromised as a result of lens placement or Nd:YAG laser treatment, there appears to be a

substantial risk for further capsule tearing and IOL dislocation in the vitreous cavity<sup>[10]</sup>.

It is possible that the forces generated by posterior bowing are greater than the retentive strength of the fibrosis in the holes when the posterior capsule is compromised. Disruption of the posterior capsule or the anterior capsular rim will likely extend during capsular fibrosis and the forces of capsular contraction can be sufficient to impart a spring-loading effect in these lenses<sup>[8]</sup>. Additionally the contraction of the capsule can exert continuous centrifugal forces on the zonules that become rigid over the post-operative course, finally causing their rupture<sup>[11,12]</sup>.

Careful slit lamp examination is recommended before anterior capsulotomy, to exclude adherence between the anterior or posterior capsule and establish whether any visible tension lines are present. It might be also prudent to initiate linear cuts in all 4 quadrants, releasing any tension symmetrically<sup>[6]</sup>. In case 1 the inferiorly targeted anterior capsulotomy could have caused asymmetrical distribution of the centrifugal forces with subsequent unequal tension and peripheral extension of radial tears. Furthermore, manufacturers of plate-haptic IOLs recommend in their product labelling that only continuous curvilinear capsulorhexis be performed and that Nd:YAG capsulotomy be delayed until at least 12 weeks post-operatively to maximise the potential for these lenses to fixate.

Although the use of silicone plate-haptic lenses has been surpassed by the introduction of acrylic IOLs, there are many patients who were previously implanted with the former lenses and who may undergo Nd:YAG capsulotomy in the future. We believe therefore that it is advisable to inform

these patients about the potential risk of posterior dislocation as an early or late complication following laser capsulotomy at the time of consent and prior to treatment.

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