Histomorphological analysis of a Ridley intraocular lens implanted 45 years ago

Sir Harold Ridley is recognised today as the inventor of intraocular lens (IOL) implantation. The first surgery in a human eye was performed in 1949, and approximately 1000 lenses have been implanted worldwide.[1 2] Since then, significant changes in IOL technology have allowed ophthalmic surgeons to correct not only aphakia, but also other refractive errors such as astigmatism or presbyopia. To date, only a few cases with a Ridley IOL and a long postoperative follow-up of 30–40 years have been reported.[3] Sixty-four years after the first IOL implantation, we have had the opportunity to analyse a Ridley IOL implanted 45 years ago, following its explantation. To our knowledge, this is one of the longest reported explantations of this type of IOL.

A 30-year-old man underwent surgery for a traumatic cataract in the right eye and a Ridley IOL was implanted. Forty-five years later, the patient suffered a car accident that caused an IOL dislocation. When the patient came to our hospital, the IOL was luxated into the vitreous cavity, and the typical small ridges around the IOL equator of the Ridley lens could be appreciated (figure 1). The preoperative visual acuity (VA) and intraocular pressure (IOP) were hand motion and 30 mm Hg, respectively. The IOL was explanted through a 10 mm corneal incision, and pars plana vitrectomy

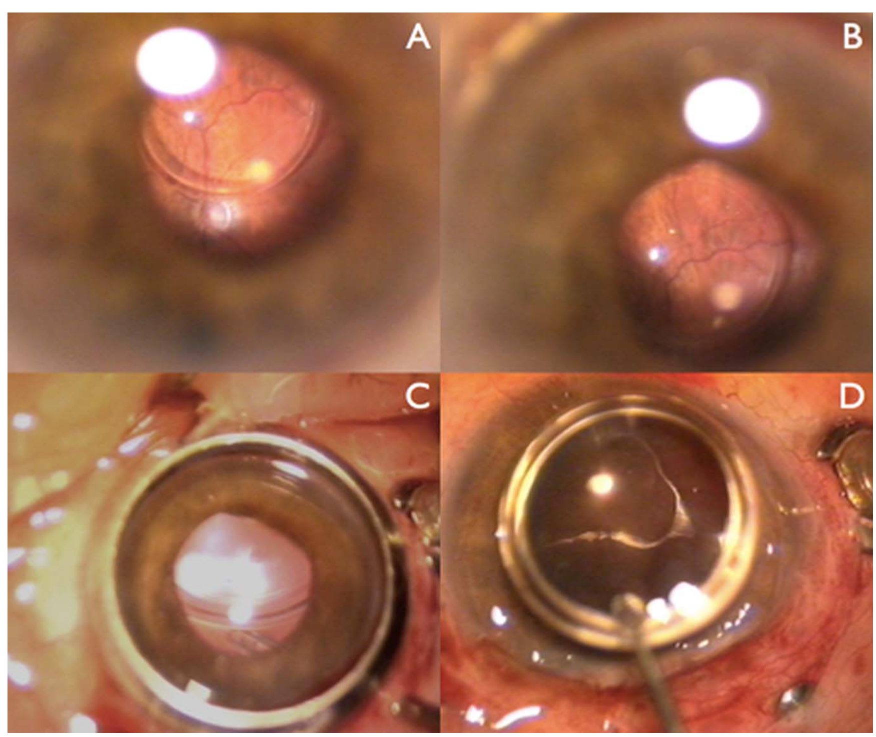

Figure 1 Serial pictures from surgical microscope when performing vitrectomy for intraocular lens (IOL) explantation. (A, B) Luxated Ridley IOL is seen through a poorly dilated pupil at the posterior pole. (C) The IOL is being rescued by pars plana vitrectomy and moved toward the anterior chamber for extraction. (D) A crystal clear Ridley IOL is out of the eye, with no macroscopic opacities or debris in the surface of the lens. A large diameter can be appreciated by comparing it with the diameter of the cornea.

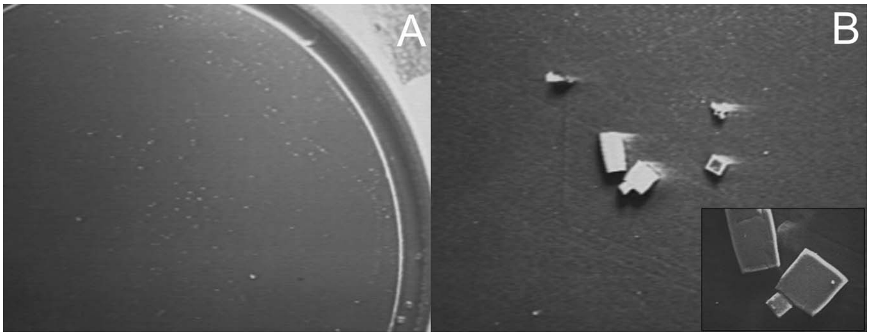

Figure 2 Optical microscopic analysis and scanning electron micrograph of the explanted intraocular lens. (A) Optical microscopy reveals no fibrotic material over the surface of the lens. (B) Scanning electron microscopy shows small solid particles on the surface of the lens (original magnification, ×2000).

was performed after the IOL extraction. After the explantation, the IOL was analysed by gross examination and by optical and scanning electron microscopy. Gross and optical microscopic analyses showed neither irido-fibro-lenticular adhesions over the IOL nor fragments of iris tissue attached to the IOL (figure 2A). The lens maintained its transparency and no signs of material degeneration could be appreciated. The scanning electron microscopy showed several small solid particles that were attached to the surface of the lens. These particles had a square shape and were grouped in the centre of the lens. We hypothesise that these particles could be the remains of salt derived from the infusion fluid (figure 2B). One month later, the patient suffered a retinal detachment and was treated by vitrectomy and scleral buckling. His current VA and IOP in his right eye is 1 logMAR (20/200) and 14 mm Hg, respectively.

The Ridley IOL was made of ICI acrylic known as Perspex CQ, a brand of polymethyl methacrylate (PMMA).[2] This material is still used in the production of IOLs because of its proven history of safety and efficacy with respect to its long term biocompatibility. Interestingly, PMMA lenses are still the most commonly implanted lenses in many areas of the world. This biconvex IOL had a total diameter of 8.35 mm, a central thickness of 2.44 mm, and a weight of 108 mg in air and 70.4 mg in water, which is 45 times heavier than modern lenses.[2 4 5]

Similar to other reported cases, the lens was very well tolerated and the patient did not suffer any spontaneous complication resulting from the Ridley IOL.[3] The approximated rate of Ridley IOL dislocations is around 20%.[6] However, in our patient, even though the traumatic injury was probably the main cause of the IOL luxation, the elevated weight of this lens and the absence of haptics could have also influenced the final outcome.

This case shows the good tolerance of the Ridley IOL inside the eye, as no signs of inflammation or lens degeneration could be appreciated after more than 45 years. We appreciate the shrewdness and talent of Sir Harold Ridley for promoting the excellent tolerance of PMMA inside the eye. This concept was undoubtedly one of the last century's most innovative and revolutionary discoveries in ophthalmology.

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REFERENCES

1 Apple DJ, Sims J. Harold Ridley and the invention of the intraocular lens. *Surv Ophthalmol* 1996;40:279–92.
2 Kohnen T. How far we have come: from Ridley's first intraocular lens to modern IOL technology. *J Cataract Refract Surg* 2009;35:2039.
3 Letocha CE, Pavlin CJ. Follow-up of 3 patients with Ridley intraocular lens implantation. *J Cataract Refract Surg* 1999;25:587–91.
4 Patel AS, Carson DR, Patel PH. Evaluation of an unused 1952 Ridley intraocular lens. *J Cataract Refract Surg* 1999;25:1535–9.
5 Moore DB, Harris A, Siesky B. The world through a lens: the vision of Sir Harold Ridley. *Br J Ophthalmol* 2010;94:1277–80.
6 Ridley H. Intra-ocular acrylic lenses—past, present and future. *Trans Ophthalmol Soc UK* 1964;84:5–14.

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