INTRAOCULAR LENS IMPLANT

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INTRODUCTION

In the past, patients with uniocular cataracts who underwent cataract extraction were not able to tolerate aphakic spectacles due to 30% magnification of visual images thus giving rise to diplopia. The other alternative was to use contact lens which needed motivation. Some could not tolerate contact lens and its magnification of 5% to 7%. These failures eventually led to the idea of intraocular lens implant which caused only about 1% magnification and were optically very well accepted.

The pioneering work of intraocular lens implant was done by Harold Ridley. [1] Now various types of implants are available. There are mainly four types of intraocular lenses which are named in relation to the iris. They are anterior chamber lenses, iris fixation lenses, iridocapsular lenses and posterior chamber lenses.

Anterior Chamber Lenses

Among the various models, the Choyce lens is popular. The work of Peter Choyce resulted in a gradual improvement in design with reduction in the danger of endothelial damage. The latest of his models which is currently in wide use is the Choyce Mark IX lens [2] (Fig. I). These lenses are individually chosen for each patient to match anterior chamber width and refraction. At the beginning, this was inserted as a second stage procedure in the aphakic eye. However, currently these lenses are inserted at the time of primary surgery. The feet of these lenses rest in the angle of the anterior chamber.

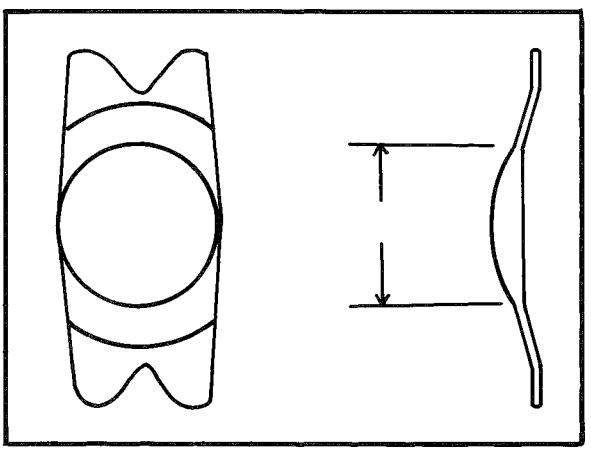

Fig. 1 Choyce Mark IX Lens Diameter of Lens — 6 mm.

Post-operatively, the long term care of these patients should be no less watchful than their early post-operative care. In the immediate post-operative care, topical instillation of an antibiotic, steroid and mydriatic are necessary to ensure the prevention of pupillary synechiae. Incidence of pupillary block glaucoma is uncommon if peripheral iridectomy performed routinely at the time of cataract extraction is patent.

The main advantage of anterior chamber lens is that it can be very easily inserted as a primary or secondary procedure. At anytime, the pupil can be fully dilated without problems with mydriatics for fundoscopy or for any posterior segment surgical procedures. Other type of anterior chamber lens which is being used in the University Hospital is the

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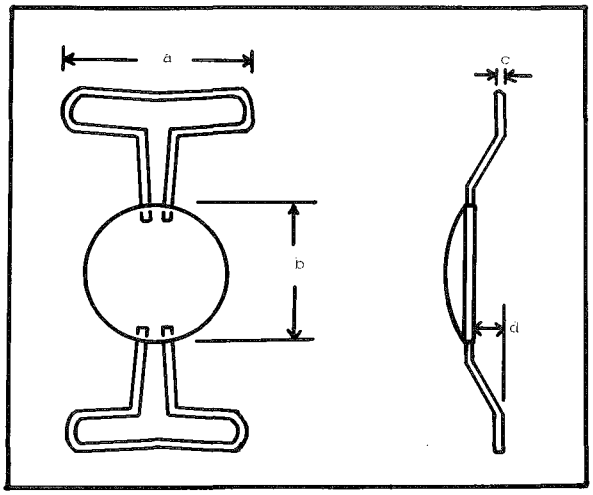

Fig. 2 Hessburg Lens — a. Width of loop - 5mm, b. diameter of lens - 5mm, c. Thickness of loop 0.25mm, d. vault - 0.6mm

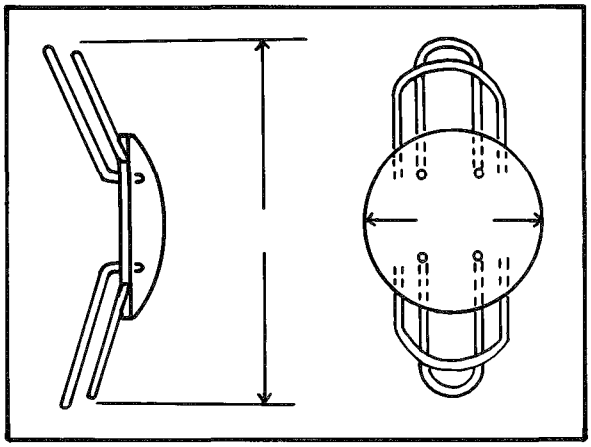

Fig. 3 Binkhorst-clip 4-looped lens a. Diameter of lens - 4.8mm, b. Total length of lens - 8mm.

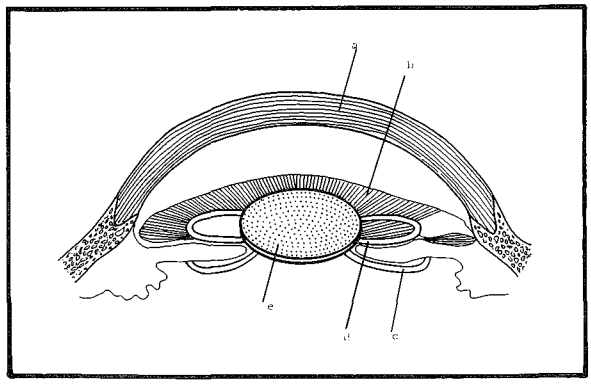

Fig. 4 Binkhorst 4-looped lens in situ, a. Cornea, b. Iris, c. Posterior loop, d. Anterior loop, e. Binkhorst lens.

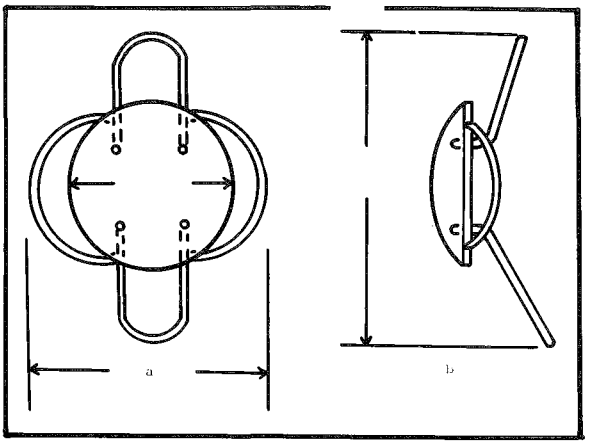

Fig. 5 Fydorov's 4-looped lens, a. Diameter of lens - 4.8mm, b. Total length of lens - 8mm.

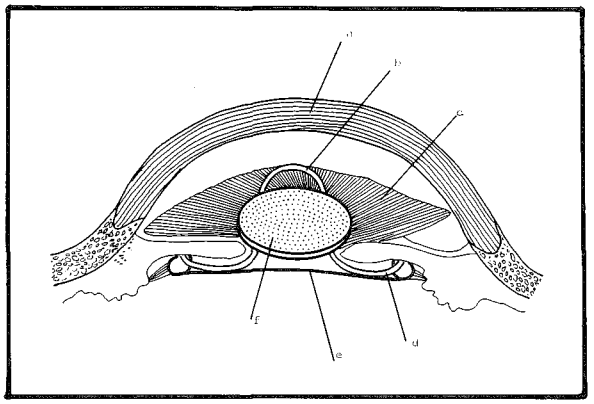

Fig. 6 Fydorov's 4-looped lens in situ, a. Cornea, b. Anterior loop, c. Iris, d. Posterior loop, e. Posterior cap, f. Fydorov's lens.

Hessburg lenses model 024 (Fig. 2).

Iris Fixation Lenses

These lenses depend on the iris for fixation and support. These were developed primarily from the work of Binkhorst. [2] A few others who have done similar work in this type of lens are Epstein and Fydorov. The Binkhorst-clip 4-looped lens (Figs. 3 & 4) and Fydorov's 4-looped lens (Figs. 5 & 6) are inserted as a primary procedure after intracapsular extraction. The anterior loop can be sutured to the iris with a 10/0 Ethicon suture for added stability. Just prior to the insertion of this lens the pupils are constricted by a miotic. Routine post-operative treatment is carried out and mydriatics are used sparingly. The main disadvantage of this lens is that one cannot achieve good pupillary dilatation because of pupillary synechiae thus making

fundoscopy and posterior segment surgical procedures difficult.

Iridocapsular Lenses

The Binkhorst two-looped lens is used after an extracapsular extraction. The two loops are inserted within the 'capsular bag' remaining after extracapsular extraction. The absence of anterior loops in these lenses makes endothelial touch even less likely and the pupillary function is normal post-operatively. It is postulated that the incident rate of post-operative cystoid macular oedema remains the same with or without an implant. [3]

Posterior Chamber Lenses

In theory, the ideal position of an intraocular lens is in the posterior chamber from where the normal lens has been removed. The Binkhorst two-looped lens can be used in reverse fashion so that the optical part is behind the iris. [4] As in the iridocapsular lens, the posterior chamber lens is inserted only after an extracapsular extraction. The loops are inserted within the 'capsular bag'.

The intraocular lens' dioptric power is specific for each patient. The specific power of the lens can be determined by knowing the refractive power of the cornea using a keratometer and the antero-posterior diameter of eye using ophthalmic ultrasound. Since the equipment is not available here we estimate the specific dioptric power by less desirable method i.e., basing on the patient's previous refractive error if known. Though we preferably select patients above the age of 50 to receive the lens, anyone above the age of three could receive one if there is an indication.

Indications

Patients who have uniocular cataracts are best advised to have an implant so as to have a good binocular vision. To prevent amblyopia in children with traumatic cataracts, an intraocular implant can be inserted. Psychiatric and mentally retarded patients and geriatric patients with physical deformities could also be advised to have an implant. Others who could receive an implant are patients who cannot tolerate contact lenses or aphakic glasses (secondary implant).

Contraindications

Intraocular implants are best avoided in patients who have only one eye with potentially useful vision or who are high myopes. Patients who suffer from corneal dystrophy, proliferative diabetic retinopathy or glaucoma with shallow anterior chamber should not receive an implant.

Complications

Most of the post-operative complications which are uncommon, can be easily dealt with. They are corneal oedema, anterior uveitis, secondary glaucoma (pupillary block), dislocation of the lens, loss of transparency of the lens or dissolution of the supporting loops of the nylon suture.

CONCLUSION

Intraocular implant is now a safe procedure. The lenses mentioned in this article are the lenses used in the University Hospital at present. There are many other types of lenses available. Studies are being done at the University Hospital among the patients who have had various lenses inserted. The results will be published in due course.

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REFERENCES

[1] Pierse D. Intraocular lens implants — An introduction. *Trans Ophthal Society UK* 1977; **97**: 64-66.

[2] Anis Aziz Y. Principles and Evolution of intraocular lens implantation. *Int ophthalmology clinics* Summer 1982; **22**: 1-13.

[3] Sanford L, Severin M D. Late cystoid macular oedema in pseudophakia. *Am J of Oph* 1980; 223-225.

[4] Shearing Steven P. Posterior Chamber Lens Implantaion. *Int Ophthalmology Clinics*, Summer 1982; **22**: 135-153.