ANTERIOR CHAMBER IMPLANTATION AT UNIVERSITY HOSPITAL, KUALA LUMPUR

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SUMMARY

50 cases of anterior chamber intraocular lens implantation at the University Hospital, Kuala Lumpur were studied. 80% of the cases achieved visual acuity of 6/9 or better. The percentage would be higher if cases with pre-existing pathology are excluded and the period of follow-up is longer. Complications, mainly minor and non sight-threatening, are discussed.

INTRODUCTION

An anterior chamber intraocular lens was designed by Choyce of Southend, England, in early 1956.[1] Since then, it has undergone nine modifications and improvements have been made. The present model is Choyce Mark IX (Fig. 1).[2] The author was fortunate to have the opportunity to work with Choyce for two years from 1980 to 1982. After having examined hundreds of Choyce Mark IX implants, and performed 49 implantations in Southend without abandoning a single implantation, the author is convinced of its advantages over other groups of implant.[3]

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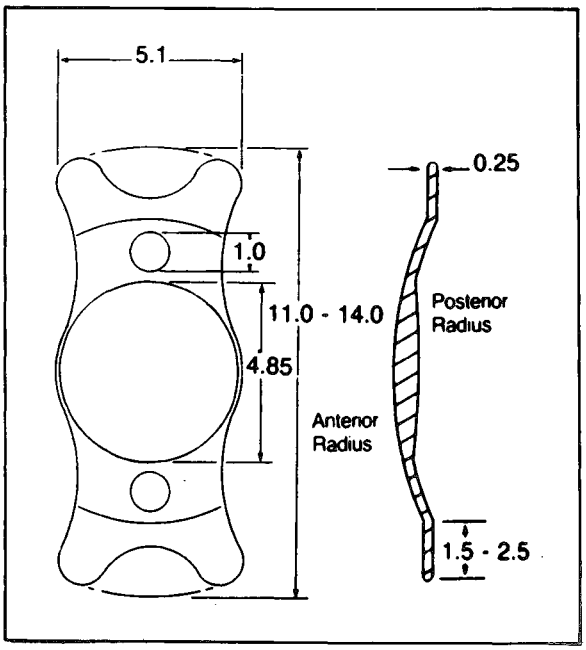

Fig. 1 Choyce Mark IX Anterior Chamber Intraocular Lenses

Past experience in assisting and discussing with the consultant ophthalmologists who perform iris-supported intraocular lens implantation revealed that the main problem during implantation was vitreous presentation.[4] In a number of cases encountered, vitreous loss occurred when implanting the iris-supported lens and the implantation had to be abandoned. For posterior chamber implant, it is a well-known practice to have an anterior chamber implant as a back-up lens if significant

complications develop at the time of extracapsular extraction.[5] As local experience in implantation is not available, this study is presented after due care had been taken to follow-up all the implant patients closely. The implantations were performed at the University Hospital, Kuala Lumpur.

MATERIALS AND METHODS

76% of the patients were above 55-years at the time of the operations (Table I). The implantations were performed between December 1982 and December 1983. 30 out of the 50 implantations were carried out on males and 20 in females. There were 42 cases of primary implantation and eight cases of secondary implantation.

50 anterior chamber implants of Choyce Mark IX Model manufactured by either Rayner or Coburn were used in the implantation. Four sizes of the implants were utilised, *viz.*, 12.0mm, 12.5mm, 13.0mm and 13.5mm (Fig. 2). The size of the anterior chamber implant required for an individual patient was estimated both before and during the operation. A caliper and a ruler were used for measuring the white-to-white horizontal corneal diameter. An extra one millimeter was added to arrive at the estimated size of the implant.[1] Patients suspected to have poor retinal function such as poor projection of light or diabetic retinopathy resulting in poor vision, were excluded from the implantation. All the patients or the relatives of the patients were informed of the surgeon's experience and the advantages and disadvantages of the anterior chamber implant,[6] including the safety of the implant[7] and the increased risk of complications in comparison to that of cataract extraction alone.[8]

Fig. 2 A case of 13.5 mm Choyce Mark IX Anterior Chamber implant. Visual acuity 6/6 with correction.

For the first 25 implantations, the technique adopted by Choyce was employed. As a routine, general anaesthesia was preferred unless there was a contraindication. Local anaesthesia would then be given to such cases (two cases). An operating microscope was used in all implantations. The Graefe section without conjunctival flap was done with twin peripheral iridectomies. α-chymotrypsin was used for patients below 50 years of age. The cryoextraction was performed using the Keeler Amoils cryo pencil unit. The intraocular lens was implanted after an air bubble of appropriate size was introduced into the anterior chamber. The corneal wound was closed with interrupted 8'0' virgin silk suture. The anterior chamber was reformed with normal saline solution or Ringer solution after the air bubble was withdrawn from the anterior chamber. Subconjunctival gentamycin was administered at the end of the operation. The intraocular pressure and refraction were examined before the discharge which took place about a week after the operation.

Pre-operatively, routine topical antibiotic and mydriatics were prescribed. Post-operatively, topical steroid was added and oral Diamox was used in small dosages for two weeks (following Choyce's routine post-operative treatment).

For the next 25 implantations, the following modifications were made. The corneoscleral section was made using a Bard Parker Knife with a fornix-based conjunctival flap to reduce the post-operative irritation from the sutures. In some cases a 10' 0' nylon suture was used to close the wound. Only one peripheral iridectomy was done. No oral diamox was prescribed post-operatively.

Close follow-ups in a special implant clinic was recommended to all patients *viz.*, two weeks, six weeks, 12 weeks, six months and one year after being

discharged from the hospital. The checking of the visual acuity, the refraction, and the slit lamp examination including applanation tonometry were carried out during every visit. For cases suspected to have retinal lesion, direct and indirect ophthalmoscopy and three mirror examinations were carried out to confirm the diagnosis. Annual follow-ups were advised following full recovery of the eye.

RESULTS

The results are presented in Tables I, II, III, IV and V. Pin-hole visual acuity is not included.

DISCUSSION

The visual outcome was satisfactory and compared favourably with the other results including those of contact lens and spectacle corrections (Table V).

TABLE I
AGE DISTRIBUTION OF 50 IMPLANTATIONS

Age (Years)	No. of Implantations
46 – 60	7
51 – 55	5
56 – 60	6
61 – 65	10
66 – 70	14
71 – 69	5
80	3
Total	50

TABLE II
PRE-OPERATIVE VISUAL ACUITY

Visual Acuity	No. of Implantations
P.L. with good projection of light	4
H.M. with good projection of light	8
Counting Finger at one meter	18
6/60	10
6/36	2
Aphakia	8
Total	50

N.B.: P.L. – Perception of light; H.M. – Hand movement.

TABLE III
POST-OPERATIVE VISUAL ACUITY

Visual Acuity	No. of implantations
6/9 and better	40
6/12	4
6/18	6
6/24 and worse	0
Total	50

TABLE IV
COMPLICATIONS OF IMPLANTATION

Complications	No. of Cases
Iris Bulge	4
Slit Pupil	1
Anterior Uveitis (three months after operation)	2
Raised Intraocular Pressure (three months after operation)	1
Sterile Hypopyon	1
Dislocation of Implant	1
Tilting of Implant	2
Descement Membrane Scroll	1
Vitreous Opacity affecting vision	2
Cystoid Macular Edema	3

The follow-up period of the present study is from four months to 16 months.

The type of complications encountered (Table IV), related to the implantation, would be discussed in relation to the timing of the operation. During the operation, surgical hyphaema due to the implantation occurred occasionally but it did not present any problem. Implants which were found to have been loosely fixed during the operation were replaced with another one of the correct size. Deep scratches and deposits were found in the surfaces of some lenses and replacement with a new lens was the rule. Therefore, it is important to examine the implant carefully under the operating microscope. A total of five lenses were sent back for resterilisation and replacement. Localised stripping of Descement membrane occurred in one case due to poor technique of implantation.

Post-operatively, pigmented deposits were found on the surfaces of all lenses which invariably

TABLE V
COMPARISON OF VISUAL OUTCOME IN CATARACT SURGERY (%)

Visual Acuity	ACI (UH)	ACI[10]	Contact Lens[11]	Spectacles[11]	Optical Correction[12]
6/9 and better	80	72.3	73	55.6	83.7
6/12	8				
6/18	12	24.1	15	22.9	
6/24	0				
6/36	0				
⩽6/60	0	3.6	12	21.5	13.7

N.B: ACI – Anterior Chamber Implant; UH – University Hospital; 10, 11, 12 – references.

disappeared or reduced markedly within six months. Non-pigmented deposits occurred in much fewer cases always associated with anterior uveitis. Visual acuity was affected by these non-pigmented deposits in two cases. One case with elongated pupil (slit pupil) along the axis of the implant due to iris tuck was encountered. The vision, however, was not affected.

Iris bulge is a condition whereby the iris bulges anteriorly over the edges of the implant. It usually occurs inferiorly. If the superior part of the iris is involved, it is usually less severe. All four cases of iris bulge responded to conservative treatment, i.e., no additional medication was given and the patients were advised to rest at home. Post-operative raised intraocular pressure (four cases) was easily controlled with glaucoma therapy and medication could be withdrawn within the next three months without further increase in the intraocular pressure. Only one case of raised intraocular pressure continued to be controlled with oral Diamox and Guttae Timoptol at the last follow-up. Raised intraocular pressure in these five cases was detected between one to two months after the implantation.

No sign of pupil block was found. In all five cases, the anterior chamber was deep and without significant uveitis clinically. Gonioscopy was not carried out due to the tenderness of the recently-operated eye. Uncommon complications included sterile hypopyon uveitis (one case), cystoid macular edema (three cases), dislocation (one case) and tilting of the implant (two cases). The dislocation occurred eight months after secondary implantation and no history of trauma was obtained. However, the patient admitted sexual activity the night before the onset. This was successfully treated with tertiary implantation. Three months after the operation, the visual acuity was 6/9 with correction. Three cases of cystoid macular edema occurred exclusively in Eurasian patients. Two of these complained of acute deterioration of vision four months after the operations. Visual acuity in both cases improved to 6/6 and 6/9 respectively within the following five months without treatment. The third case was detected during the last follow-up, six months after the operation because of unsatisfactory vision of 6/18. Cases of hypopyon, uveitis and implant tilt achieved visual acuity of 6/9 and better during the follow-ups. No case of corneal edema or post-operative hyphaema was encountered. Tenderness of eyeball did not give rise to any problem and invariably disappeared within six months after the surgery.

With reference to cases with visual acuity worse than 6/9, two of the four cases with 6/12 have axial vitreous opacities, one had vitreous loss during cataract extraction and the other had no apparent relation to the implantation. One case had 6/6 vision three months after the implantation, but developed mild uveitis resulting in 6/12 vision due to the deposits on the implant. The fourth

case was an 81-year-old patient with 3.00 dioptre astigmatism. Keratometry was done and corneal astigmatism was found to be the cause of high astigmatic correction.

Two of the six cases of 6/18 vision are in their eighties and with high astigmatic correction of 4.00 dioptres. One of the two cases had keratometry done and this confirmed the corneal aetiology while another case defaulted keratometry. Another three cases had macular lesions, cystoid macular edema and early senile macular degeneration respectively. The last case of 6/18 was a defaulter from a distant rural village, and the visual acuity presented was checked one month after the operation.

All the three eyes belonging to the patients over 80-years-old had visual acuity of worse than 6/9 but 6/18 or better. Study has shown that those in their eighties have poorer prognosis in their visual outcome.[5] Cases of poor vision due to implant deposits and cystoid macular edema are likely to improve when the conditions settle. One implant patient who had a post-operative visual acuity of 6/9, died five months after the operation of causes unrelated to the implantation.

CONCLUSION

This study suggests that a stock of eight implants would be needed in order to perform an anterior chamber implantation, *viz.*, two each of size – 12.0mm, 12.5mm, 13.0mm and 13.5mm. All four sizes have been used in this series. An extra implant is needed in each size so that the operation will not be postponed if one is found faulty.

Intraocular lens implantation is a complex procedure.[9] With relevant experience, the series of 50 cases performed achieved 80% of visual acuity of 6/9 and better. This compared favourably not only to the other methods of aphakic correction, but also to that of anterior chamber implants. None of the patients had visual acuity less than 6/18 (Table III). However, long term follow-ups are needed for the ultimate safety of implants in the local population.

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REFERENCES

1 Choyce DP. *Intraocular lenses and implants.* London: H.K. Lewis and Co Ltd, 1964: 16.

2 Choyce DP. The evolution of the anterior chamber implant upto, and including, the Choyce Mark IX. *Ophthalmology* 1979; 86: 197-206.

3 Choyce DP. The VI Binkhorst Medal Lecture. Anterior chamber implants – Past, present and future. *Am Intraocular Implant Soc J* 1982; 8: 42.

4 Binkhorst CD. Iris-clip and Irido-capsular lens implants. *Brit J Ophthal* 1967; 51: 767.

5 Stark WJ *et al.* The FDA Report on intraocular lenses. *Ophthalmology* 1983; 90: 311-317.

6 Lim TK. Intraocular lens for the correction of aphakia. *Singapore Med J* 1984. (in press).

7 Drews RC. Lens implantation: Lessons learned from the first million. The Third Rayner Lecture 1982. *Trans Ophthal Soc UK* 1982; 102: 505.

8 Gruber E. Contact lens *versus* intraocular lens in the correction of aphakia. *Trans Ophthal Soc UK* 1980; 100: 231.

9 Jaffe NS. Editorial. The intraocular implant lens – Reflections on the current state of the art. *Ophthalmology* 1979; 86: 195-196.

10 Worthen DM *et al.* Interim FDA Report on intraocular lenses. *Ophthalmology,* 1980; 87: 267-271.

11 Ruben M. The contact tens in aphakia. *Trans Ophthal Soc UK* 1981; 101: 48-50.

12 Then SM, Chandran S. Cataract extraction in West Malaysia. *Med J Malaysia* 1975; 30: 180-186.