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Intraocular Lens Implantation in Leprosy[1]

Ebenezer Daniel and Sheena Koshy[2]

Cataract in leprosy can occur in several ways. A secondary cataract can develop in multibacillary patients with chronic uveitis. This is usually a posterior subcapsular variety but anterior lens changes can also occur, often with the formation of a pupillary membrane. Patients on prolonged therapy with oral steroids or topical steroid eye drops can develop a steroid-induced cataract of the posterior subcapsular variety. The most common variety of cataract seen in leprosy patients is an age-related cataract. These may be nuclear, cortical or posterior subcapsular. When a patient develops a cataract and vision is impaired to an extent that impedes the daily activities of the patient, cataract surgery is considered.

The implantation of intraocular lenses (IOLs) has become an increasingly popular form of aphakic correction in the last three decades. A plethora of literature exists detailing the results of intraocular implantation in patients who underwent extracapsular cataract extraction (ECCE) surgery. Although this data is plentiful, very little of it is on intraocular implantation in leprosy patients ([1, 2]). There has always been an overly cautious approach while considering implantation of IOLs in leprosy patients. This is understandable because the eyes of leprosy patients are prone to a number of complications that the disease produces. Some of these complications like lagophthalmos, ectropion, entropion, trichiasis, decreased corneal sensation, corneal opacities, chronic uveitis, iris atrophy and decreased intraocular pressure may adversely affect the surgical procedure as well as the visual outcome after successful implantation of an IOL. Despite these concerns two factors have seen the emergence of an increasing number of patients being implanted with IOLs after their cataractous lenses had been removed. The number of patients with ocular complications has become fewer, while patients with operable age-related cataracts have increased and the advantages offered by IOLs over aphakic glasses far outweigh the anticipated problems.

The ophthalmology department of the Schieffelin Leprosy Research and Training Center, a tertiary leprosy hospital in South India, started implanting posterior chamber IOLs in leprosy and non-leprosy patients in 1996. The methodology used in implanting lenses in cataract surgery have undergone many changes in the past two decades and, consequently, these changes were reflected on the surgeries done in this center also. During 1997 and 1998 a number of leprosy patients were operated for cataract and IOLs were implanted by the same surgeon using the same technique. We reviewed the charts of these leprosy patients who had undergone standard extracapsular cataract surgery and posterior chamber IOL implantation and present the results in this paper, discussing the merits of intraocular implantation in leprosy patients with cataracts.

METHODOLOGY

Charts of all leprosy patients who underwent cataract surgery with IOL implantation from January 1997 to December 1998 were reviewed. The demographic data, leprosy data and ophthalmic data were extracted and documented using a preformed pro forma. Leprosy data included the classification of leprosy, duration of the disease, reactive episodes, smear status, deformity grading and the anti-leprosy drugs administered. Ophthalmic data included visual acuity, eye complications that were present before surgery, operative complications, immediate postoperative complications, late postoperative complications at 6 months and 2 years after surgery. The surgical procedure in all the patients was a standard ex-

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[2] Ebenezer Daniel, M.B.B.S., M.S., D.O., M.P.H., Head, Department of Ophthalmology, and Sheena Koshy, M.B.B.S., D.O., Specialist, Department of Ophthalmology, SLRTC, Karigiri, Vellore District, Tamilnadu, India - 632106.

Reprint requests to Dr. Ebenezer Daniel at the above address, e-mail: oculep@vsnl.com

TABLE 1. *Deformity grading of patients at the time of IOL implantation.*

Deformity grading	Right hand no. (%)	Left hand no. (%)	Right leg no. (%)	Left leg no. (%)
Nil	12 (31)	13 (33)	10 (26)	9 (23)
Grade 1	9 (23)	7 (18)	13 (33)	15 (38.5)
Grade 2	18 (46)	19 (49)	16 (41)	15 (38.5)
Total	39 (100)	39 (100)	39 (100)	39 (100)

tracapsular cataract extraction (ECCE) done with a linear capsulotomy. Five 10-zero nylon sclerocorneal sutures were used for closing the incision. A standard 21-diopter intraocular lens was used for implantation in all of these patients because an A-scan (used for measuring the length of the eye ball and calculating the exact diopter of the lens to be implanted) was not available at the time of these surgeries. Use of glasses for refractive errors were specifically ascertained before surgery was undertaken to prevent the possibility of implanting a lens of a grossly unacceptable diopter. All data were coded and entered into the computer and analysis of data was performed using the STATA version 7.0 statistical package.

RESULTS

Between January 1996 and December 1997, IOL implantation after ECCE was performed in 48 eyes of 39 leprosy patients by the same ophthalmologist using the same surgical technique at the Schieffelin Leprosy Research and Training Center in South India. An equal number of surgeries were done in the left and right eyes. Seventeen (44%) were male and 22 (56%) female. The ages ranged from 37 years to 87 years with a mean (SD) of 60 (10). The approximate duration of leprosy, taken as time in years from the beginning of the first sign or symptom of leprosy to the date of cataract surgery, ranged from 5 years to 46 years with a mean (SD) of 27 (12). Clinically, 2 patients (5%) were classified as tuberculoid tuberculoid (TT), 10 patients (26%) as borderline tuberculoid (BT), 4 patients (10%) as mid-borderline (BB), 11 patients (28%) as borderline lepromatous (BL), 11 patients (28%) as lepromatous leprosy and 1 patient (2%) as indeterminate leprosy (IND). IND, TT and BT were clubbed together as paucibacillary (PB) patients (33%) and BB, BL and LL as multibacillary (MB) patients (67%). Only one patient had previous reversal reaction (Type 1 reaction) while 5 had previous erythema nodosum leprosum (ENL). When first seen at the hospital, 31 patients (79%) were smear negative while 8 patients (21%) were smear positive. At the time of cataract surgery only 3 patients (8%) had positive smears. Seventeen patients (44%) had only been treated with dapsone monotherapy; 14 patients (36%) had been treated with both dapsone monotherapy and multidrug ther-

TABLE 2. *Corrected visual acuity of operated patient's eyes.*

Vision	Pre-op		Immediate post-op		6-months		2-years	
	RE[a] no (%)	LE[b] no (%)	RE[a] no (%)	LE[b] no (%)	RE[a] no (%)	LE[b] no (%)	RE[a] no (%)	LE[b] no (%)
6/6	—	—	1 (4)	—	6 (25)	3 (14)	—	3 (25)
6/9	—	—	6 (25)	1 (4)	6 (25)	6 (29)	5 (45)	1 (8)
6/12	—	—	7 (30)	10 (43)	6 (25)	7 (33)	4 (37)	5 (42)
6/18	2 (8)	1 (4)	3 (12)	6 (25)	4 (17)	5 (24)	2 (18)	2 (17)
6/24	1 (4)	1 (4)	—	3 (12)	—	—	—	—
6/36	1 (4)	1 (4)	4 (17)	2 (8)	2 (8)	—	—	1 (8)
6/60	2 (8)	5 (21)	—	2 (8)	—	—	—	—
3/60	1 (4)	3 (13)	2 (8)	—	—	—	—	—
<3/60	17 (72)	13 (54)	1 (4)	—	—	—	—	—
Total	24 (100)	24 (100)	24 (100)	24 (100)	24 (100)	21 (100)	11 (100)	12 (100)

[a] Right eye.
[b] Left eye.

TABLE 3. *Preoperative and postoperative ocular complications of patients.*

Other complications	Multibacillary no. of eyes (%)	Paucibacillary no. of eyes (%)	Total no. of eyes (%)
Preoperative			
Lagophthalmos	4/33 (12)	1/15 (6)	5/48 (10)
Corneal opacity	1/33 (3)	2/15 (13)	3/48 (6)
Past iridocyclitis	0/33 (0)	0/15 (0)	0/48 (0)
Operative:			
Vitreous Loss/PC rupture	1/33 (3)	0/15 (0)	1/48 (2)
Cortex left behind	3/33 (9)	1/15 (6)	4/48 (8)
Immediate Postoperative:			
Uveitis >3+	12/33 (36)	5/15 (33)	17/48 (35)
Endophthalmitis	0/33 (0)	0/15 (0)	0/44 (0)
Iris prolapse	0/33 (0)	0/15 (0)	0/44 (0)
Decentration of lens	3/33 (9)	0/15 (0)	3/48 (6)
Pupillary capture	2/33 (6)	0/15 (0)	2/48 (4)
Late Postoperative:			
PCO	4/32 (12.5)	3/15 (20)	7/47 (14)

apy (MDT); 8 patients (20%) had only been treated with MDT. The deformity grading of these patients is given in Table 1. One patient had a saddle nose; 6 patients (15%) had unilateral claw hands; 8 patients (20%) had bilateral claw hands; 5 patients (13%) had unilateral absorption of fingers; and 12 patients (31%) had bilateral absorption of fingers.

Visual acuity in the operated eyes before surgery, immediately after surgery on the first postoperative day, 6 months after surgery and 2 years after surgery is given in Table 2. At the 6th month, although 23 left eyes were examined, data of the recorded vision of two eyes were missing. Follow-up ocular examinations at 2 years were done only on 11 right eyes and 12 left eyes. Existing ocular complications before cataract surgery, during surgery, immediately after surgery and 6 months after surgery are given in Table 3.

In this series of patients, none had iridocyclitis prior to surgery but in the immediate postoperative period uveitis of 3+ flare and cells were seen in 17 out of 48 eyes (35%). The uveitis in all but one patient subsided with topical steroid eye drops. One patient was treated with oral steroids. Previous lagophthalmos or corneal opacities did not show correlation with any reduced postoperative visual acuity. At 2 years the only complications recorded were posterior capsular opacities (PCOs) in two eyes. These were also present at the earlier 6-month follow-up examination. Seven out of 47 eyes (15%) had developed PCOs at 6 months postoperatively. The complications and visual acuity recorded at different periods in these patients did not differ statistically ($p > 0.05$) between the multibacillary (MB) group and the paucibacillary (PB) group. One patient had a fall and injured her operated eye one year after surgery and had blood staining of the cornea and blood in the anterior chamber which lowered her vision to perception of light. She was treated conservatively and her vision improved to 6/36 after 3 months. Two eyes had visual acuity of less than 6/18 at 6 months but the cause for reduced vision was not evident from the patient's chart although posterior examination of the eye ball was recorded as being done. Three patients were smear positive at the time of surgery, but did not show any significant difference in the outcomes observed ($p > 0.05$).

DISCUSSION

There are an estimated 10.3 million leprosy patients in the world who have been treated adequately with anti-leprosy drugs. It is also estimated that there may be about 3 million persons with leprosy-related impairments and disabilities in the world. Two million of them have grade 2 deformity and one million have grade 1 deformity. About 12% of all newly diagnosed leprosy patients present with severe deformities ([6]). Although nonspecific figures are available, many of these patients with disabilities have deformities like saddle noses, absorbed fingers, claw hands, foot ulcers and

amputated feet. Saddle nose was not an uncommon finding among lepromatous patients a few decades ago, but is rarely seen among newly diagnosed lepromatous patients at the present time. Many of these patients with saddle noses are probably old with age-related or complicated cataracts that require surgery. Intraocular lens implantation is an ideal surgery in these patients who would otherwise find it almost impossible to wear the heavy aphakic glasses that are necessary after cataract surgery that is performed without intraocular lens implantation. However, many of these patients who have saddle noses are also likely to belong to the lepromatous group of patients and have eyes that have been extensively damaged by repeated iridocyclitis and, therefore, these eyes need careful evaluation before an implantation surgery is considered.

Eighty-four percent of the patients in our series had either a grade 1 deformity or a grade 2 deformity in one of the extremities. Sixty-four percent had grade 2 deformity in one of the extremities and 26% had grade 2 deformity in both extremities. Patients with such deformities, especially those with claw hands and absorbed fingers, would find handling thick aphakic glasses a difficult task. The benefit of having an IOL implanted in a leprosy patient is not limited to helping structurally disadvantaged patients, but also in giving patients a better optical advantage after removal of the cataract lens. Aphakic glasses have the disadvantage of magnifying images by 33%. IOLs, because they occupy the space of the natural lens after its removal, do not exhibit this disadvantage. Aphakic glasses also have many other inherent optical disadvantages that are not present in IOLs. Patients having deformities of the foot and difficulty in locomotion would be increasingly handicapped with aphakic glasses because of the various optical problems that impede good vision. IOLs, unlike aphakic glasses, do not get lost, broken or stolen and, therefore, are more economical when lengthy postoperative durations are taken into account. The disadvantages of an aphakic correction can be ameliorated to a great extent by the use of contact lenses, but the difficulty in handling these contact lenses by patients with deformities and the vulnerability of leprosy eyes to injury and infections would preclude the use of these in almost all leprosy patients.

One of the major reasons for delaying the use of IOLs in leprosy patients, even years after they had been shown to be successful in treating age-related cataracts and had become an accepted form of surgery, was the fear of precipitating catastrophic uveitis. Lepromatous patients are prone to develop iridocyclitis and the introduction of an IOL, which is a foreign body, although inert, was believed to be a very dangerous procedure, especially in patients whose iris and ciliary bodies were affected due to previous inflammations. There have been several reports of IOLs implanted in patients who had previously had chronic uveitis due to diseases like sarcoidosis, syphilis, ankylosing spondylitis and rheumatoid arthritis ([3, 5]). The results from these studies illustrate the safety of IOLs and improvement of vision up to 1–3 years of follow-up after surgery. Certain precautions were observed in these patients. Preoperative corticosteroid doses and routes of administration were individualized according to the degree and duration of intraocular inflammation. Clinically significant inflammation was defined as 1+ cells (5 to 10 cells per high power field) or more observed with a narrow slit beam according to the criteria of Hogan and associates ([4]). Only eyes with less than clinically significant inflammation for a minimum of 2 months had surgery. Taking similar precautions, eyes with previous inflammation in leprosy patients can also be fitted with IOLs.

Since implanting IOLs in lepromatous eyes that have had uveitis is still uncharted territory, it is important to thoroughly evaluate these patients and follow known precautions. All patients must undergo careful biomicroscopic (slit-lamp) examination before being admitted for surgery. Patients with uveitis in the past may have posterior synechia that may not be visible unless full dilatation of the pupil is achieved and this may not be possible if extensive iris atrophy is present. This is an important feature that, if not evaluated properly, may cause undue operative complications and result in bad visual outcomes. During surgery excessive manipulation of the iris should be avoided. Care must be taken to place the IOL inside

the capsular bag to prevent any irritation of the ciliary body. Anterior chamber lenses and iris clip lenses are best avoided. Patients need to be followed up at regular intervals for at least 3 years. None of the patients in our series had previous iridocyclitis and this could be the reason why even though 35% developed a uveitis of 3+ postoperatively, the uveitis subsided with conservative topical steroid drops.

Fifteen percent of the eyes had developed PCO at the end of 6 months after surgery. At the end of 2 years, only 2 eyes had PCO of the 23 eyes that were available for examination. These two eyes had previously had PCO at 6 months also. The rest of the patients who had PCO at 6 months were lost to follow-up. The figures, therefore, do not represent the true incidence of PCO in leprosy patients after IOL implantation. The patients in this series did not have any significant operative or immediate postoperative complications. Visual outcomes were generally good as shown in Table 2. Patients with a positive smear either at the time of diagnosis (13 eyes, 27%) or at the time of surgery (5 eyes, 10%) did not show significant differences in their complications or visual outcomes from those patients who were smear-negative ($p > 0.05$).

Reports of IOL implantation in leprosy patients are scanty because of several reasons. There are several leprosy hospitals, government hospitals and private eye clinics where lens implantations are done routinely in leprosy patients who present with operable cataracts but most of these establishments have not felt the need to publish the results of their surgeries. Stigma due to leprosy still exists and many adept ophthalmic surgeons who perform large numbers of highly-skilled surgery using state-of-art equipment are reluctant to operate on leprosy patients who are predominantly poor and cannot afford to pay for their services. There are leprosy endemic areas in the Indian subcontinent and in Africa where adequate health care facilities still do not exist and they are not likely to look for skilled eye surgeons and do not have well-equipped ophthalmic operating theaters that would be needed for performing IOL implantations in these areas. Many advances have been made in the IOL implantation techniques and there is need to study how beneficial these are in leprosy patients. Too small a sample of operated eyes, a still smaller sample of follow-up eyes of over 2 years duration from the time of surgery and the use of standardized IOLs, instead of using accurately calculated IOLs, have been some of the inadequacies of this study, but the scanty literature in this field justifies reporting of these results. Further studies without these drawbacks are needed so that good IOL implantations with all its benefits are made available to all leprosy patients who need surgery for their cataracts.

SUMMARY

The preoperative, operative and postoperative ocular complications in 48 eyes of 39 leprosy patients who underwent standard extracapsular cataract extraction and posterior chamber intraocular lens implantation, by the same surgeon, were studied retrospectively. Seventeen were male and 22 were female. Thirteen (33%) were paucibacillary (PB) while 26 (67%) were multibacillary (MB) patients. Three patients were smear-positive at the time of surgery. Grade 2 deformity that included claw hands, absorbed fingers, saddle noses and foot drop were present in 64% of the patients. None of the patients had any previous intraocular inflammation although one patient had previously had a Type 1 reaction and 5 patients had previously had Type 2 reactions. Preoperative complications like corneal opacities (3 eyes) and lagophthalmos (5 eyes) were not associated with lower vision postoperatively. No significant operative complications like vitreous loss, endothelial damage or iris tear were encountered, except in one eye where there was a posterior capsular tear. Seventeen eyes (35%) developed uveitis of 3+ or more in the immediate postoperative period, but abated with routine topical steroid eye drops. Six months after surgery 7 out of 47 eyes (15%) had developed posterior capsular opacities. There were no significant differences ($p = > 0.05$) in the visual acuity outcomes or in ocular complications when MB patients were compared with PB patients. Smear-positive patients were not significantly different from smear-negative patients when postoperative complications were compared. Visual outcomes in the 23 eyes followed up at two years after surgery

were 6/18 or higher, except in one eye which had sustained a severe injury one year after surgery. IOLs were found to be safe and beneficial in this series of patients, but a much larger prospective study with matched normal controls is needed to prove the safety and efficacy of IOLs in leprosy patients.

RESUMEN

Se estudiaron, de manera retrospectiva, las complicaciones preoperatorias, operatorias y postoperatorias en 48 ojos de 39 pacientes con lepra que fueron sometidos a la extracción estándar de cataratas extracapsulares y a la posterior implantación intraocular de lentes por el mismo cirujano. De los pacientes, 17 fueron hombres y 22, mujeres; trece (33%) fueron paucibacilares (PB) y 26 (67%), multibacilares; tres pacientes fueron baciloscopicamente positivos al momento de la cirugía y 64 pacientes mostraron deformidad de grado 2, incluyendo mano en garra, dedos absorbidos, nariz hundida y pie caído. Ninguno de los pacientes había tenido inflamación intraocular previa, aunque uno de ellos había tenido una reacción de tipo 1 y cinco, reacciones de tipo 2. Las complicaciones preoperatorias como opacidades comeales (3 ojos) y lagoftalmos (5 ojos) no estuvieron asociadas con disminución en la visión después de la operación. No se encontraron importantes complicaciones operatorias tales como pérdida del humor vítreo, daño endotelial o desgarramiento del iris, excepto en un ojo que presentó un desgarramiento capsular posterior. Diez y siete (35%) ojos desarrollaron uveitis (≥3+) en el periodo postoperatorio inmediato, misma que se controló tópicamente con esteroides en gotas. Seis meses después de la cirugía, 7 de 47 ojos (15%) desarrollaron opacidades capsulares posteriores. No hubieron diferencias significativas ($p > 0.05$) ni en la agudeza visual ni en las complicaciones oculares, cuando los pacientes MB se compararon con los pacientes PB. En cuanto a complicaciones postoperatorias, los pacientes con baciloscopía positiva no fueron estadísticamente diferentes de los pacientes con baciloscopía negativa. Los resultados visuales en los 23 ojos a los 2 años de seguimiento fueron 6/18 o mayores, excepto en un ojo el cual mostró un daño severo sostenido después de un año de la cirugía. Se encontró que los implantes intraoculares de lentes (IOLs) fueron seguros y benéficos en esta serie de pacientes, pero hace falta un estudio prospectivo más grande, con controles apropiados, para probar la seguridad y eficacia de los IOLs en la lepra.

RÉSUMÉ

Une étude rétrospective des complications ophtalmiques préopératoires, opératoires et postopératoires est présentée, portant sur 48 yeux de 39 patients hanséniens qui furent l'objet d'une extraction standard de cataracte lenticulaire et d'une implantation intraoculaire de prothèse cristallinienne (IPC) dans la chambre postérieure par le même chirurgien. Dix-sept étaient de sexe masculin et 22 de sexe féminin. Treize (33%) étaient des patients paucibacillaires (PB) tandis que 26 (67%) étaient multibacillaires (MB). Trois patients étaient positifs à l'examen bactérioscopique du suc dermique au moment de la chirurgie. Des déformations de grade 2 incluant des mains en griffe, des doigts résorbés, des nez en lorgnette et des pieds tombants étaient présents chez 64% des patients. Aucun des patients n'avaient d'antécédents d'inflammation oculaire active, bien qu'un patient et cinq patients présentaient des commémoratifs de réaction de type 1 et de type 2, respectivement. Des complications préopératoires telles que des opacités cornéennes (3 yeux) et des lagophtalmies (5 yeux) ne furent pas associées avec une vision plus basse en postopératoire. Il n'y eut pas de complications opératoires importantes telles que des pertes de vitré, des atteintes de l'endothélium ou des déchirures de l'iris, à l'exception d'une déchirure de la capsule postérieure. Dix-sept yeux (35%) ont développé une uvéite de grade 3+ ou plus dans l'intervalle postopératoire immédiat, qui a régressé avec des gouttes de corticostéroïdes en application topique de routine. Dans les six mois suivant la chirurgie, 7 des 47 yeux (15%) ont développé des opacités de la capsule postérieures. Il n'y eut pas de différences significatives ($p = >0,05$) entre les résultats d'acuité visuelle des patients PB et ceux des patients MB. Lorsque les complications postopératoires furent comparée entre les patients positifs à l'examen bactérioscopique du suc dermique et les patients négatifs à ce test, aucune différence significative ne fut notée. Les résultats visuels de 23 yeux suivi jusqu'à 2 années après la chirurgie fut de 6/18 ou plus, à l'exception d'un œil victime d'un blessure sévère un an après la chirurgie. En conclusion, les IPCs se sont avérées avoir une bonne inocuité et bénéfiques dans cette série de patients. Cependant, une étude prospective d'une taille beaucoup plus grande avec témoins serait nécessaire pour prouver définitivement l'innocuité et l'efficacité des IPC chez les patients lépreux.

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