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RESEARCH ARTICLE

EVALUATION OF DEMOGRAPHIC PROFILE AND VISUAL OUTCOMES OF CATARACT PATIENTS OPERATED IN A CHARITABLE CAMP HOSPITAL IN CENTRAL INDIA

Dr. Pragya Prakash[1] and Dr. Ashima Monga[2]

1. Assistant Professor, Deptt of Ophthalmology, Sri Aurobindo Medical College and PGI, Indore.
2. Consultant, Thind Eye Hospital, Pathankot, Punjab.

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Abstract

Aim: To Study the Demographic Profile and visual Outcomes of Cataract Patients Operated in a Charitable Camp in Central India Introduction Cataract is a leading cause of preventable blindness globally. Developing countries account for three quarters of cataract blindness worldwide. Despite the large number of corrective surgeries being performed globally cataract blindness is believed to be increasing by1Â– 2 million/year. The present study was conducted in the patients residing in a peripheral rural area of Indore division (central India) to study the demographic and clinical profile of patients with cataract. This study supplements to understand the outcomes of such patients who were operated in camp at a tertiary care center.

Study Design: It is a prospective descriptive study conducted on camp patients at a charitable tertiary eye care hospital (Central India) from December 2019 to February 2020.Wirtten informed consent was taken from patients for participation in this study.

Setting: Department of Ophthalmology Choithram Netralaya, Indore from December 2019 to February 2020.

Material and Methods: During the study period 139 surgeries were performed by the surgeon. All patients above 40 years of age having senile cataract with stable systemic condition were included. Patients with age less than 40 years of age, uncontrolled systemic condition, Patients with other ocular comorbidities, undergone previously any ocular surgery in the selected eye or not giving written informed consent were excluded.All the patients were screened for cataracts in the camps in the periphery by the trained optometrist and referred to the base hospital. Detailed pre-operative ocular examination of all the patients was performed and medical checkup with routine pre-operative profile was also done. Patients medically fit for cataract surgery underwent small incision cataract surgery with Posterior capsular IOL implantation (PCIOL) under local anesthesia. All the cataract surgeries were performed by a single surgeon using the same technique to avoid any bias.

Results: It was observed that the mean age of presentation was 61.5 years with female preponderance of nearly (56.8%) . out of 139 patients 63 patients (45.3,%) had systemic comorbidities, which included ,33 patients (23.74%) with hypertension and 28 patients(20.14%) with

Corresponding Author:- Dr. Pragya Prakash
Address:- Assistant Professor, Deptt of Ophthalmology, Sri Aurobindo Medical College and PGI, Indore.

Diabetes mellitus. Majority of patients i.e.101 (72.66%) patients had onset of ocular symptoms between 3 to 6 months . In this study bilateral immature nuclear cataract was commonly encountered cataract in 88.48% of patients and only 8 patients had mature cataract and 7 patients presented with hyper mature cataract respectively .On post-operative day one, 19 patients and 8 patients had blood clot in anterior hamber,5 patients had cortical matter in Anterior chamber On follow up at one week, majority of patients i.e 110 (79.13%) had visual acuity between 6/9-6/12.Patients after re-surgery had visual acuity of minimum up to 6/24 with possibility of getting better on further visits.

Conclusion: In our study, increasing age and female gender were commonly associated with cataract. Most of the patients had bilateral cataract and low vision at presentation. Hypertension and type 2 diabetes mellitus were commonly associated systemic disorders with cataract.This study highlights that high quality cataract surgery with a low intra-operative complication rate and good visual outcome can be attained even in camp patients operated in the base hospitals with standard protocols.

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Introduction:-

Cataract is a major cause of preventable blindness all over the world. Developing countries account for three quarters of cataract blindness worldwide. Despite the large number of cataract surgeries being performed in the world ,cataract blindness is believed to be increasing by1–2 million/year.[1] Globally there are approximately 45 million blind people with a Best corrected visual acuity less than 3/60 in the better eye,80% of these people live in developing countries, and majority of them are blind as a result of cataract.[1]This carries even more significance in India where people are deprive of health care facilities, resulting to increased burden of cataract related blindness and visual disability . Recently, National Blindness and Visual Impairment Survey has shown that cataract is the major cause of blindness in India, accounting for 66.2% of total causes.[2]

To decrease the burden of the disease,various strategies have been developed for enhancing cataract surgeries in developing countries. A significant progress is being made in increasing the output of cataract surgical services in last decade. The inadequate doctor-patient ratio lead to inaccessibility of medical resources in developing countries. Although most cases of cataract is common in elderly age group, occasionally it may occur in pediatric patients, or may develop secondary to ocular trauma, inflammation, and some other eye diseases. Cataract formation is influenced by many factors such as genetic, environmental, systemic and natural.[3]Lacks of proper diet, diarrhoea, dehydration, prolonged ultraviolet light exposure are some of the factors linked to cataract.[4] For the effective management of cataract, it is important to have a clear picture of clinico-epidemiological and socio-economic factors associated with this disease. A number of studies have been conducted but due to lack paucity of data on this subject from the rural areas of India. The present study was conducted in the patients residing in a peripheral rural area of Indore division (central India) to study the demographic and clinical profile of patients with cataract. This study supplements to understand the outcomes of such patients who were operated in camp at a tertiary care center. The results of this study should help to understand the local issues and challenges faced by such patients and guide us in designing and implementation of strategies to encourage early presentation in rural cataract patients.

Material and Methods:-

It is a prospective descriptive study conducted on camp patients at a charitable tertiary eye care hospital (Central India) from December 2019 to February 2020.Wirtten informed consent was taken from patients for participation in this study.

(a)Inclusion criteria:

1. All patients above 40 years of age having senile cataract
2. Patients with stable systemic condition.

(b)Exclusion Criteria:

1. Patients with age less than 40 years of age
2. Congenital cataract.
3. Uncontrolled systemic condition eg. uncontrolled diabetes, hypertension, cardiac issues
4. Patients with other ocular comorbidities like corneal pathology, retinal pathology, glaucoma.
5. Complicated cataracts like traumatic c, uveitic , subluxated or dislocated cataracts.
6. Patients having undergone previously any ocular surgery in the selected eye.
7. Patients not giving written informed consent.

Patients were screened for cataracts in the camps in the periphery by the trained optometrist and referred to the base hospital. Detailed pre-operative ocular examination of all the patients was performed by slit lamp microscopy. Best corrected visual acuity, lacrimal sac syringing, type and grade of cataract according to LOC II grading, anterior and posterior segment evaluation was performed. Intra ocular pressure (IOP) measurement by non-contact tonometer was done. B scan in cases with hazy media, keratometry readings using a hand held keratometer, axial length assessment and intraocular lens power were calculated by using the Sanders-Retzlaff-Kraff (SRK II)formula in all eyes prior to cataract surgery.8

For each patient medical checkup routine pre-operative profile was done. Patients medically fit for cataract surgery underwent small incision cataract surgery with Posterior capsular IOL implantation (PCIOL) under local anesthesia. All the cataract surgeries were performed by a single surgeon using the same technique to avoid any bias.

Manual SICS was performed with a 6–6.5 mm scleral incision made 2.5 mm behind the anterior limbus. A partial thickness scleral tunnel was dissected into the cornea with a crescent knife. A side port paracentesis was made to facilitate intraocular manipulation. The anterior chamber was entered with a 3.2 mm keratome and the internal lip of the incision was further extended. The anterior chamber was filled with viscoelastic before making a 6–6.5 mm capsulorhexis, continuous curvilinear capsulorhexis (CCC) was performed. Hydrodissection and delineation of nucleus was performed to hydroprolapse the endonucleus into the anterior chamber. In cases of canopener capsulotomy, or where hydroprolapse is incomplete, a Sinsky hook was used to spin the nucleus into the anterior chamber.The nucleus was hydro-extracted with an irrigating vectis. The epinucleus and residual cortex were aspirated with a Simcoe canula and a 6 mm optic PMMA IOL was implanted.

Contraindications to manual SICS include zonular weakness as a result of pseudoexfoliation, decompensated cornea, and hard nuclear cataract (.grade IV) Protocols for the management of intraoperative complications were as follows. Patients with posterior capsule rupture or zonular dialysis without vitreous loss underwent IOLimplantation in the ciliary sulcus. In patients with vitreous loss, anterior vitrectomy was done manually then the IOL was sulcus fixed. If stable IOL fixation could not be obtained, the patient was left aphakic.

The preoperative, intraoperative, and postoperative findings and complications were recorded on a programmed case sheet. On the first postoperative day, patients were examined by the operating surgeon according to OCTE (Oxford Cataract Treatment and Evaluation) grading. Patients were discharged with topical steroid prednisolone 1% and antibiotic Moxifloxacin (0.5%) combination for 8 times a day for one week. Topical steroids were tapered over next six weeks. Patients were followed up regularly at weekly interval up to one month .On every follow-up recording of Best or corrected visual acuity, full list lamp examination and IOP as recorded. Patients were prescribed glasses after one month of surgery.Levels of visual acuity after cataract surgery were categorised using the WHO guidelines—that is, good outcome was defined as 6/6–6/18, borderline outcome as 6/24–6/60, and poor outcome as ,6/60.

Results and Analysis:-

During the study period 139 surgeries were performed by the surgeon. The results obtained result are compiled as under.

1. Age distribution:

The patients ranged from 41 years to 82 years with a mean of 61.5 years. The patients were divided into four categories of 41-50 ,51-60 , 61-70 and above 70 years with each group constituted by 18,53,54 and 14 patients respectively .Thus nearly 77 % patients belonged to 51-70 year age group.

2. Gender distribution:
Of the total 139 patients 60 patients (43.1%) were males and 79 patients (56.8%) were females the M: F ratio was 0.76:1 showing a female preponderance in our population.

3. Systemic Co-morbidities:
63 patients (45.3,%) had systemic comorbidities, which included ,33 patients (23.74%) with hypertension and 28 patients(20.14%) with Diabetes mellitus. One patient (0.7%) suffered from asthma and another had history of cardiac surgery.

4. Duration of symptoms:
Majority of patients i.e.101 (72.66%) patients had onset of symptoms between 3 to 6 months while patients with onset of symptoms for less than 1 month were only 20.

5. Type of cataract:
Immature cataract was observed in 123 patients (88.48%) which was further classified into nuclear sclerosis and cortical cataract in 71 and 52 patients respectively. Only 8 patients had mature cataract and 7 patients presented with hyper mature cataract.

6. Laterality of the Disease
116 patients (83.45%) presented with cataract in both eyes followed by one eye pseudophakia in 20 patients and one eye clear lens in only 3 patients.

The involvement of eyes and severity of disease can be better understood by table no 1.

Table 1:- Table showing involvement of eyes and severity of disease.

Duration of symptoms	Severity of the disease/ Diagnosis	Number of patients	Laterality
<1month	• Pseudophakia in one eye • Immature senile cataract in other eye	20	Unilateral (one eye)
1to3 months	Clear lens in one eye • Immature senile cataract in other eye.	3	Unilateral (one eye)
3to6 months	• Immature senile cataract	101	Bilateral (both eyes)
6to9 months	• Mature or Near mature cataract	8	Bilateral (both eyes)
> 9months	• Hypermature cataract • Brown cataract • Absolute eye	7	Bilateral (both eyes)

7. Pre-operative visual acuity:
Pre operatively best corrected visual acuity (VA) was recorded 49 patients (35.25%) had VA in the range 5/60-1/60. Another 41 patients (29.49%) presented with the range 6/36-6/60. 29 (20.86%) patients had VA of more than 6/24 and 20 patients (14.38%) had VA of less than 1/60.

8. IOP distribution :
Maximum patients i.e. 92, had the IOP of range 10-15 mam Hg. 37 patients presented with IOP in the range of 16-20 mm of Hg while 8 patients had IOP of less than 10 mm of Hg. Only 2 patients had IOP above 21 mm Hg.

9. Post-operative assessment:
On post-operative day one, 91 patients had clear cornea while mild iritis was observed in 19 patients and 8 patients had blood clot in anterior chamber. Seven patients had to undergo redo surgery as described in table 2.

Table 2:- Table reflecting post operative findings (Immediate).

Immediate Post Operative (Day 1)	NO. OF PATIENTS
Normal with clear cornea	91
Mild iridocyclitis	19
Blood Clot/ Hyphema in A.C	8

A.C reaction/Fibrinous membrane	5
Reversible Microepithelial edema	5
Cortical matter in A.C	5
Vitreous in A.C	1
Mild Sks	4
Optic capture	1

10. Follow up:

On follow up at one week, majority of patients i.e 110 (79.13%) had visual acuity between 6/9-6/12.Patients after re-surgery had visual acuity of minimum up to 6/24 with possibility of getting better on further visits. The detailed results at one week follow up are described in table 3

Table 3:- Table reflecting post operative findings (After 1 week).

One week post operative follow up	**Visual acuity**	**No. of patients**
Uneventful immediate post-op	6/9to6/12	110
Microepitheialedema	6/18	3
	6/24	2
Blood clot / Hyphema in A.C	6/12	4
	6/18	3
	6/24	1
A.C reaction/fibrinous Membrane	C.F	1
	C.D	1
	6/60	1
	6/36	2
Mild Sks	6/9	4
Re surgery pt:		
Cortical matter in A.C.(AfterCortical wash)	6/9	1
	6/12-6/18	4
Vitreous strand in A.C(After ant.Vit)	6/24	1
Optic capture (after IOL redialing)	6/6	1

On further follow up at one month VA further improved drastically as shown in Table 4 with distinct improvement in vision and quality of life. Majority of patients had satisfactory recovery at one month and only one patient had VA <6/60.

Table 4:- Table showing recovery of visual acuity at 1 month Post Op.

No. of patients	Visual acuity
6/6	32
6/9	37
6/12	36
6/18	15
6/24	13
6/36	3
6/60	2
4/60	1

Discussion:-

The success rate, of cataract surgeries were defined as the percentage of operations that result in restoration of sight in the operated eye in a particular year.[5]

It is important to monitor the results of changes in surgical technique and the management of postoperative complications adequately, to bring about a marked improvement in the quality of visual outcome following a cataract surgery.

In our research maximum prevalence of cataract was seen in age groups of 51-60 years (38%) and 61-70 years

(38.4%). Shori et al. also found maximum prevalence of cataract in the age group of 51-60 years (37%) followed by 61-70 year (30%) , similar to our study .[6] In yet another study by Mahajan et al maximum prevalence of cataract was seen in the age group of 51-60 years and 61-70 years (34.4%).[4] This is consistent with the fact that senile cataracts become symptomatic at these ages. Early changes of cataract are seldom noted by patients especially in rural areas like in our study.

A female preponderance is observed in our study with 56.8% patients being female .This finding corroborated to couple of other studies conducted by Shori et al and Mahajan et al where 59% and 51% patients were females respectively.[4-6]Vashist et al. also observed that prevalence of cataract was more common in females.[7]This is a promising trend as it shows the awareness amongst families and society about vision of elderly females.This can be attributed to efforts of charitable organizations by doing outreach programs and free surgeries.

In our study, bilateral involvement was noticed in majority of the patients (72.6%) similar to Mahajan et al where both eyes were involved in majority of the patients (63.12%).[4] In another study by Avachat et al 52.5% patients had bilateral cataract .[8]This can be explained by the fact that senile cataract is a physiological process .cataract due to trauma or any other insult of eye can lead to unilateral cataract.

In our study, maximum patients i.e.[10] patients had bilateral immature cataract showing growing awareness amongst masses or early checkup and management of cataract. The older concepts of waiting for a cataract to be fully advanced before getting operated are being busted by general awareness programs and ophthalmologists.

Mahajan et al reported that Nuclear cataract was more common (53.13%) than cortical cataract (46.87%) in their study. [4] Shori et al found that cortical cataract was more prevalent (86%) than nuclear cataract,which is opposite to our study.[6]Vashist et al. noted that nuclear cataract was most common type of cataract in North India (48%) and South India (38%). [7] Nirmalan et al. found that nuclear cataract was more common as compared to cortical cataract. [9] Xu et al. in their study in Chinese population found that prevalence of nuclear cataract was 82%, which is much higher than our study and prevalence of cortical cataract was around 10.3%.[10] Murthy et al. found that nuclear cataract was the more common (56.9%) as compared to cortical cataract (21.6%). 20.6% patients had sub-capsular opacity in their study.[11] These findings correlate with our study where nuclear cataract was more common (51.13%) than cortical cataract (45.32%) . This can be explained by the fact that nuclear sclerosis causes more visual impairment than cortical cataract hence presents early.

Mahajan et al reported Sixty percent patients had IOP between 10-15 mm of Hg in contrast to our study where 66.19.3% patients had IOP between 10-15 mm of Hg.[4] In our study the population followed a gasserian curve with skew towards higher IOP in range of 10-21 mm Hg.

In patients included in our study 45.3%patients had systemic illnesses. Hypertension being most common (23.3%) followed by diabetes mellitus. These findings corroborated with Mahajan et al.[4]These systemic conditions are very often observed in patients of cataract in our population. Presence of Diabetes mellitus and hypertension also contribute in development of cataract. We can label these as risk factors for cataract development just as Tsai et al. concluded in their study that Cigarette smoking, higher systolic blood pressure and history of diabetes were the most significant risk factor for cataracts.[12]

Majority of our patients (35.25%) had complaints of gradual painless progressive diminution of vision since 6 months had visual acuity between 5/60 - 1/60. It signifies the fact that patients in rural areas due to their life style don't realize a diminution of vision until it reaches a significant level. Urban lifestyle and demands makes patients aware of diminution of vision earlier. Other reason for this can also be attributed to yearly camp structure by various charitable organizations. Many patients refrain from getting an early consultation and wait for camp to take place.

The older concepts of getting operated in winter season is also a contributing factor for this 6 month time of complaints. This can be attributed to myths of wound infection in summer and rainy season resulting in patients delaying treatment and waiting till winter season.

All these factors combined make this camp system a double edged sword in our fight against cataract blindness. Where urban population gets operated early on seeing a slight blurring of vision and patients in rural areas wait for

free surgeries sit and home and let their cataracts progress to advance stage increasing the possibilities of intraoperative complications and guarded visual prognosis.

The first post-operative day complications showed that a major percentage (13.6%, 19 eyes) suffered from mild iridocyclitis followed by transient corneal edema (3.8%, 5 eyes), and striate keratopathy (2.9%, 4eyes). The complications based on OCTET definitions showed that 28 eyes (19.4%) had Grade I, 13 eyes (9.3%) had Grade II and15 eyes (10.7%) had Grade III complications. It was alsoobserved that the mature and hyper-mature cataract eyes had grade 3 complications in immediate post-operative period.

As aforementioned presence of mature and hypermature cataracts increase the risk of intraoperative complications leading to a graver visual prognosis in such patients. The levels of visual acuity 4 weeks (1 month) after cataract surgery were categorized using the WHO guidelines of good outcome being 6/6 to 6/24, borderline outcome as 6/24 to 6/60 and poor outcome as <6/60 . In our study, the majority (86.3%) had a good outcome, (12.9%) had borderline and only 1 case had poor outcome, which indicates that the visual outcome was par excellence in majority of the patients.

This implies that proper pre-operative evaluation. methodical approach and a skilled surgeon can yield excellent outcomes even in high volume camp settings. Ability to manage complications and proper post-operative care is also an essential component of cataract surgery. It is evident from various studies from the sub continenet that properly managed surgeries provides a very satisfactory result to the patient even in camp settings with high patient volume and influx**.** [13-15]

This is dependent on the choice of surgical technique, standardised protocols, standardised training of surgeons and paramedical personnel, and an overall organisational structure that supports high volume patient flow. Therefore young ophthalmologists working at charitable institutions should hone their skills and learn to manage such patients and their surgical complications

Conclusion:-

In our study, increasing age and female gender were commonly associated with cataract. Most of the patients had bilateral cataract and low vision at presentation. Hypertension and type 2 diabetes mellitus were commonly associated systemic disorders with cataract.

This study indicated that high quality cataract surgery with a low intra-operative complication rate and good visual outcome can be attained even in camp patients operated in the base hospitals. Standard protocols, good surgical technique, trained surgeons and paramedical personnel and good organizational setup can better the visual outcome even in high volume camp patients. the burden of cataract blindness can be decreased by conducting cataract screening camps and giving patients a quality surgical care at a base hospital. In a large country like India it is equally important to consider local and demographic factors while planning for such camps as they play crucial role in increasing patient pool and optimizing the outcomes.

In developing countries where a large population still does not have access to state of art facilities such camps are of paramount importance in providing to high quality ophthalmological care to the deprived population on large scale in their own region.

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Conflicts of Interest:
Nil.

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