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Blurred vision post multifocal IOL implantation

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Aim:

- **To find out the causes and possible treatment options for patients suffering from blurred vision following multifocal IOL implantation.**

Patients and methods:

- **A retrospective case series study. All patients implanted with a multifocal lens during cataract surgery and complaining of blurred vision any time after this surgery were included.**
- **I recorded the patient's age, gender, duration of time between IOL implantation and presentation, pre and post-operative refraction, type of blurred vision, pupil diameter and corneal topography plus slit lamp biomicroscopy and fundus examination.**

Introduction

- Enabling good visual acuity at more than one distance was the main reason to develop multifocal IOLs. However, the potential unwanted effects occurring in some patients should be weighed against the potential benefits for each individual case.

- Compromising some of the visual functions such as contrast sensitivity, intermediate visual acuity, positive dysphotopsia (glare and halos), and negative dysphotopsia (a dark crescent in the temporal field of vision) are considered as weaknesses of these lenses.

- Despite the fact that most patients are satisfied after multifocal IOL implantation, some patients will be dissatisfied, even to the point that this lens must be explanted.

Table (1): demographic data at presentation.

Mean age (y)	**62.3 (+_ 10.3)**	
Mean refraction (D)		
Sphere	**-1.18+_3.52**	
Cylinder	**-1.07+_0.75**	
SE	**-1.62+_3.90**	
Time from surgery to presentation(mean/D)		**128+_192**
Eyes No. according to Gender (%)		
Male	**30 (46.9)**	
Female	**34 (53.1)**	
Total No. of eyes	**64**	

Table (2): presenting symptoms.

symptom	Eyes, n(%)
1. *Blurred vision*	
Distance only	23 (35.9%)
Near only	11 (17.2%)
Distance and Near	25(39%)
2. *Photic phenomenoa*	26 (40%)
3. *Blurred vision and Photic phenomnena*	20 (31.2%)

Table (3): Prevalence of clinical findings in patients and main etiology of complaints (N= 64).

Clinical Finding/ Etiology	Eyes, n(%)
Ametropia/ astigmatism	43 (67.1%)
Wavefront anomalies	8 (12.5%)
Large pupil size	10 (15.6%)
Decentration of IOL	6 (9.3%)
Posterior caps opacification	11 (17.1%)
Dry eye	3 (4.6%)

Table (3): Prevalence of clinical findings in patients and main etiology of complaints (N= 64).

Other findings	22(34.3%)
Vitreous floaters	4 (6.25%)
Diminished mesopic con. Sens.	3 (4.6%)
Epithelial corn. Dyst.	3 (4.6%)
Irregular corneal astig.	2 (3.1%)
Too small capsulorhexis	2 (3.1%)
Fuchs endoth. Dyst.	2 (3.1%)
Diabetic macular edema	2 (3.1%)
Negative dysphotopsia	2 (3.1%)
Wrong IOL implanted	1 (1.5%)
Epiretinal membrane	1 (1.5%)
unexplained	2 (3.1%)
Single factor	39 (60.9%)
Multiple factors	28 (43.7%)

Table (4): symptoms reported by patients and perceived etiology of complaints.

Complaint, Number of Eyes (%)			
Clinical finding	**Blurred vision (n= 59)**	**Photic (n= 26)**	**Blurred+photic (n= 20)**
Ametropia/ astigmatism	**43 (72.8%)**	**8 (30.7%)**	**6 (3%)**
Wavefront anomalies	**8 (13.5%)**	**5 (19.2%)**	**5 (2.5%)**
Large pupil size	**10 (17%)**	**6 (23%)**	**6 (3%)**
IOL decentration	**6 (10.16%)**	**4 (15.3%)**	**4 (2%)**
post. Caps. opacification	**11 (18.6%)**	**2 (7.6%)**	**2 (1%)**
Dry eye	**3 (5.0%)**	**0**	**0**
Other causes	**22 (37.2%)**	**11 (42.3%)**	**8 (4%)**
unexplained	**2 (3.38%)**	**2 (7.6%)**	**2 (1%)**

Treatment of complaints (No.= 64 eyes)

Treatment	Eyes, No. (%)
PRK	31 (48.4)
Spectacles	12 (18.7)
ND: TAG capsulotomy	9 (14)
Artificial tears, punctum plugs	4 (6.2)
Brimonidine	10 (15.6)
Other	6 (9.3)
Reoperation	6 (9.3)
Capsulorhexis enlargement	1 (1.5)
IOL repositioned	1 (1,5)
IOL exchanged	4 (6.2)
None	10 (15.6)
Single modality	42 (65.6)
Multiple modalities	22 (34.3)

Treatment and Results:

- 64 (84.2%) of all study eyes were amenable to therapy ; 22 eyes (28.9%) were treated with a combination of 2 or more modalities.
- Ametropia and astigmatism were treated with spectacles or refractive surgery in cases in which subjective refraction using trial frames increased distance visual acuity. The most frequent treatment was PRK. In eyes having PRK, the mean sphere was +_ 0.53 D; the mean cylinder, -1.28 +_ 0.76D; and the mean SE, -0.25 +_ 0.76 D.
- The uncorrected near visual acuity (UNVA) before PRK was reported in 28 eyes; it was Jaeger (J) 1 in 10 eyes (35.7) and J3 or better in 24 eyes (85.7%). After PRK, it was J1 in 16 eyes (57.1%) and J3 or better in 27 eyes (96.4%). In eyes that received spectacles for treatment, the mean sphere was -0.66 +_ 0.42 D; the mean cylinder, -0.86 +_ 0.76 D; and the mean SE , 0.23 +_ 0.37 D. The mean UDVA was 0.24 +_ 0.15 log MAR and the mean CDVA was 0.02 +_ 0.06 log MAR ; 80% of patients were able to read J3 or better.

Treatment and Results:

- Eyes with large pupils were treated with brimonidine 0.2% . In these eyes, the mean sotopic , mesopic low , and mesopic-high pupil diameters were 5.83 +_ 0.92 mm, 5.07 +_0.64 mm , and 4.09 +_ 0.34 mm, respectively.
- The treatment resulted in subjective improvement in photic complaints in 9 eyes (81.8%).
- Difficulties with reading, specifically under mesopic conditions, were treated with a combination of treatment modalities in 3 of 4 patients with this complaint. In 1 patient, reading spectacles combined with brimonidine drops were presceibed for both eyes, resulting in an increase in reading ability (J3 binocular UNVA, J1 binocular corrected near visual acuity [CNVA] .
- Another patient (1 eye) had unsatisfactory results after brimonidine treatment and had coexiting photic complaints; the multifocal IOL was exchanged for monofocal IOL.
- A third patient was treated for coexisting ametropia with PRK, resulting in monocular UNVA of J1 bilaterally.
- Another patient (1 eye) reported difficulties reading under mesopic circumstances; reading spectacles were presccribed and a neodymium:YAG (Nd:YAG) capsulotomy was performed, resulting in a CNVA of J5.

Results:

- Sixty-four eyes of 42 patients were included in this study all complaining of blurred vision following cataract surgery plus multifocal IOL implantation.
- Photic phenomena was reported in 28 eyes(43.75%). The most prominent causes were residual refractive errors, posterior capsular opacification and large pupil diameter.
- Fifty five eyes (85.9%) responded to glasses, Nd-YAG laser posterior capsulotomy or refractive surgery.
- Unfortunately, 4 patients (6.25%) in this study required IOL exchange.

Discussion:

- **The current study evaluated the presenting symptoms, etiology of complaints, and treatment of those complaints in patients who were dissatisfied after multifocal IOL implantation.**
- **This agrees with a previous observation by Galor et al. that subjective complaints often do not mirror the measured visual acuity; the authors also stressed the importance of contrast sensitivity function, wavefront disturbances, and visual function under mesopic conditions in the subjective rating of quality of vision. In a study by woodward et al.27 of 43 eyes of 32 patients dissatisfied after multifocal IOL implantation, blurred vision was erported in 95.4% of eyes, similar to the percentage in our study. In that study, however, the blurred vision was more often caused by posterior capsule opacification (PCO) than by ametropia and astigmatism, although astigmatism was also an important cause of blurred vision.**
- **This is reflected by the higher percentage of eyes treated with Nd:YAG capsulotomy (34.9%of all eyes) and the lower percentage of eyes treated with refractive surgery (16.3% of all eyes) or spectacles (16.3%of all eyes) in the study by woodward et al. than in the current study.**

Discussion:

- **No statistically significant differences were found in aberrometry value between patients with IOL decentration and those without IOL decentration. The lack of accuracy of wavefront aberrometry in eyes with multifocal IOLs, The value of wavefront aberrometry in eyes with a diffractive or refractive multifocal IOL is therefore controversial because the wavefront of the IOL is the result of 2 distinct superimposed wavefronts.**

Conclusion:

- **Despite extensive positive experiences with multifocal IOLs, some patients are dissatisfied postoperatively. Presenting symptoms can be classified as complaints about visual acuity, complaints associated with photic phenomena, or a combination.**
- **There are many causes of these complaints, including residual ametropia, PCO, pupil size, and coexisting ocular pathology. However, most causes of dissatisfaction can be treated successfully and explantation of multifocal IOL appears to be rare.**

THANK YOU