



Functional Results in Refractive Clear Lens Extraction with Implantation of Multifocal Restor +3D Intraocular Lens at Hyperopic and Presbyopic Patients

KEYWORDS

visual acuity, multifocal intraocular lens, hyperopia, presbyopia

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ABSTRACT *Purpose: The authors present the biometrical and functional results of a retrospective study in which they evaluate the patients with hyperopia and presbyopia who were operated by clear lens extraction with implantation of multifocal ReSTOR +3D intraocular lens.*

Material and method: We studied a group of 21 eyes from 11 patients with age between 40 and 70 years, who were operated for hyperopia and presbyopia by phacoemulsification with multifocal posterior chamber ReSTOR +3D intraocular lens. Before the surgery we performed the ocular biometry, the ultrasound and optic technique. The refractive target was 0,00+0,5 D.

Results: At 1 year after the operation, the refractive target was obtained in 38,1% of cases. At 6 weeks after the operation, the distance visual acuity without correction was 0,0 logMar scale in 66,67% of cases and the visual acuity with correction was 85,72%. Visual acuity at near without correction was 0,0 logMar scale in 71,43% and with correction in 90,48% of cases. The intermediate visual acuity without correction was 0,0 logMar scale in 66,67% and with correction 90,48% of cases. At one year after the surgery, distance visual acuity without correction was 0,0 logMar scale in 66,67% of cases and with correction in 80,95% of cases. Near visual acuity without correction was maximal in 76,19% of cases and with correction in 85,72% of cases. Intermediate visual acuity without correction was 0,0 logMar scale in 71,43% and with correction it was maximal in 85,72%.

Conclusion: Refractive clear lens extraction with multifocal intraocular lens ReSTOR +3D implantation gives very good functional results at distance, intermediate and near. It represents a therapeutical approach at patients older than 40 years old with hyperopia and presbyopia.

Introduction

Lately, in the refractive clear lens extraction surgery were achieved high performances regarding the surgical technique devices, types of artificial intraocular lenses and the patient expectations highlighted. An optimal functional result after the surgery for distance induced the frequent utilization of multifocal intraocular lenses. The ocular biometry performed before the surgery play a major role in the refractive postoperative result.

Purpose: The authors present the biometrical and functional results of a retrospective study in which they evaluate the patients with hyperopia and presbyopia who were operated by clear lens extraction with implantation of multifocal ReSTOR +3D intraocular lens.

Material and Method

We performed a retrospective study on a group of 21 eyes from 11 patients who were operated for hyperopia and presbyopia by refractive clear lens extraction(phacoemulsification) with multifocal ReSTOR +3D intraocular lens (IOL) implantation.

Inclusion criteria were:

- Age between 40-70 years,. both genders

- Hyperopia and presbyopia patients
- Patients with realistic expectations regarding the postoperative visual acuity
- Preoperative astigmatism <1 D.

Exclusion criteria were:

- Patients with unrealistic expectations
- Preoperative astigmatism higher than 1 D
- Pathology of the retina and optic nerve (age related macular degeneration, diabetic retinopathy, vitreous haemorrhage)
- Corneal ectasy

The preoperative evaluation included: examination of visual acuity(VA) with and without correction, ocular refraction (with cycloplegia), keratometry, intraocular pressure, slit lamp examination, examination of the fundus, corneal topography (Pentacam), endothelial cell count.

Ocular biometry was performed with the contact and immersion technique with ultrasound device. We also performed the optical biometry with IOL Master. The formulas used in the calculation of IOL were correlated with antero-posterior length of the eye ball (AXL):

- Hoffer Q for AXL<22 mm
- Hoffer Q, Holladay, SRKT for AXL between 22-24 mm
- SRKT for AXL>24 mm

The biometry was bilateral performed and the postoperative target was situated between 0.00→+0,5 D sf. The patient consent was asked before the surgical act.

The chosen surgical technique was phacoemulsification with multifocal ReSTOR +3D IOL implantation. Preoperative , midriasis was performed by instillation of Mydrim and Neosinefrin 10%, which was maintained by adding a local non-steroid antiinflammatory.

The follow-up of the patient was performed at 24 hours after surgery, at 6 weeks and 1 year after the surgery. The treatment after the surgery was local with steroids and antibiotic drops, for 6 weeks. At the follow-up visits was tested the VA with and without correction at distance, near and intermediate, intraocular pressure, slit lamp examination and refraction.

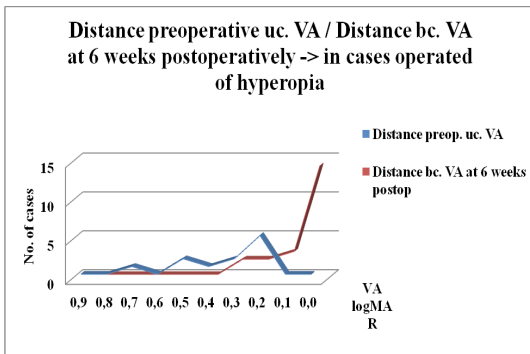
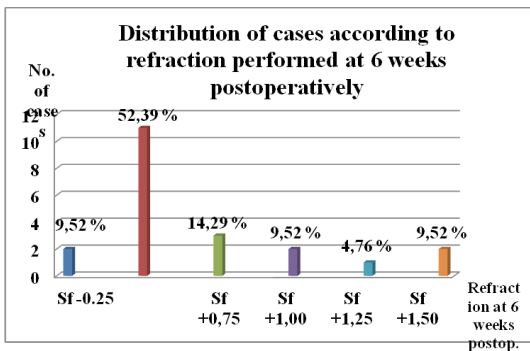
Results

Regarding the gender, we established that the female gender was a little bit higher (57,1%) comparative with the male gender(42,9%). Regarding the age, it was a small difference in group 40-50 years(52,4%) comparing with the group of 50-60 years(47,6%).

According with the refraction performed at 6 weeks after the surgery, in 52,39% of cases we obtained the established refractive target (fig. 1a).

At 1 year after the surgery, 38,1% of cases had the refractive target(fig.1b).

Figure 1a. Case repartition regarding the ocular refraction at 6 weeks after the surgery; 1b. Case repartition regarding the ocular refraction at 1 year after the surgery



Distance functional results without correction at 6 weeks after the operation showed in 66,67% of cases a VA of 0,0 logMar scale. Near VA without correction at 6 weeks after the operation showed maximal VA in 71,43% of cases.

Intermediate VA without correction at 6 weeks after the surgery was 0,0 logMar in 66,67% of cases.

At 6 weeks after the surgery we obtained in 85,72% of cases we obtained a distance VA with correction of 0,0 logMar scale while in 9,52% of cases we needed an optical correction in order to obtain a VA of 0,1 logMar respectively 4,76% of cases for a VA of 0,2 logMar.

At 6 weeks after the surgery, in 90,48% of cases we had a 0,0 logMar near VA with correction, while in 4,76% of cases we needed an optical correction for a VA of 0,1 logMar, respectively in 4,76% of cases for a visual acuity of 0,2 logMar.

At 6 weeks after the surgery, in 90,48% of cases we had a 0,0 logMar intermediate VA with correction, , while in 4,76% of cases we needed an optical correction for a VA of 0,1 logMar, respectively in 4,76% of cases for a visual acuity of 0,2 logMar.

At 1 year after the surgery, in 66,67% of cases we had a 0,0 logMar distance VA without correction, , while in 23,81% of cases had a VA of 0,1 logMar, respectively in 4,76% of cases had a visual acuity of 0,2 logMar, and the same percentage had a VA of 0,3 logMar.

At 1 year after the surgery, in 76,19% of cases we had a 0,0 logMar near VA without correction, while in 14,29% of cases had a VA of 0,1 logMar, respectively in 4,76% of cases had a visual acuity of 0,2 logMar, and the same percentage had a VA of 0,3 logMar. At 1 year after the surgery, in 71,43% of cases we had a 0,0 logMar intermediate VA without correction, , while in 19,05% of cases had a VA of 0,1 logMar, respectively in 4,76% of cases had a visual acuity of 0,2 logMar, and the same percentage had a VA of 0,3 logMar.

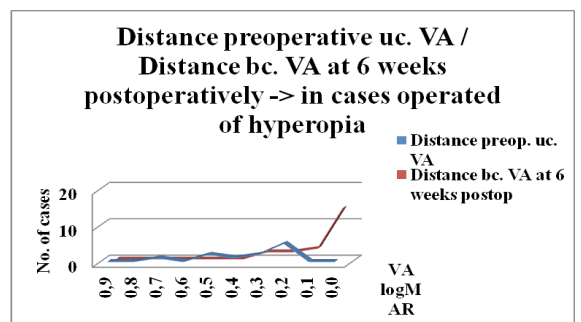
At 1 year after the surgery, in 80,95% of cases we had a 0,0 logMar distance VA with correction, while in 14,29% of cases had a VA of 0,1 logMar, respectively in 4,76% of cases had a visual acuity of 0,2 logMar.

At 1 year after the surgery, in 85,72% of cases we had a 0,0 logMar near VA with correction, , while in 9,52% of cases had a VA of 0,1 logMar, respectively in 4,76% of cases had a visual acuity of 0,2 logMar.

At 1 year after the surgery, in 85,72% of cases we had a 0,0 logMar intermediate VA with correction, , while in 9,52% of cases had a VA of 0,1 logMar, respectively in 4,76% of cases had a visual acuity of 0,2 logMar.

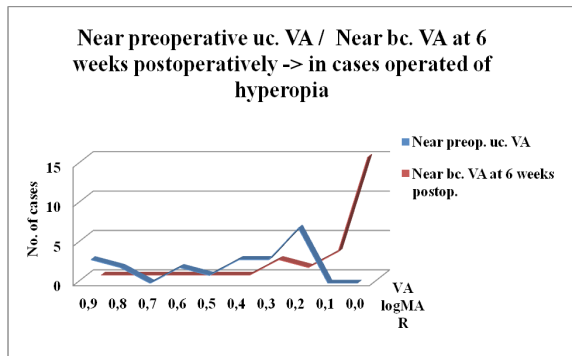
Comparing the distance VA without correction at 6 weeks after de surgery with the VA before surgery, we noticed that postoperatively all the cases were in the interval [0,3;0,0] logMar(66,67% of cases with 0,0 VA). Before the surgery the majority of cases were included in the interval [0,7;0,2] logMar with statistically significant value of P(P=0,0000144) (fig. 2)

Figure 2. Comparison between the distance VA without correction at 6 weeks after the surgery with distance VA without correction before the surgery.



Regarding the near VA without correction also discovered that at 6 weeks after the surgery it was statistically significant improvement comparing with the near VA without correction before the surgery. At 6 weeks after the surgery in 71,43% din cazuri had a near VA of 0,0 logMar, 14,29% had a VA of 0,1 logMar, while before the surgery, none of the patients had a VA of 0,0 or 0,1 logMar. (P= 0,000008427) (fig. 3)

Figure 3. Comparison between the near VA without correction at 6 weeks after the surgery with near VA without correction before the surgery.



Discussions

The multifocal intraocular lens Acrysof ReSTOR +3D (SN60D3) was first introduced in 2008 and offers a better intermediate VA in comparison with the multifocal intraocular lens Acrysof ReSTOR +4D[1].

In our study we obtained in 66,67% of cases a distance visual acuity without correction of 0,0 logMar at 6 weeks after the surgery. De Vries and colab. (2008) obtained a complete independence of glasses in 83,5% of cases. Similar results were reported by Chiam and colab. (2006) who had visual acuity without correction at distance of 20/30 in 93,8 % of cases. The same author compared the distance visual acuity in cases of multifocal lenses with visual acuity in cases of monofocal intraocular lenses and he had a visual acuity of 20/20 in 57,5% of cases. Bi Y and colab. (2008) on a group of study of 36 eyes operated with multifocal ReSTOR +3D obtained a visual acuity higher than 0,5 in 92.5% of cases. Fernandez Vega (2009) revealed on his cases, a distance visual acuity of 20/25 at 100% of his patients.

In the case of distance visual acuity without correction at 1 year after the surgery we obtained in 66,67% of cases maximal visual acuity (0.0 logMar) and in 23,81% of cases a VA equal with 0,1 logMar. In 80,95% of cases we had a maximal visual acuity with correction and in 14,29% of cases we had a visual acuity of 0,1 logMar. Similar results were announced also by the recent studies of Barisic and colab. (2008) and Goes and colab. (2008).

In 71,43% of cases we obtained maximal near visual acuity without correction at 6 weeks after the surgery. Bi Y and colab. (2008) obtained only in 33% of cases a near visual acuity

without correction higher than 0,5 logMar. Our results are almost the similar with those reported by Dick and colab. (2002) who obtained in 94% of cases a near visual acuity without correction equal or higher than 20/40. In 90,48% of cases we obtained a near visual acuity at 6 weeks postoperatively equal of 0,0 logMar. Our results are similar with those reported by Dick and colab. (2002) who obtained in 94% of cases near visual acuity with correction of J4 so their patients were completely content. Alfonso and colab. (2009) declared near visual acuity with correction of 0,02+/- 0,04 logMar at patients with small hyperopias and 0,05 +/- 0,06 logMar at patients with high hyperopias.

On our cases we obtained a near visual acuity with correction at 1 year after the surgery of 0,0 logMar in 85,72% of cases. Blaylock and colab. (2006) obtained a near visual acuity with correction equal with 20/23 in 97.3% of cases, the most frequent addition for optimal correction being -0,26+/- 0,24 D.

We obtained an intermediate visual acuity of 0,0 logMar without correction at 6 weeks after the surgery in 66,67% of cases, while in 90,48% of cases the intermediate visual acuity with correction was 0,0 logMar. De Vries and colab. (2008) obtained a significant statistically better intermediate visual acuity at patients operated with Acrysof ReSTOR +3D compared with those operated with Acrysof ReSTOR +4D., without any compromising of near and distance visual acuity. Blaylock and colab. (2006) noticed on their personal cases the presence of haze at intermediate distance, but in 75% of cases the patient didn't complained of any difficulties to read at intermediate distance. The most frequent addition for the intermediate visual acuity was +1,2 D +/- 0,27 D.

At 1 year after the surgery the intermediate visual acuity without correction was 0,0 logMar in 71,43% of cases and the one with correction was 0,0 logMar in 85,72%. Our results are consistent with those offered by the studies of Goes (2008) and Cillino et al. (2008) who obtained high values of intermediate visual acuity at patients with ReSTOR and Technics intraocular lens.

Comparing the distance and near visual acuity without correction after the surgery with a visual acuity before the surgery we noticed a statistically significant improvement (P= 0,0000144 and respectively P=0,000008427), so a maximum satisfaction of our patients.

Until this moment, we don't have a perfect solution for hyperopic and presbyopic patients, but refractive clear lens extraction with implantation of multifocal intraocular lens ReSTOR+3D can offer good functional results in selected cases. Our study revealed that this type of surgery reduces the dependence regarding the glasses and gives a maximum satisfaction and an intermediate visual acuity better than ReSTOR+4D.

Conclusion

Refractive clear lens extraction with implantation of multifocal intraocular lens ReSTOR+3D offers good functional results at distance, intermediate and near, representing a therapeutic alternative at hyperopic patients older than 40 years.

REFERENCE

- Alfonso JF, Fernandez-Vega L. (2009). Refractive and visual results after implantation of the Acrysof Restor IOL in high and low hyperopic eyes. Eur J Ophthalmol, 19(5), 748-53. | Ante Barisic. (2008). Comparison of Diffractive and Refractive Multifocal Intraocular Lenses in Presbyopia Treatment. Coll Antropol, 32 Suppl 2, 27-31. | Bi H. (2008). Early clinical evaluation of Acrysof Restor multifocal lens for treatment of cataract. Ophthalmologica, 222(1), 11-6. | Blaylock JF. (2006). Visual and refractive status at different focal distances after implantation of the Restor multifocal intraocular lens. J Refract Surg, [serial online], Pubmed. | Chiam PJ. (2006). Restor intraocular lens implantation in cataract surgery: quality of vision. J Cataract Refract Surg, 32(9), 1459-63. | Cillino S., Casuccio AI., Di Pace F., Pillitteri F., Cillino G. (2008). One-Year Outcomes with New-Generation Multifocal Intraocular Lenses. Ophthalmology, 115, 1508-1526. | De Vries NE. (2008). Long term follow-up of a multifocal apodized diffractive intraocular lens after cataract surgery. J Cataract Refract Surg, 34(9), 1476-82. | Dick HB. (2002). Refractive lens exchange with an array multifocal intraocular lens. J Refract Surg, [serial online], Pubmed. | Goes FJ. (2008). Personal results with the 3M diffractive multifocal intraocular lens. J Refract Surg, 24, 243.