

Visual Outcome and Patient Satisfaction of Inferior Segmental Low Power Near Addition Intraocular Lenses (IOLs)



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Abstract

Purpose: To evaluate visual outcome and patient satisfaction following implantation of inferior segmental low power near addition intraocular lenses (IOLs)

Setting: Department of Ophthalmology, Ramathibodi Hospital, Faculty of Medicine, Mahidol University. Bangkok, Thailand.

Study design: Prospective longitudinal case series.

Methods: This prospective case series involved consecutive 123 eyes (87 patients) who underwent phacoemulsification with implantation of inferior segmental low power near addition IOLs (LS313-MF15, Oculentis GmbH, Berlin, Germany) at the Department of Ophthalmology, Ramathibodi Hospital. The adding power is plus 1.5 diopters of intraocular lens is approximate plus 1.0 diopter of glasses. Visual outcome, halo, glare, ocular optical quality, spectacle dependence and scores in a questionnaire were assessed at least 3 months postoperatively.

Results: The study included 87 patients. Postoperative visual outcome of 85 patients (97.7%) was improved. Satisfaction with near vision was 72.42% in the High and Good categories, 26.44% in the Moderate and Minimal groups and 1.15% in the Dissatisfied group. Satisfaction with distance vision was 82.76% in the High and Good categories, 14.94% in the Moderate and Minimal groups and 2.30% in the Dissatisfied category. Satisfaction comparison between preoperative and postoperative vision of patients was found to be 87.36% in the High and Good groups categories, 11.49% in the Moderate and Minimal groups and 1.15% in the Dissatisfied group. Some patients (5.7%) need glasses for distance vision due to myopia and astigmatism and 23% need reading glasses. More than 90% reported no or mild halos, glare, starbursts, or other photic phenomena.

Conclusions: The inferior segmental low power near addition intraocular lenses (IOLs) restored distance, intermediate and near vision after cataract surgery, with high levels of patient satisfaction and low levels of disturbing photic phenomena.

Keywords: intraocular lens, inferior segmental low power near addition intraocular lenses

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บทคัดย่อ

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วัตถุประสงค์: เพื่อประเมินการมองเห็นและความพึงพอใจของผู้รับการผ่าตัดตาต้อกระจกและฝังเลนส์ตาเทียมชนิดเสริมค่าเลนส์สำหรับมองใกล้เล็กน้อยบริเวณส่วนล่างของเลนส์ (LS313-MF15, Oculentis GmbH, Berlin, Germany)

วิธีการ: เป็นการศึกษาแบบไปข้างหน้าในผู้ป่วย 87 ราย จำนวน 123 ตา ที่มีกำหนดรับการผ่าตัดตาต้อกระจกด้วยวิธีสลายต้อกระจกและฝังเลนส์แก้วตาเทียมชนิดเสริมค่าเลนส์สำหรับมองใกล้เล็กน้อยบริเวณส่วนล่างของเลนส์ โดยค่าเลนส์ที่เพิ่มมีค่า 1.5 diopter ซึ่งเทียบเป็นค่าแвенตาประมาณ 1.0 diopter ที่ภาควิชา จักษุวิทยา คณะแพทย์ศาสตร์โรงพยาบาลรามาธิบดี ทำการประเมินผลการมองเห็นหลังผ่าตัดที่ประมาณ 3 เดือน ในส่วนของ คุณภาพการมองเห็น การเห็นแสงแตกกระจายทั้งแบบเป็นวงและแบบรัศมี (halo and glare) ความต้องการใช้แวนอ่อนช่วยในการอ่าน

ผลการศึกษา: พบว่า 85 ราย (ร้อยละ 97.7) มีการมองเห็นหลังผ่าตัดดีขึ้น ร้อยละ 74.42 มีความพอใจในการมองที่ใกล้ ขณะที่ร้อยละ 26.44 มีความพอใจในระดับปานกลาง และ ร้อยละ 1.15 มีความไม่พอใจในการมองที่ไกล ในส่วนการมองไกล ร้อยละ 82.76 มีความพอใจมาก ขณะที่ร้อยละ 14.94 มีความพอใจในระดับปานกลาง และ ร้อยละ 2.30 ไม่พอใจ ร้อยละ 5.7 ต้องใช้แวนตาช่วยมองใกล้เนื่องจากยังมีสายตาสั้น ขณะที่ร้อยละ 23 ต้องใช้แวนอ่อนหนังสือ ผู้ป่วยมากกว่าร้อยละ 90 ไม่มี หรือมีอาการน้อยมากในการเห็นแสงแตกกระจายทั้งแบบเป็นวงและแบบรัศมี

สรุป: เลนส์ตาเทียมชนิดเสริมค่าเลนส์สำหรับมองใกล้เล็กน้อยบริเวณส่วนล่างของเลนส์ ช่วยการมองเห็นในผู้รับการผ่าตัดเปลี่ยนเลนส์ต้อกระจก ทั้งการมองที่ไกล ระยะกลาง ระยะใกล้ ได้ดี โดยพบปัญหาแสงแตกกระจายน้อย

คำสำคัญ: เลนส์ตาเทียมชนิดเสริมค่าเลนส์สำหรับมองใกล้เล็กน้อยบริเวณส่วนล่างของเลนส์

ผู้วจัยไม่ได้รับผลประโยชน์ใดๆ กับผลิตภัณฑ์ที่กล่าวข้าง

Introduction

Visual rehabilitation after cataract surgery includes restoring a wide range of distance. Because of the development of various models of multifocal intraocular lens (IOL), multifocal intraocular lens have been used over the past 25 years to enhance near and distance vision in the pseudophakic patient.^{1,2} New models of diffractive multifocal IOL were developed to overcome the lack of accommodation in pseudophakic patients and thus provide functional distance, near, and even intermediate vision.³ However, optical side effects, such as decreased contrast sensitivity,

glare disability, or the presence of halos, have been also reported.⁴⁻⁶ To reduce such side effects, a new concept of multifocal IOL (Lentis LS-313 multifocal IOL, Oculentis GmbH) to correct presbyopia through use of a refractive design has been recently developed and introduced into clinical practice. It incorporates a new approach in multifocal IOL technology by virtue of its sector-shaped near vision section. This IOL has been shown to provide high-quality vision with high patient tolerance of abnormal visual phenomena and less loss of contrast sensitivity.^{7,8}

Materials and Methods

This prospective case series involved patients who underwent phacoemulsification with implantation of Lentis Comfort LS-313 MF15 multifocal IOL (Oculentis GmbH, Berlin, Germany) [Figure 1] at the Department of Ophthalmology, Ramathibodi Hospital during November 2015-December 2016. All patients were informed and consented to participation in the study and the protocol was approved by the Research Ethics committee of Mahidol University, Thailand. Exclusion criteria included patients with complicated surgery, probable or definite cases of uveitis, glaucoma and maculopathy. One hundred and twenty-three eyes in 87 patients were enrolled.

Surgical technique

All operated eyes were dilated with topical tropicamide 1% and phenylephrine 2.5%. All surgeries were performed by the same surgeon (P.S.) under peribulbar anesthesia (2% lidocaine with hyaluronidase). Standard phacoemulsification

was performed through a 3-mm clear corneal incision using the stop-and-chop technique, anterior and posterior capsule were polished with sweeper, a foldable acrylic IOL (LS313-MF15, Oculentis GmbH, Berlin, Germany) was implanted into the capsular bag with the near segment placed inferior and slightly nasal under an ophthalmic viscoelastic device (OVD) and the OVD was removed. Intracameral 0.5% levofloxacin 0.1 ml was infused at the end of surgery. A combination of 0.3% ofloxacin and 1% prednisolone acetate (exopred, Allergan, USA) was applied four times/day for 3 weeks.

Outcome measurements

All patients were scheduled for evaluation at one day, one week, three weeks and three months postoperatively. BCVA (Log MAR), IOP, and adverse events were recorded. Visual outcome, halo, glare, ocular optical quality, spectacle dependence and satisfaction- scores in a questionnaire were assessed at least 3 months postoperatively.

Results

The study included 123 eyes in 87 subjects. There were 36 subjects with bilateral surgery. In all, more than 90% have good quality of life after surgery. Some patients (9.6 %) need glasses for distance vision due to myopia and astigmatism and 23% need reading glasses (Table 1). Postoperative visual outcome of 85 patients (97.7%) was improved (Table 2). Satisfaction comparison between preoperative and postoperative vision of patients was 87.36% at the Good or High level, 11.49% at the Minimal-Moderate level and 1.15%

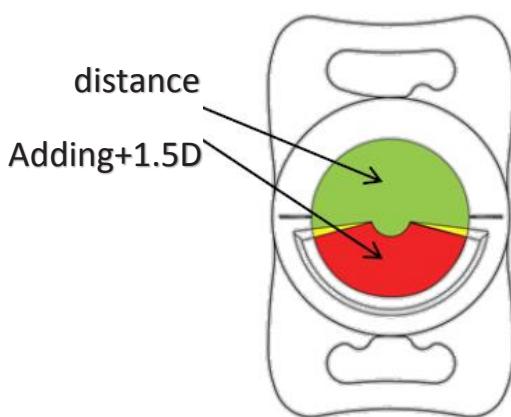


Figure 1. Design of inferior segmental low power near addition IOL (+1.5 Diopters

Table 1. Quality of life after implantation with inferior segmental low power near addition intraocular lens in 87 subjects

Situations	Level of Quality of Life (n=87)			
	Impaired (%)	Moderate (%)	Mild (%)	No symptoms (%)
1. Eye strain from long time use of eye	3.45	3.45	19.54	73.56
2. Glare or halo when looking in dim light	3.45	5.75	17.24	73.56
3. Diplopia	1.15	3.45	12.64	82.76
4. Near vision such as reading newspaper, menu, iPad, smart phone, etc.	6.90	10.34	25.29	57.47
5. Distance vision such as watching TV, watching scenery, watching sports, doing outdoor activities, driving	2.30	4.60	27.59	65.52
6. Intermediate vision such as looking at the monitor or computer keyboard or cooking and preparing food	3.45	3.45	24.14	68.97
7. Distance vision in dim light	2.30	6.90	34.48	56.32
8. Near vision in dim light	3.45	5.75	35.63	55.17
9. Need to use glasses for distance vision	5.77	3.85	38.46	51.92
10. Need to use glasses for near vision	16.98	5.66	47.17	30.19

Table 2. Patient satisfaction according to questionnaire

Patient satisfaction	High 5 (%)	Good 4 (%)	Moderate 3 (%)	Minimal 2 (%)	Dissatisfied 1 (%)
Satisfaction in near vision	28.74	43.68	20.68	5.75	1.15
Satisfaction in distance vision	36.78	45.98	12.64	2.30	2.30
Comparison of satisfaction between IOL and other eye (n=8)	50.00	37.50	12.50	0.00	0.00
Comparison of satisfaction between preoperative vision and postoperative vision	47.13	40.23	10.34	1.15	1.15

were dissatisfied. Satisfaction with distance vision was 82.76% at the High and Good levels, 14.94% at the Minimal-Moderate levels and 2.30% were dissatisfied. Satisfaction with near vision of patients was 72.42% at the High and Good levels, 26.44%

at the in Minimal-Moderate levels and 1.15% were dissatisfied. There were 8 subjects who had previous monofocal IOL implantation before the other eye was implanted with this IOL. Most of them were satisfied (Table 2).

Discussion

Multifocal IOLs were designed to improve vision at different distances by increasing the depth of vision in order to offer patients the most spectacle independence possible.[3] The recent concept of extended depth of focus (EDoF) aims to enhance near and intermediate vision without compromising far distance vision and with the least possible visual disturbances [8], primarily the dysphotopic phenomena as they are often reported with diffractive multifocal IOLs, and are the first dissatisfaction factor, and sometimes the main reason for explantation^{5,6,9}.

In the present study, we evaluate visual outcome and patient satisfaction following implantation of inferior segmental low power near addition intraocular lens (IOLs) plus 1.5 diopters of intraocular lens. The level of satisfaction reported by the patients was very high. However about 20 % needs reading glasses. Further study using more additional power, e.g. +2.0 or +3.0 diopters, may reduce reading glasses use.

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