

## Success Rate of Phacoemulsification for Cataract in Patients with High-Degree Myopia in National Eye Center Cicendo Eye Hospital Bandung, Indonesia

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### Abstract

**Background:** Phacoemulsification is one of the procedures performed in cataract with high-degree myopia patients. Patients with high-degree myopia have a higher risk for postoperative complications due to phacoemulsification which affects their visual acuity. These patients also have higher manifest refraction compared to cataract without high-degree myopia. This study aims to evaluate the success rate of phacoemulsification for cataract in patients with high-degree myopia in National Eye Center, Cicendo Eye Hospital Bandung, Indonesia.

**Methods:** A descriptive study was performed by collecting data from medical records on phacoemulsification in cataract patients with high-degree myopia at the National Eye Center, Cicendo Eye Hospital, during January–December 2011. There were 79 cases out of 136 cases that met the inclusion criterias, those were cataract patients with high-degree myopia who underwent phacoemulsification and patients who did regular follow up visits. Data were analyzed using computer.

**Results:** The results showed that from 79 cases, 44(55.7%) cases involved female patients. Visual acuity after phacoemulsification increased gradually at 1–2 months follow-up. Eighty one percent cases have been corrected at best with a visual acuity of higher than 6/18. No intraoperative complication occurred in 96.2% of the cases but 3.8% cases had zonular dialysis and vitreous prolaps as intraoperative complication. Meanwhile, corneal edema as postoperative complications occurred in 58.3% of the patients. A total of 17 (21.5%) cases had manifested refraction more than  $\pm 2.00$  diopter.

**Conclusions:** Phacoemulsification in cataract with high-degree myopia resulted in good visual acuity and minimal complications. However, extreme manifest refraction still occurs in several patients [AMJ.2014;1(1):12–6]

**Keywords:** cataract, high-degree myopia, phacoemulsification

## Tingkat Keberhasilan Fakoemulsifikasi pada Penderita Katarak yang Disertai Miopia Tinggi di Pusat Mata Nasional Rumah Sakit Mata Cicendo, Bandung, Indonesia

### Abstrak

**Latar Belakang:** Miopia tinggi diketahui berhubungan dengan terjadinya katarak. Kasus-kasus tersebut memiliki risiko komplikasi fakoemulsifikasi yang lebih tinggi dibandingkan katarak biasa dan dapat memengaruhi tajam penglihatan serta kualitas hidup pasien sehingga dibutuhkan evaluasi mengenai tingkat keberhasilan fakoemulsifikasi. Penelitian ini bertujuan untuk mengetahui gambaran tajam penglihatan pascabedah, komplikasi, dan refraksi manifest pada penderita katarak disertai miopia tinggi yang menjalani prosedur fakoemulsifikasi.

**Metode:** Penelitian dilakukan dengan metode deskriptif dengan pengambilan data sekunder dari rekam medis di Pusat Mata Nasional Rumah Sakit Mata Cicendo pada Januari–Desember tahun 2011. Ada 79 kasus dari 136 kasus yang memenuhi kriteria inklusi yaitu penderita katarak dengan derajat miopia tinggi yang menjalani fakoemulsifikasi dan rutin datang berobat. Data diolah menggunakan program komputer.

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**Hasil:** Hasil penelitian menunjukkan bahwa tajam penglihatan tanpa koreksi 1 hari pascabedah fakoemulsifikasi pada 49,4% kasus dibawah 6/60 yang berangsur membaik pada kunjungan 1-2 bulan. Sebanyak 81,0% kasus memiliki tajam penglihatan dengan koreksi terbaik diatas 6/18. Terdapat 96,2% kasus yang tidak mengalami komplikasi intrabedah. Edema kornea sebagai komplikasi 1 hari pascabedah fakoemulsifikasi cukup banyak terjadi yaitu sebanyak 45,6%. Pada penelitian ini didapatkan refraksi manifest dengan rentang -12.00 sampai +10.00 dioptri, 78,5% berada dalam rentang  $\pm 2.00$ .

**Simpulan:** Prosedur pada katarak miopia tinggi menunjukkan hasil penglihatan yang baik dan komplikasi minimal, tetapi pada katarak yang disertai miopia tinggi masih terdapat pasien yang memiliki refraksi manifest yang cukup berat.

**Kata kunci:** Fakoemulsifikasi, katarak, miopia tinggi

## Introduction

Cataract is the leading cause of blindness in the world. The World Health Organization (WHO) stated that cataract causes 39% of blindness, 18% of refractive error, and 10% of glaucoma. The WHO also estimated that 18 million people suffer from bilateral blindness caused by cataract.<sup>1</sup>

High-degree myopia is known as a risk factor for cataract.<sup>2</sup> Phacoemulsification is a common method used for cataract extraction today.<sup>3</sup> With the development of cataract surgery, patients' expectation for the successful visual acuity outcome is very high. In addition, phacoemulsification is also one of the best procedures with good and fast recovery.<sup>4,5</sup> Phacoemulsification is one of the procedures performed in cataract with high-degree myopia patients.

Cataract patients with high-degree myopia have higher postoperative risk and intraoperative complications compared to cataract without high-degree myopia with retinal ablations as the most common complication.<sup>6,7</sup> Intraocular pressure increase may also occur in early period of postoperative phacoemulsification.<sup>6</sup> This intraocular pressure increase and its complication may affect visual acuity. Moreover, the postoperative manifest refraction in cataract patients with high-degree myopia tends to be higher than in cataract patients without high-degree myopia.<sup>8</sup>

Because of the lack of study on evaluation of phacoemulsification in cataract patients with high-degree myopia, this study aims to evaluate the success rate of phacoemulsification using the parameters of visual acuity, complication, and manifest refraction after phacoemulsification in cataract patients with high-degree myopia in National Eye Center Cicendo, Eye Hospital, Bandung 2011.

## Methods

A descriptive study was conducted in high-degree myopia cataract patients who underwent phacoemulsification procedure at the National Eye Center, Cicendo Eye Hospital, in January–December 2011.

This study was conducted by collecting data from medical records on phacoemulsification in cataract patients with high-degree myopia. There were 79 cases out of 136 cases that met the inclusion criteria, which was cataract patients with high-degree myopia who underwent phacoemulsification and patients who did regular follow up visits. Meanwhile 57 cases had to be excluded. The exclusion criteria include incomplete data and patients with other diseases in addition to cataract and high-degree myopia which can affect their visual acuity. The postoperative data on uncorrected visual acuity (UCVA) and best corrected visual acuity (BCVA) during the first and 1–2 months follow up; intraoperative and postoperative complication data; and postoperative manifest refraction data were collected. These data were then processed using computer.

## Results

A total of 79 data sets were available. Of these, 44 (55.7%) cases involved female patients, and 35 (44.3%) cases involved male patients. Twenty six patients (32.9%) were 50–59 years old, while 23 (29.1%) patients were 60–69 years old. The median of this study was 59 years old and the mean was 58 years old. Range of age in this study was 28 until 85 years old.

From all cataract patients with high-degree myopia who underwent phacoemulsification in this study, 59.5% came from Bandung. Patients who came from outside Bandung were from West Java area; Jakarta Bogor, Tangerang,

**Table 1 Uncorrected and Best Corrected Visual Acuity on The 1<sup>st</sup>-2<sup>nd</sup> Months Follow-up**

Visual Acuity Classification	UCVA		BCVA	
	Case	Percentage (%)	Case	Percentage (%)
Good (6/6-6/18)	42	53.2	64	81
Borderline (<6/18-6/60)	17	21.5	7	8.9
Poor (<6/60)	20	25.3	8	10.1
Total	79	100	79	100

UCVA = uncorrected visual acuity; BCVA = best corrected visual acuity

Bekasi (Jabotabek), and Central Java area. About 96.2% were poor patients while general patients only made up 3.8%. Most patients came with Asuransi Kesehatan Wajib (53.2%) and Jaminan Kesehatan Masyarakat (21.5%). Asuransi Kesehatan Wajib is a compulsory health insurance in a company or in a certain country. Jaminan Kesehatan Masyarakat is a comprehensive health care program by the government including preventive, promotive, curative, and rehabilitative for poor people.

The range of preoperative visual acuity in this study was 20/25 to hand movement, with the biggest percentage (91.1%) for poor (<6/60) visual acuity, based on the WHO category for Guidelines to Monitor The Outcome of Cataract Surgery. Only 4 patients (5.1%) have good (6/6-6/18) preoperative visual acuity.

After the patients had gone through the phacoemulsification procedure, they underwent visual acuity examination on the first day of follow up. There was an increase in visual acuity although 49.9% still had poor visual acuity. Sixteen (20.3%) cases were in borderline (<6/18-6/60) and 24 (30.4%) cases showed good visual acuity.

On the 1<sup>st</sup>-2<sup>nd</sup> month follow up, there was an increase in visual acuity with 53.2% cases had good uncorrected visual acuity (UCVA) (Table 1). Twenty two (27.8%) cases had visual acuity of more than 0.5.

Best corrected visual acuity examinations

were also performed in the 1<sup>st</sup>-2<sup>nd</sup> months follow up. Nevertheless, there were still 8 (10.1%) cases that had poor best corrected visual acuity (BCVA). The range of BCVA in this study from hand movement was 6/6. There were 52 cases (65.8%) that had visual acuity above 0.5. There was no further investigation about the causes of poor visual acuity in these patients.

The range of manifest refraction in this study was from -12.00 to +10.00. There were still 17 (21.5%) cases that had extreme manifest refraction or more than  $\pm 2.00$  diopter. Of these, 70.5% cases underwent axial length examination by ultrasound biometry.

Intraoperative complications in this study were vitreous prolapse and zonular dialysis. These complications are shown in table 3. Only 3 cases (3.8%) suffered from intraoperative complications. Patients who suffered from zonular dialysis had poor UCVA, i.e. 0.05, and high manifest refraction of +10.00 but good BCVA, i.e. was 0.50. One of the patients who suffered from prolapsed vitreous had poor UCVA which, i.e. 0.05 and BCVA 0.3.

Corneal edema as a postoperative complication occurred in 46 (53.3%) cases. However, in 1<sup>st</sup>-2<sup>nd</sup> months follow up visits, the complications gradually disappeared.

## Discussion

Gender is known as a risk factor of cataract and female patients are more at risk for cataract

**Table 2 Postoperative Manifest Refraction**

Manifest Refraction	Case	Percentage (%)
<-2.00	15	19.0
-2.00-0.00	29	36.7
0.01-2.00	33	41.8
>2.00	2	2.5
Total	79	100

**Table 3 Intraoperative Complications**

Complication	Case	Percentage (%)
No Complication	76	96.2
Vitreous Prolapse	2	2.5
Zonular dialysis	1	1.3
Total	79	100

**Table 4 One Day Postoperative Complication**

Complication	Case	Percentage (%)
No Complication	32	40.5
Severe Corneal Edema	36	45.6
Minimal Corneal Edema	10	12.7
Kerato conjunctivitis	1	1.3
Total	79	100

than men.<sup>9</sup> Jeon and Kim<sup>10</sup> found that cataract patients with high-degree myopia are younger than cataract patients without myopia with a mean age of  $59.60 \pm 12.28$ , while cataract patients without myopia patients has a mean age of  $67.47 \pm 11.36$ .

A study by Joshi and Shakya<sup>11</sup> showed that 61.3% cataract patients without high-degree myopia who underwent phacoemulsification have preoperative visual acuity of less than 6/60, meanwhile only 9.09% have visual acuity above 6/18.

One day postoperative visual acuity in cataract patients without high-degree myopia patients tends to be poor, only 28% patients have near normal visual acuity or better than 6/18 in both eyes.<sup>12</sup> Tinley et al.<sup>13</sup> found that 83% cataract patients without high-degree myopia have 2 week postoperative UCVA of more than 6/12. A study by Kim JH et al.<sup>14</sup> showed 92.3% patients have a BCVA of 20/20 six months after phacoemulsification. Patients with poor BCVA might have corneal opacity and glaucoma or other ocular diseases.<sup>15</sup>

Axial length examination using IOLMaster biometry was found to be more accurate and had better manifest refraction than ultrasound biometry.<sup>16</sup> The IOLMaster biometry was a complete system that could perform keratometry, anterior chamber depth, corneal white to white and calculated intraocular lens (IOL) power.<sup>17</sup> High-degree myopia might cause error in determining IOL power, so the surgeon have to re-check the keratometer and A-scan.<sup>18</sup>

Axial length of more than 26 mm is a risk factor of phacoemulsification complications, including posterior capsule rupture and vitreous loss (8.5%) mentioned in Zare et al study.<sup>7</sup> Corneal edema is a common postoperative phacoemulsification, about 20.7% cases experience corneal edema in 1 day postoperative phacoemulsification with mature cataract.<sup>19</sup> Although corneal edema is a common complication, viscoelastic can

be used to improve the protection of corneal endothel during phacoemulsification and decrease the occurrence of corneal edema as a complication.<sup>20</sup>

In conclusion, phacoemulsification is a safe procedure for cataract patients with high-degree myopia. This procedure has low complication and good visual outcome. However, the manifest refraction seen in some patients is still extreme. This might happen due to the inaccurate IOL power measurement. By using IOLMaster biometry or ultrasound biometry with experts, this error can be minimalized. Corneal edema as a postoperative complication can also be minimalized by using the appropriate viscoelastics to protect the corneal endothelial cells. Further investigation to evaluate the poor visual outcome also is needed so proper treatment can be planned. Data about cataract diagnosis based on nucleus hardness are also needed because cataracts with hard nucleus need longer operation time and have higher risks for complication. With these data, we can evaluate whether the hard nucleus is a risk factor for complications in phacoemulsification or not. For further study, the correlation between axial length and manifest refraction after phacoemulsification should be evaluated.

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