

THE OUTCOME OF EXTRACAPSULAR AND PHACOEMULSIFICATION CATARACT EXTRACTIONS

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Abstract

This study was to evaluate the post operative astigmatism and visual acuity of patients after extra capsular extraction (ECCE) and phacoemulsification (PE) for the purpose of recommending the appropriate referral time for cataract extraction. Subject's hospital file data comprising 30 ECCE and 48 PE were collected and recorded according to gender and the technique employed in the surgical procedure. Patients with 6/60 visual acuity were included in the study. . The mean surgically induced astigmatism (SIA) was 1.71 ± 1.5 for the ECCE group and 0.70 ± 0.80 for the PE procedure. . Patients with VA lesser than 6/60 ($< 6/60$) had 3.3% success rate with ECCE procedure and PE had 2.0% success rate. Patients with cataract and poor visual acuity (lesser than 6/36) should be referred immediately for cataract extraction and management.

Key words: Cataract, Phacoemulsification, extra capsular extraction, astigmatism, visual acuity

Introduction

Cataract and uncorrected refractive errors were reported to be the commonest cause of treatable blindness and reduced vision in Malaysia^{1,2}. Cataract, a chief cause of visual impairment, has been a major public health and socioeconomic problem. Many cataract cases are often age related, with high prevalence among the aging population^{3,4}. Cataract surgery plays a very important role in restoring vision and hope to the sufferers. The extraction of cataract has been an age long practice that has improved over the years. The modern advances in cataract extraction technology

have reduced the risk of blindness after eye surgery. It was observed that phacoemulsification (PE) method of cataract extraction had wider acceptance among the eye surgeons, but some eye surgeons continued to use the extracapsular (ECCE) approach. However, the final anatomic and visual outcomes appeared to be similar in the two methods of extractions⁵⁻⁷. The objectives of these modern methods (PE and ECCE) of cataract extractions amongst others were to rapidly improve visual rehabilitation and minimize surgically-induced astigmatism⁸.

Recent studies revealed that PE with implantation of foldable lens was considered as the Gold Standard in cataract extraction techniques A major concern of modern cataract surgery was the inducement of astigmatism, which could lead to monocular diplopia, blur vision,

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glare, asthenopic complaints and visual aberrations^{9,10}. Thus astigmatism is now a major problem of cataract surgery. This study is therefore aimed at evaluating the outcome of the post operative astigmatism and visual acuity of patients after ECCE and PE cataract extractions and to recommend the appropriate referral time for a particular extraction technique.

Methods

This is a retrospective study carried out at the Ophthalmology Department in Ampang Hospital, Malaysia. The study was carried out after oral and written consent of the hospital authority were obtained. The study was conducted in accordance with the tenants of the declaration of Helsinki. The post operative outcome of visual acuity, astigmatism with the keratometric values of the patients, after extracapsular cataract extraction (ECCE) and phacoemulsification (PE) surgical procedures were considered. The subject's hospital files data were collected, selected and recorded according to gender and the technique employed in the surgery procedure. The files of all patients that had cataract extraction over the period of three years were considered. All patients, that had (ECCE) and (PE) surgical procedures, with 6/60 visual acuity were included in the study. In all, 78 subjects' files, comprising 30 ECCE and 48 PE subjects were included in the study.

The files selected were for ECCE and PE patients with posterior chamber intraocular lens implant (PCIOL). Subjects files that showed compliance to the post operative follow up programme were included in the study. Subjects with ocular co- morbidity complications were excluded. All the subjects had their eyes previously examined. Each eye of a patient was considered; and cataract patients

without any other obvious previous eye problems were included. Patients with post operative ocular complications in any of their eyes, and had any previous serious systemic diseases indicated in their files, were excluded from the study. The visual acuity for the ECCE and PE patients were determined from the refraction data provided in the files. The patients best corrected visual acuity (BCVA) measured after 3 months of post operative follow up care were recorded and used in this study. For the purpose of this study, a successful surgical procedure was defined as BCVA better than 6/12 in one or both eyes that was observed 3 month after the operation.

Data Analysis

The data analyses were carried out with the SPSS 18.0 version. Normality test and the distribution of the data were determined and there was no need for correction. Independent t-test was employed in the comparison of surgically induced astigmatism on the subjects that had ECCE and PE procedures, at 95% confidence level. Paired T-test was used to compare the pre and post corneal astigmatism for the ECCE and PE procedures.

Limitation of the study

There were many ophthalmologists that carried out the cataract surgeries in the hospital and they might have employed individual techniques to improve their success rates. The measurements of the patients' visual acuity were also not standardized. These procedural differences in patient management were not accounted for and might have resulted in treatment bias.

Results

The mean ages for the subjects who had ECCE and PE procedures were 63.4 ± 12.13 and 65.0 ± 9.62 , respectively. There were

more females than males in both groups. For the ECCE procedure group, there were 15 right eyes (OD) and 15 left eyes (OS) and the PE procedure group had 26 OD and 22

OS eyes. The visual acuity (VA) of the patients revealed that 76.7% of ECCE and 20.8% of PE subjects had visual acuity of <6/60 pre-operatively (Table 1).

Table 1. Characteristics of subjects for the ECCE and PE

Characteristics	ECCE	PE
NO. OF SUBJECTS	30	48
AGE	63.4 ±12.13	65.0 ± 9.62
Gender (Female=F; M = male)	F23 :M 7	F35: M13
OD:OS	OD15: OS 15	OD 26 : OS22
Pre-operativeVA		
>6/12-6/36	3 (10%)	30 (62.5%)
>6/36-6/60	2 (6.7%)	8 (16.7%)
< 6/60	23 (76.7%)	10 (20.8%)

Table 2 revealed the surgically induced corneal astigmatism (SICA) and its corneal steepness and flatness of the keratometric mean values. The keratometric mean values of the pre and post operative corneal astigmatism differed significantly (pre – operation values, p = 0.02; and post-operative, p = 0.001) for the ECCE

procedure. There were no significant differences in the keratometric values for the pre- (p = 0.07) and postoperative (p = 0.24) for PE procedure. However, there were significant differences in the pre- and postoperative corneal astigmatism for ECCE and PE (p = 0.01), (p < 0.05).

Table 2 Corneal astigmatism (CA) induced by ECCE and PE

	Steep k		P value	Flat k		P value	SICA		
	Pre	Post		Pre or before operation	Post-operative		Pre or before surgery	Post-operative	P value
ECCE	45.3±1.6	46.2±1.8	0.002	44.5±1.4	43.9±1.5	0.001	0.8±0.6	2.3±1.7	0.00005
PE	45.2±1.6	45.5±2.0	0.07	44.4±1.6	44.3±1.7	0.24	0.8±0.6	1.2±0.9	0.01

There were significant differences in the surgically induced corneal astigmatism between the ECCE and PE procedures ($p = 0.00023$), $p < 0.05$. Induced corneal

astigmatism for ECCE was 1.71 ± 1.5 and 0.70 ± 0.80 for the PE procedure. Therefore ECCE had significantly higher astigmatism than the PE (Table 3).

Table 3. Induce corneal astigmatism for ECCE and PE

Groups	Mean \pm S.D	P VALUE
ECCE	1.71 ± 1.5	0.00023
PE	0.70 ± 0.80	

Many of the subjects had marked improvement in the postoperative visual acuity (VA). However, 91.7% of the PE

patients had BCVA better than 6/12 than the 66.7% observed in ECCE patients (Table 4).

Table 4. Visual acuity outcomes of ECCE and PE.

VA at 3 months post-surgery	ECCE (n=30)	PE (n=48)
6/12 or better	20(66.7%)	44(91.7%)
>6/12-6/36	9(30%)	3(6.3%)
>6/36-6/60	1(3.3%)	1(2.0%)
Worse than 6/60	0	0

n= number of patients

Discussion

Cataract has been a leading cause of redeemable blindness and visual impairment¹¹.

The main objective of current methods of cataract surgery is to provide better visual acuity and reduce induced astigmatism. This study revealed that the visual acuity outcome for PE procedure was better than that found in ECCE. This is similar to the reports of Cheen et al.¹² and George et al.¹⁶ who found that the proportion of postoperative better VA (VA > 6/12) success with PE patients was higher than

that of the ECCE patients. Another study carried out in United Kingdom also reported that PE was superior to ECCE procedure and it was cost effective¹⁴. It was also observed that PE procedure induced lesser postoperative astigmatism than the ECCE, which was similar to the reports of George et al.¹³ Minassian et al.¹⁴ and Desai et al.¹⁵. However, several literatures reported that ECCE cataract extraction procedure was better for dense cataract patients with VA lesser

than 6/60¹⁴⁻¹⁷. These reports agreed with our observation that revealed the success rate of patients with pre-operative VA of lesser than 6/60 (< 6/60); ECCE procedures success rate (3.3% success rate) was higher than that found in PE (2.0% success) (Table 4).

The observed mean surgically induced astigmatism (SCIA) was 1.71 ± 1.5 for the ECCE procedure and 0.70 ± 0.80 for PE procedure. The mean pre-operative astigmatism for ECCE was 0.8 ± 0.6 and the mean post-operation was 2.3 ± 1.7 . The mean pre-operative astigmatism for PE was 0.8 ± 0.6 and the post-operative mean was 1.2 ± 0.9 . There were remarkable improvement in visual acuity of patients with preoperative VA of 6/36 and 6/60 who had PE procedure, but had lower success rate. Therefore, Cataract patients with poor visual acuity (lesser than 6/36) should be referred immediately for timely intervention and appropriate management.

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