

# Posterior Capsule Rupture during Phacoemulsification among Patients with Pseudoexfoliation—Is There A Correlation?

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## Abstract

This study was done to correlate the occurrence of posterior capsule rupture among patients with pseudoexfoliation during phacoemulsification. This was a retrospective audit of patients who underwent phacoemulsification type cataract surgery from January 2011 to December 2012 in a tertiary hospital in Malaysia. Data was obtained from the National Eye Database (NED) of Malaysia. The data was analysed using SPSS version 21.0. By using logistic regression analysis, it was found that there was no significant increase in the occurrence of posterior capsule rupture among patients with pseudoexfoliation. Hence, we concluded that there was no correlation between the occurrence of posterior capsule rupture and the presence of pseudoexfoliation among patients who underwent phacoemulsification.

**Keywords:** phacoemulsification, posterior capsule of the lens, rupture, cataract, pseudoexfoliation

## Introduction

Pseudoexfoliation (PEX) is an age related process whereby abnormal fibrillar extracellular material is deposited progressively in the anterior segment of the eye. Deposition of pseudoexfoliative material on the anterior lens surface is the most commonly recognised feature of PEX and is usually best appreciated after pupillary dilatation (1). It is very frequently observed at the pupillary border and is diagnosed even before the pupil is dilated. Pigment and flakes of pseudoexfoliative material may be deposited on the corneal endothelium. Clinically the conjunctiva is not involved but conjunctival biopsies have shown presence of pseudoexfoliative material (2). The material is also deposited in the anterior chamber angle and along with pigment dispersion syndrome is the commonest cause for increased pigmentation in the trabecular meshwork. It is also deposited in the zonules and ciliary processes. The PEX syndrome when associated with cataract can cause a rise in the occurrence of intraoperative complication (3). Modern

cataract surgery is generally a safe procedure. However, a small percentage of cases have complications, the most common of which is rupture of the posterior capsule (4). This can lead to raised intraocular pressure, retinal detachment, cystoids macula oedema, and the devastating endophthalmitis as well as distress to the patient. Frequent and long term follow-ups are time consuming both for the surgeon and the patient who may be further burdened by additional surgical procedures (5). However, proper intraoperative and post-operative management can be successful with the safe placement of an intraocular lens, can render a favourable outcome. Since the zonules tend to be weak in cases with PEX, these patients are more prone to develop posterior capsule rupture especially during manipulation of the nucleus.

This study was undertaken to determine whether PEX contributes to increased incidence of posterior capsule rupture during phacoemulsification.

## Materials and Methods

A retrospective analysis was done of patients who underwent cataract surgery from January 2011 to December 2012 in a tertiary care hospital in Malaysia. Patients who had posterior capsule rupture were traced from the NED. Demographic and surgical details were obtained from the folders of the patients. Informed consent was taken and pupils were dilated with tropicamide 1% and phenylephrine 10% eyedrops. Anaesthesia was administered either locally or generally.

Clear corneal, limbal or scleral tunnel incisions of 2.75 mm were made. Continuous curvilinear capsulorhexis and hydrodissection were performed. Divide and conquer phacoemulsification was done. Automated irrigation and aspiration of cortical removal was done. Intraocular lenses were placed and the wound was secured. Patients with PEX were

operated on by specialists. Hard and brunescant cataracts, polar cataracts, traumatic cataracts, subluxated lenses and cases with pre-existing zonal dialysis were excluded from the study.

The study was approved by the Research & Ethical board of Ministry of Health Malaysia. Data were processed using Microsoft Excel and analysed using SPSS version 12. Descriptive statistics such as frequency, percentage, mean, and standard deviation were described. Binary logistic regression and multiple logistic regression were used to correlate association between the occurrence of posterior capsule rupture and the presence of PEX among patients who underwent phacoemulsification after adjustment for age, gender and ethnicity. Odds ratio was described together with its 95% confidence interval. Level of significance was set at 0.05.

## Results

Table 1 reveals the socio-demographic characteristics of the patients who underwent phacoemulsification. Fifty-three percentage of the patients were female and the Malays were the largest race (47.2%) followed by the Chinese (39.5%). Mean age at date of encounter among the patients who had PEX was 72.27 years and 65.2 years among those without PEX.

Table 2 shows the binary and multiple logistic regression analysis of Posterior Capsule Rupture among patients with PEX. Binary logistic regression showed that although patients with PEX were 2.833 times more likely to have posterior capsule rupture, however it was not significant (Unadjusted OR (95% CI) = 2.833 (0.652 – 12.312)). By using multiple logistic regression analysis, after adjusting for age, gender and ethnicity, it was found that there was no significant relationship between the presence of PEX and the occurrence of posterior capsule rupture among the patients who underwent phacoemulsification (adjusted OR (95% CI) = 3.083 (0.689–13.801)).

**Table 1:** Socio-demographic characteristics of patients (n = 2544)

Variable	Frequency (%)
Gender	
Male	1196 (47.0)
Female	1348 (53.0)
Ethnicity	
Malay	1201 (47.2)
Chinese	1004 (39.5)
Indian	303 (11.9)
Others	7 (0.3)
Unknown	29 (1.1)
Age at date encounter (Pseudoexfoliation present) Mean (SD)	72.27 (SD 6.846)
Age at date encounter (Pseudoexfoliation absent)	65.20 (SD 9.452)

**Table 2:** Logistic regression analysis of Posterior Capsule Rupture (PCR) among patients with pseudoexfoliation

Variable	Posterior Capsule Rupture			
	Unadjusted Odds Ratio (95% CI)	P value	Adjusted Odds Ratio (95% CI)	P value
Pseudoexfoliation	2.833 (0.652–12.312)	0.165	3.083 (0.689–13.801)	0.141

Odds Ratio adjusted for age at date encounter, sex and ethnicity; 95% CI = 95% Confidence Interval

## Discussion

Posterior capsule rupture during phacoemulsification is a devastating complication that can lead to further complications such as cystoid macula oedema, retinal detachment and the much dreaded endophthalmitis. Apart from that, frequent and long term follow-ups are time consuming both for the patient and the medical personnel.

Problems arising during cataract extraction in patients with PEX have been described. An increased risk of posterior capsule rupture has been noted by Awan and Humayun (6). Guzek and co-workers (7) reported that zonular breaks were four times higher in patients with PEX compared to those without PEX during extra-capsular cataract extraction. Higher rates of vitreous loss have been reported in cataract extraction in the presence of PEX (8). However, in our present study the incidence of posterior capsule rupture in cases with PEX is not statistically significance. The limitation in the current study could be attributed to a small sample size in terms of PEX cases undergoing phacoemulsification.

## Conclusion

In our study, there was no correlation between the occurrence of posterior capsule rupture and the presence of PEX among patients who underwent phacoemulsification.

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## Conflict of Interest

None.

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## Authors' Contributions

Conception and design, drafting of the article, critical revision of the article for the important intellectual content: TT, SS

Analysis and interpretation of the data: SS, HHKS  
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## References

1. Prince AM, Ritch R. Clinical signs of the pseudoexfoliation syndrome. *Ophthalmology*. 1986; **93(6)**:803–807.
2. Prince AM, Streetan BW, Ritch R, Dark AJ, Sperling M. Preclinical diagnosis of pseudoexfoliation syndrome. *Arch Ophthalmol*. 1987;**105(8)**:1076–1082.
3. Nauman C, Schlotzer-Schrehardt GO, Chle M. Pseudoexfoliation syndrome for the comprehensive ophthalmologists; intraocular and systemic manifestations. *Ophthalmology*. 1998;**105(6)**:951–968.
4. Chan E, Mahroo OA, Spalton DJ. Complication of cataract surgery. *Cli Exp Optom*. 2010;**93(6)**: 379–389. doi: 10.1111/j.1444-0938.2010.00516.x.
5. Ang GS, Whyte IF. Effect and outcomes of posterior capsule rupture in a district general hospital setting. *J Cataract Refract Surg*. 2006;**32(4)**:623–627.
6. Awan KJ, Humayun M. Extracapsular cataract surgery risks in patients with exfoliative syndrome. *Pakistan J Ophthalmol*. 1986;**2**:79–80.
7. Guzek JP, Holm M, Cotter JB. Risk factors for intraoperative complications in 1000 extracapsular cases. *Ophthalmology*. 1987;**94(5)**:461–466.
8. Kirkpatrick JNP, Harrad RA. Complicated extracapsular cataract surgery in pseudoexfoliation syndrome. A case report. *Br J Ophthalmol*. 1992;**76(11)**:692–693.