

(02)

The complications during phacoemulsification in patients with posterior polar cataract

Komplikacje w czasie fakoemulsyfikacji u pacjentów z zaćmą biegunową tylną

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Summary:

Purpose: The aim of the study was to evaluate the intraoperative complications during phacoemulsification of a posterior polar cataract, especially the risk of posterior capsule rupture.

Material and methods: The retrospective evaluation of complications during phacoemulsification of a posterior polar cataract in patients in the Department of Ophthalmology, Medical University of Warsaw from January 2001 to June 2007. The surgical procedures, as well as the implanted IOL type and intraoperative and postoperative complications were evaluated in every case in 2 years' observations. Best-corrected visual acuity before and 3 months after surgery was evaluated using the standard Snellen chart.

Results: The study group consisted of 16 individuals, 6 women and 10 men in age 21-55 (mean 32.7). 22 eyes were operated on, all using the phacoemulsification method through corneal incision (10 individuals – 1 eye, 6 individuals – both eyes). In all cases, phacoemulsification was performed using a hydrodissection free technique by corneal incision. A posterior capsule rupture was observed in 4 eyes (18%), localized in the central region and caused by changes in the capsula. The mean visual acuity was significantly better after cataract surgery. The best corrected visual acuity (BCVA) was 6/6 in 8 eyes (36%). A BCVA of less than 1.0 was caused by either amblyopia or nystagmus.

Conclusions: Phacoemulsification in patients with posterior polar cataract is associated with a high risk of posterior capsule rupture and potential vitreous loss, which is why this procedure should be performed carefully by senior surgeons using an appropriate, hydrodissection free technique.

Słowa kluczowe:

fakoemulsyfikacja, zaćma biegunowa tylna, zaćma wrodzona, przerwanie torebki tylnej.

Key words:

phacoemulsification, posterior polar cataract, congenital cataract, posterior capsule rupture.

Introduction

Posterior polar cataract (*Cataracta polaris posterior*), is a type of congenital cataract, in which the opacification is localized in the subcapsular cortex and in the posterior capsule (1).

Its symptoms and signs include visual acuity impairment, especially to near (which is caused by the localization of the opacification in the cardinal point). Photopic phenomena (glare), especially at night, often cause great discomfort (2). Visual acuity impairment usually occurs in 2-4 decades of life.

The course of posterior polar cataract might be stationary (more frequently), or progressive. The incidence may run in the family or be coincidental. In familial cases, the changes are bilateral and inherited autosomal dominant (genes: *CRYAA*, *CRYAB*, *PITX3*). Coincidental cases are usually unilateral (3,4).

Posterior polar cataract is a white, well-delineated opacification in the posterior pole, with an abnormal structure of lens fibers and an accumulation of extracellular material. In the opacification the cortex shows strong adherence to the posterior capsule, which is often thin or even absent (1,5). Calcifications in the posterior capsule may also occur. Lenticonus or lentiglobus may be concomitant.

Material and methods

Purpose of our paper was to evaluate complications during posterior polar cataract phacoemulsification, especially the risk of posterior capsule rupture.

In the retrospective study we included patients who underwent posterior polar cataract surgery by phacoemulsification in the Department of Ophthalmology, Medical University of Warsaw between January 2001 and June 2007. The diagnosis of posterior polar cataract had been made by at least 2 persons based on slit lamp biomicroscopy during qualification to the surgical procedure.

In 22 eyes in 16 patients (10 individuals – 1 eye, 6 individuals – both eyes), the phacoemulsification was performed by 3 different senior surgeons through corneal incision and under peribulbar anesthesia. In all cases an intraocular lens (IOL) was implanted at the time of the cataract surgery.

All concomitant systemic and eye disorders were noted before surgery. Best-corrected visual acuity before and 3 months after surgery was evaluated using the standard Snellen chart.

The surgical procedures, as well as the implanted IOL type and intraoperative and postoperative complications were evaluated in every case in 2 years' observations.

Results

The study group consisted of 16 individuals – 6 women and 10 men, in age 21-55 (mean 32.7). 22 eyes (10 individuals – 1 eye, 6 individuals – both eyes), were operated on, all using the phacoemulsification method through corneal incision (Tab. I).

Characteristic/ Charakterystyka	Results/ Wyniki
Mean age (years)/ Średni wiek (w latach)	32.71 ± 13.02
Sex (M/ F)/ Płeć (M/ K)	10/6
Eye (L/ R)/ Oko (L/ P)	10/12
Concomitant disorders/ Zaburzenia towarzyszące: Down's syndrome/ Zespół Downa Nystagmus/ Oczopląs Aniridia/ Brak tęczówki	4 patients/ 4 pacjentów 4 patients/ 4 pacjentów 1 patient/ 1 pacjent

Tab. I. Clinical characteristics of the patients.

Tab. I. Charakterystyka grupy pacjentów.

Means ± SD

L – left, R – right

From the study group, 4 patients suffered from Down's syndrome, 4 individuals from nystagmus, and 1 patient from aniridia (no concomitant diseases).

In all cases, the phacoemulsification was performed using a hydrodissection free technique by corneal incision. After that, a dispersive viscoelastic was injected into the anterior chamber and continuous curvilinear capsulorhexis was performed. No hydrodissection was attempted – a careful hydrodelineation was performed. During phacoemulsification, the posterior material adherent to the posterior capsule was extracted last. Polishing the central part of the posterior capsule was avoided.

Posterior capsule ruptures were observed in 4 eyes (18%), all localized in the central region and caused by changes in the capsula. In 2 eyes, the posterior capsule rupture was followed by vitreous leakage and resulted in anterior vitrectomy, the incision widened and PMMA MZ60BD IOL sulcus fixation. In 2 eyes, a foldable IOL MA60BM was also fixated in the sulcus. In other cases – foldable IOLs was fixated in the capsular bag.

Early postoperative complications included IOP elevation in 1 eye, corneal edema in 3 and increased inflammation in the anterior chamber in 1 eye.

In 2 years' observations no serious postoperative complications, such as retinal detachment were found. The mean preoperative visual acuity 0.32 and postoperative 0.74. The mean visual acuity was significantly better after cataract surgery ($p < 0,001$, Mann-Whitney U test). The best corrected visual acuity (BCVA) was 6/6 in 8 eyes (36%). A BCVA of less than 1.0 was caused by either amblyopia or nystagmus.

Discussion

Phacoemulsification of a posterior polar cataract significantly increases the risk of posterior capsule rupture during the surgery, which is brought about by several changes in the posterior capsule structure and the localization of the opacification.

The incidence of posterior capsule rupture has been reported to be between 0% and 36% (0% in Siatry and Moghimi, 7.1% in Hayashi et al., 11.1% in Lee and Lee, 16.7% in Liu et al.,

26% in Osher et al., and 36% in Vasavada et al.) (1,2,5-7). In our study, the rate of posterior capsule rupture was 18% and all were caused by changes in the capsula. In 3 eyes the posterior capsule was very thin with a strong adherence to the calcified opacification, and in 1 eye the posterior capsule was absent. In previous reports, some authors did not observe any defects in the posterior capsules which ruptured (5).

It should be noted that all the afore mentioned reports had relatively small study groups. In such small groups, the incidence of a posterior capsule rupture may not only depend on the operative technique employed but also on patient-specific structural changes in the posterior capsule (i.e. the lack of a posterior capsule in the areas of opacification and calcification). In accordance with all the other authors, all attempts to minimize risk of posterior capsule rupture were taken during surgery (8-10). In all cases, a hydrodissection free technique was used in order to avoid unnecessary pressure on the posterior capsule. The posterior material, which is adherent to the posterior capsule, was extracted last and the polar opacity was gently separated from the posterior capsule. In cases of the opacity's strong adherence to the posterior capsule, the residual plaque was usually left in place and polishing was avoided.

Although a posterior capsule rupture occurred in 4 eyes, leading to a subsequent vitreous loss in 2, we did not observe any retinal detachment in 2 years' observations.

In all cases, the visual acuity was significantly better. However, in 14 eyes (64%), the patients did not achieve a postoperative visual acuity of 6/6. In every case, this was caused by either amblyopia or nystagmus, both of which were preexisting conditions. Most of these cases, were patients who suffered from amblyopia due to a unilateral or a highly asymmetric bilateral cataract. 4 patients exhibited nystagmus and 1 aniridia before surgery. These results were consistent with the results of previous studies (6).

Conclusions

1. Phacoemulsification in patients with posterior polar cataract is associated with a high risk of posterior capsule rupture, assessed as 18% in our material, and potential vitreous leakage.
2. Despite the high risk of posterior capsule rupture and subsequent complications, visual acuity shows significant improvement after the phacoemulsification of posterior polar cataract.
3. In order to achieve good postoperative results the procedure should be performed carefully by experienced surgeons using an appropriate, hydrodissection free technique.

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