European Journal of Ophthalmology / Vol. 17 no. 4, 2007 / pp. 601-604

Phacoemulsification on previously vitrectomized eyes: Results of a 10-year period

Z. SZIJÁRTÓ, B. HASZONITS, Z. BIRÓ, B. KOVÁCS

Department of Ophthalmology, University of Pécs, Pécs - Hungary

PURPOSE. *To provide an overview of intraoperative and postoperative complications during phacoemulsification cataract surgery and to evaluate the visual results in patients having pars plana vitrectomy (PPV) with 10 years of follow-up.*

METHODS. *Retrospective evaluation of intraoperative and postoperative complications and postoperative visual results in 134 consecutive patients who underwent phacoemulsification after PPV. Of 11,498 eyes treated with phacoemulsification, 143 (1.2%) had previous PPV during the 10-year period (January 1, 1995-December 31, 2004). A total of 134 eyes were included in this study.*

RESULTS. *The phacoemulsification procedure seemed to be difficult where there was a deep or fluctuating anterior chamber (93%) and primary posterior capsule opacification (19%). The most frequent intraoperative complications were posterior capsule rupture (9%) and incomplete capsular rhexis (5%). Postoperative intraocular pressure elevation (7%), retinal detachment (6%), and posterior capsule opacification (8%) occurred most frequently during the mean follow-up period of 18.2 months (1.5–110 months). Best-corrected visual acuity (BCVA) increased two or more Snellen E lines in 55% of the cases or became better than or equal to 0.5 in 10% of the cases.*

CONCLUSIONS. *Despite the well-known difficulties encountered in vitrectomized eyes such as zonular damage, increased mobility of the lens-iris diaphragm, and altered intraocular fluid dynamics, phacoemulsification proved to be a safe procedure in the hands of experienced surgeons. (Eur J Ophthalmol 2007; 17: 601-4)*

KEY WORDS. *Cataract, Phacoemulsification, Pars plana vitrectomy, Vitrectomized eye*

Accepted: March 4, 2007

INTRODUCTION

An increasing number of posterior segment disorders are successfully managed with pars plana vitrectomy (PPV) due to progressive refinements in vitreoretinal surgical techniques. Cataract formation is a frequent complication after vitrectomy, occurring in up to 80% of the cases (1). Age of the patients, timing of vitrectomy, and use of gas or silicone oil tamponade increases the incidence and progression of cataract (1-5).

It has been noted that cataract extraction in previously vitrectomized eyes is often more complicated because of various anatomic changes within the eye. Well-known potential complications that may arise from this situation include poor pupil dilation, posterior synechiae, zonule damage, posterior capsule tears, increased mobility of the lens–iris diaphragm, and altered intraocular fluid dynamics as a result of the absence of the anterior hyaloid face (2-7). Because of these, phacoemulsification in vitrectomized eyes has been reported to be associated with an increased rate of complications (4).

We retrospectively analyzed the incidence of intraoperative complications and visual results in 134 cases undergoing phacoemulsification cataract surgery after PPV.

 1120-6721/601-04$15.00/0

PATIENTS AND METHODS

Phacoemulsification was performed on 143 previously vitrectomized eyes of 140 patients. Results of 134 surgeries were collected in this study; 9 were unavailable for follow-up.

The patients were between 21 and 78 years of age (mean age 62.5 years).

Phacoemulsification was performed under peribulbar anesthesia by three experienced surgeons through clear-cornea tunnel incision, using a "divide and conquer" phacoemulsification technique with posterior chamber intraocular lens implantation. The mean follow-up period was 18.2 months (1.5–110 months).

RESULTS

The number of phacoemulsification procedures and the rate of surgery on vitrectomized eyes continuously increased in our department between January 1, 1995, and December 31, 2004 (Tab. I). The mean interval between PPV and phacoemulsification was 23.5 months (1–96 months). The type of cataract was progredient in 82% of the cases (110 eyes), mature in 14% of the cases (19 eyes), and tumescent in 4% of the cases (5 eyes).

TABLE I - NUMBER OF PHACOEMULSIFICATION AND RATE OF VITRECTOMIZED EYES AT OUR CLINIC IN THE LAST 10-YEAR-PERIOD

1995-99	Phaco: 1893	After PPV: 15	0.8%
2000	1504	13	0.9%
2001	1822	19	1.0%
2002	1933	27	1.4%
2003	2292	35	1.5%
2004	2054	34	1.7%
Total	***11498***	***143***	***1.2%***

TABLE II - ETIOLOGY OF PPV

Retinal detachment	42%	56 eyes
Diabetic retinopathy	30%	40 eyes
Epiretinal membrane	9%	12 eyes
Vitreous haemorrhage after venous occlusion	7%	9 eyes
Macular hole	4%	6 eyes
Non diabetic macular oedema	4%	5 eyes
Traumatic vitreous haemorrhage	3%	4 eyes
Uveitis	1%	2 eyes

The PPV was performed mainly for retinal detachment (42% of the cases, 56 eyes) and diabetic retinopathy (30% of the cases, 40 eyes) (Tab. II).

Sulfur-hexafluoride or silicone oil tamponade was used during the PPV in 74 eyes (55%) and 60 eyes (45%), respectively. Silicone oil was left in the eye in all cases. The phacoemulsification procedure became difficult because of fluctuation of the anterior chamber or extremely deep anterior chamber in 93% of the cases (126 eyes), because of primary posterior capsule opacification (19%), and because of small pupil in 6% of the cases (8 eyes).

Intraoperative complications during phacoemulsification were posterior capsule rupture in 9% of the cases (12 eyes), incomplete capsular rhexis in 5% of the cases (7 eyes), dropped nucleus in 2% of the cases (3 eyes), and zonulolysis in 2% of the cases (3 eyes).

Early postoperative complications were intraocular pressure elevation in 7% of the cases (9 eyes), retinal detachment in 6% of the cases (8 eyes), and fibrinous iritis and hyphema in 1% of the cases (1 eye).

Late postoperative complications were posterior capsule opacification requiring Nd-YAG capsulotomy in 8% (11 eyes) and macular edema in 3% of the cases (4 eyes).

Mean preoperative best-corrected visual acuity (BCVA) was 0.21, mean postoperative BCVA became 0.41.

BCVA increased (by a minimum of 2 Snellen E lines) in 55% (74 eyes), decreased in 9% (12 eyes), and showed no change in 36% (48 eyes).

We compared eyes with good (better than or equal to 0.5) and poor (worse or equal to 0.1) final BVCA. Post-phacoemulsification BCVA became better than or equal to 0.5 in 14 eyes (10%) and worse than or equal to 0.1 in 30 eyes (22%). In cases with good final BCVA, PPV was performed due to vitreous hemorrhage (diabetic retinopathy in 9 eyes or venous occlusion in 3 eyes) and due to epiretinal membrane (2 eyes). No complication occurred during and after phacoemulsification in these eyes.

Macular disease was the cause of the poor final BCVA in 25 eyes (19%). Due to earlier retinal detachment with macula off (12 eyes), diabetic maculopathy (6 eyes), epiretinal membrane (4 eyes), nondiabetic macular edema (2 eyes), and complete venous occlusion (1 eye), the BCVA could not improve. Serious complications during or after phacoemulsification caused a poor visual outcome in 5 eyes (4%). Postoperative intraocular pressure elevation

caused optic nerve damage in 2 cases (2%), cystoid macular edema developed in 2 cases (2%), and dropped hard nucleus with retinal damage during phacoemulsification occurred in 1 case (1%).

DISCUSSION

Phacoemulsification can be more difficult on previously vitrectomized eyes because of the small pupil, deep or fluctuating anterior chamber, primary posterior capsule fibrosis, and hard nucleus of the lens. The results of our study showed a higher rate of posterior capsule (PC) rupture than that reported in the United Kingdom National Cataract Surgery Survey (8). The complication rates in this study were generally less than those in previous reports on vitrectomized eyes. Biró and Kovács reported a 4% rate of PC rupture and 4% rate of dropped nucleus in a vitrectomized study group of 41 patients (2). We registered 9% of PC rupture and 2% of dropped nucleus in 134 patients. Pinter and Sugar (5) found that the loss of nuclear fragments in the posterior segment occurred in 1.92% of vitrectomized eyes, similar to our results. The results of the study by Misra and Burton suggest that eyes with and without prior PPV have a similar likelihood of having intraoperative complications (9).

A clear corneal approach for phacoemulsification is recommended, avoiding the conjunctival–scleral scarring from previous retinal surgery (10). No intraoperative wound-related problems have been seen using a clear corneal approach. Similar to previous surgeons (2, 5, 9, 10), most eyes in this study had deeper anterior chamber than in nonvitrectomized eyes. Sudden changes in the anterior chamber depth can occur at any time during surgery because of a disparity between fluid flow and outflow which results from the absence of vitreous support (4, 6). Lowering the infusion bottle has been shown to manage this problem effectively (4, 6, 10). Accurately sized wounds, including the clear corneal incision for the phaco tip and the side port for the nucleus manipulator, help to maintain a relatively sealed chamber during surgery and minimize fluctuation of the anterior chamber depth (9).

Long lasting surgery and multiple procedures predispose the vitrectomized eye to a greater likelihood of compromised zonules and capsule damage (4, 10). Thorough hydrodissection, confirmation of adequate lens rotation before phacoemulsification, and gentle nucleus manipulation help to avoid unnecessary zonular stress and posterior capsule tears.

We used the divide and conquer phacoemulsification technique described by Gimbel (11). The cracking and fragmentation maneuvers allow phacoemulsification to be extended to patients with hypermature and brunescent lenses, as well as small pupils.

Post-phacoemulsification posterior capsule opacification requiring Nd-YAG capsulotomy is a frequent late complication in post-vitrectomized eyes (2); 8% of the eyes in our study seemed to have this complication.

Post-phacoemulsification BCVA mostly depends on the state of the macula. In 10% of our patients BCVA became better than or equal to 0.5. Mean preoperative BCVA duplicated after the phacoemulsification procedure.

Phacoemulsification is a safe procedure for cataract extraction on previously vitrectomized eyes, and allows a quick rehabilitation.

ACKNOWLEDGEMENTS

The authors thank the Vitrectomy Group for their help.

The authors have no proprietary or financial interest in any of the products mentioned in the article.

Reprint requests to:
Zsuzsanna Szijártó, MD
University of Pécs
Department of Ophthalmology
Ifjúság Street 13 7624 Pécs, Hungary
zsuzsanna.szijarto@aok.pte.hu

REFERENCES

1. Blankenship GW, Machemer L. Long-term diabetic vitrectomy result, report of 10 year follow-up. Ophthalmology 1985; 92: 503-6.
2. Biró Z, Kovács B. Results of cataract surgery in previously vitrectomized eyes. J Cataract Refract Surg 2002; 28: 1003-6.
3. Chang MA, Parides MK, Chang S, Braunstein RE. Outcome of phacoemulsification after pars plana vitrectomy. Ophthalmology 2002; 109: 948-54.
4. Lacalle VD, Gárate FJO, Alday NM, et al. Phacoemulsification cataract surgery in vitrectomized eyes. J Cataract Refract Surg 1998; 24: 806-9.
5. Pinter SM, Sugar A. Phacoemulsification in eyes with past pars plana vitrectomy: case-control study. J Cataract Refract Surg 1999; 25: 556-61.
6. Grusha YO, Masket S, Miller KM. Phacoemulsification and lens implantation after pars plana vitrectomy. Ophthalmology 1998; 105: 287-94.
7. Ahfat FG, Yuen CHW, Groenewald CP. Phacoemulsification and intraocular lens implantation following pars plana vitrectomy: a prospective study. Eye 2003; 17: 16-20.
8. Desai P, Minassian DC, Reidy A. National cataract survey 1997-8: a report of the results of the clinical outcomes. Br J Ophthalmol 1999; 83: 1336-40.
9. Misra A, Burton RL. Incidence of intraoperative complications during phacoemulsification in vitrectomized and nonvitrectomized eyes: Prospective study. J Cataract Refract Surg 2005; 31:1011-4.
10. Braunstein RE, Airiani S. Cataract surgery results after pars plana vitrectomy. Curr Opin Ophthalmol 2003; 14: 150-4.
11. Gimbel HV. Divide and conquer nucleofractis phacoemulsification: development and variations. J Cataract Refract Surg 1991; 17: 281-91.