

Results of pars plana vitrectomy after complicated phacoemulsification surgery

Resultados pós-vitrectomia via pars plana em pacientes submetidos à cirurgia de facoemulsificação com complicação intraoperatória

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ABSTRACT

Purpose: To identify the causes and outcomes of pars plana vitrectomy (PPV) in patients undergoing phacoemulsification with intraoperative complication and to analyze whether the interval between phacoemulsification and PPV interferes with best-corrected final visual acuity.

Methods: This descriptive and retrospective analytical study was conducted in Paraná Eye Hospital in 2013. Data were collected from medical records of 38 patients who underwent complicated phacoemulsification and also required PPV.

Results: The most frequent complication as a result of phacoemulsification was posterior capsule rupture, observed in 35 patients (92.10%), followed by capsular bag detachment, in three patients (7.89%). Twenty-eight patients (73.68%) had cortical fragments that were removed during PPV. Twelve patients (31.57%) had their intraocular lens repositioned. PPV was performed on the same day of phacoemulsification in one patient (2.63%), within 1 week in 15 patients (39.47%), between 1 week and 1 month in 13 patients (34.21%), and 1 month after phacoemulsification in 9 patients (23.68%).

Conclusion: This study is in agreement with worldwide literature, asserting that major complications of phacoemulsification are posterior capsule rupture and capsular bag detachment, and in addition, there is an improvement in the final visual acuity in almost half the cases, even when there are complications during modern cataract surgery, when complementary appropriate treatment is provided.

Keywords: Phacoemulsification/complications; Vitrectomy/methods; Cataract extraction

RESUMO

Objetivos: Identificar as causas e os resultados da vitrectomia via pars plana (VPP) em pacientes submetidos à cirurgia de facoemulsificação com complicação intraoperatória, analisando se o tempo cirúrgico entre a facoemulsificação e a VPP interfere na melhor acuidade visual corrigida final.

Métodos: Estudo analítico descritivo e retrospectivo realizado no Hospital de Olhos do Paraná em 2013. Os dados foram coletados de prontuários de 38 pacientes que foram submetidos à cirurgia de facoemulsificação complicada e que também precisaram de VPP.

Resultados: A complicação intraoperatória mais frequente na cirurgia de facoemulsificação, nos pacientes estudados, foi a ruptura de cápsula posterior, que ocorreu em 35 pacientes (92,10%), seguido de desinserção zonular em 3 pacientes (7,89%). Em 28 pacientes (73,68%) foram encontrados restos corticais, que foram removidos durante a VPP. Em 12 pacientes (31,57%) foi realizado o reposicionamento da lente intraocular. A cirurgia de VPP foi realizada no mesmo dia da facoemulsificação em 1 paciente (2,63%), dentro de 7 dias em 15 pacientes (39,47%), entre 1 semana e 1 mês em 13 pacientes (34,21%) e após 1 mês da facoemulsificação em 9 pacientes (23,68%).

Conclusão: O presente estudo encontrou dados semelhantes aos descritos na literatura mundial, que afirmam que as principais complicações da facoemulsificação são a ruptura de cápsula posterior e desinserção zonular; e que a acuidade visual final melhora, em aproximadamente metade dos casos, mesmo após ocorrer complicações na cirurgia de catarata moderna, quando instituído tratamento complementar adequado.

Descritores: Facoemulsificação/complicações; Vitrectomia/métodos; Extração de catarata

INTRODUCTION

With the increasing popularity of phacoemulsification as a method of choice for cataract surgery, the incidence of complications such as inadvertent posterior capsule tear, nuclear fragments, and intraocular lens (IOL) loss into the vitreous cavity has increased greatly⁽¹⁻⁶⁾.

These complications are directly related to the surgeon's expertise and tend to increase in specific cases that represent major challenges. These cases include inadequate zonular support (pseudoexfoliation, trauma, and previous vitrectomy), mature and hypermature cataracts, high axial myopia, insufficient mydriasis, patient movements during the perioperative period, among others^(2,6,7-12).

Nuclear and IOL fragmentation in the vitreous may trigger serious consequences, including permanent visual loss, if not treated properly. These complications induce a severe inflammatory response

that is proportional to the excessive intraocular manipulation trauma and the nuclear fragment size or IOL model and material. These patients may also develop chronic uveitis, secondary glaucoma, corneal edema, and retinal detachment. One study showed a 52% incidence of glaucoma in such a condition⁽³⁾.

To determine the best clinical or surgical treatment strategy for such conditions, ophthalmologists mainly consider fragment size and the presence or absence of corneal edema and glaucoma⁽¹³⁻²⁰⁾.

Studies on the removal time of vitrectomy nuclear fragments indicated that it is not necessary for this procedure to be performed on the same day and that these fragments can be removed up till 1-2 weeks after surgery^(3,6,13-20).

This study aims to identify the causes and results of pars plana vitrectomy (PPV) in patients who underwent phacoemulsification with intraoperative complications and to analyze whether the surgical

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interval between phacoemulsification and PPV interferes with the best-corrected final visual acuity (VA).

METHODS

A descriptive and retrospective analytical study was conducted at Paraná Eye Hospital by reviewing 38 patient records.

The inclusion criteria were as follows: patients who underwent cataract surgery by phacoemulsification with intraoperative complications and required postoperative PPV immediately after cataract surgery. Considered surgeries were performed between January and December 2013.

The exclusion criteria were as follows: patients with incomplete follow-up during the study period or those with incomplete medical records.

The following data were collected for this study: gender, age, origin, best-corrected visual acuity (BCVA) prior to phacoemulsification and a month after PPV, and complications or procedures required during the last surgery.

The ophthalmologic examination included the following procedures: average VA with best correction according to the Snellen chart, biomicroscopy with Zeiss slit lamp, intraocular pressure measurement by Perkins tonometer, and retinal mapping by EyeTech indirect ophthalmoscopy. Legacy 20000™ (Alcon) and Infniti® (Alcon) were used for phacoemulsification, and Stellaris (Bausch & Lomb) was used for vitrectomy.

Third-year ophthalmology residents and fellows of the cataract and anterior segment department of Paraná Eye Hospital performed the phacoemulsification surgeries. Experienced physicians expertise in retinal procedures performed the PPV procedures.

The study design was submitted to and approved by the Ethics Committee of Positivo University. Patient identities were not collected, ensuring patient anonymity. Because the aim of the study was the collection of medical appointment data, there were no interventions in the physician conduct, which occurred independent of the study.

Table 1. Best-corrected visual acuity (BCVA) prior to phacoemulsification (Pre-Phaco) and after pars plana vitrectomy (Post-PPV), n=38

BCVA	Pre-Phaco		Post-PPV	
	N	%	N	%
20/20 to 20/30	0	0	6	15.78
20/40 to 20/60	14	36.8	9	23.68
20/70 to 20/200	9	23.6	8	21.05
20/300 to 20/400	1	2.63	3	7.89
Worse than 20/400	14	36.8	12	31.57
Total	38	100.0	38	100.00

BCVA= best-corrected visual acuity.

RESULTS

Between January and December 2013, 42 patients underwent complicated cataract surgery followed by PPV. Four of these patients were excluded from the study because of incomplete records or follow-up. Of the 38 remaining patients, 12 were male (31.5%) and 26 female (68.4%). The average age was 69.42 ± 13.89 years (minimum of 5 years, maximum of 84 years). Half of the patients were from Curitiba, Paraná and the other half were from other locations.

Prior to phacoemulsification, eye comorbidities (besides cataract) were found in six patients (15.78%): glaucoma (five patients) and age-related macular degeneration (one patient). Of the 38 patients, 13 (34.21%) had diabetes mellitus type II and 11 (28.94%) had systemic arterial hypertension without fundoscopic changes.

Table 1 shows the general view of the BCVA values prior to phacoemulsification (BCVA pre-surgery) and 30 days after vitrectomy (BCVA post-surgery).

When analyzed individually, 18 (47.36%) patients presented an improvement in the final BCVA after PPV compared with BCVA prior to phacoemulsification, whereas 11 (28.94%) had worsening of BCVA. BCVA remained unchanged in nine (23.68%) patients. Of the 18 patients with improvement in the final BCVA, 15 (83.33%) underwent PPV within the first month after phacoemulsification.

Eighteen (47.37%) phacoemulsification procedures were performed within the first half of 2013 and 20 (52.43%) in the second half. Vitrectomy (PPV) was performed on the same day as phacoemulsification in one patient (2.63%), within 7 days in 15 patients (39.47%), between 1 week and 1 month in 13 patients (34.21%), and 1 month after phacoemulsification in nine patients (23.68%) (Table 2).

Posterior capsule tear was the most frequent intraoperative complication (35 patients, 92.10%), followed by detachment of the capsular bag in three patients (7.89%). Cortical fragments were found in 28 patients (73.68%) and were removed during PPV. Twelve patients (31.57%) required intraocular lens repositioning in the ciliary sulcus.

DISCUSSION

Cortical fragments were observed and surgically removed in 73.68% of the patients who underwent PPV. The remaining patients underwent PPV for removal of the nucleus from the vitreous. Gilliland showed a similar occurrence of cortical fragments in patients who underwent PPV⁽³⁾.

Lavinski *et al.* revealed that the surgical interval between cataract surgery and PPV was more than 15 days for most patients. In the present study, this surgical interval ranged from up to 15 days (16 patients; 42.10%) to more than 15 days (22 patients; 57.89%)⁽²¹⁾. On the other hand, the authors suggested that a shorter surgical interval between the two procedures results in an improvement of the final VA. This finding is consistent with that of the present study, given that of the 18 patients that showed improvement in the final BCVA after PPV, 13 (72.22%) had undergone this procedure within the first month after phacoemulsification^(21,22).

The average patient age in the present study was 69.42 years, similar to that obtained by Santacruz I in his RCP and final VA study,

Table 2. Best-corrected visual acuity (BCVA) prior to phacoemulsification (Pre-Phaco) and post pars plana vitrectomy (Post-PPV), according to the interval between surgeries, n=38

Surgical interval between phaco and PPV	Pre-Phaco			Post-PPV		
	<20/400	≥20/400	Average of the eyes	<20/400	≥20/400	Average of the eyes
			≥20/400			≥20/400
Up to 7 days	7	9	20/70	5	11	20/50
Between 8 and 30 days	3	10	20/60	2	11	20/60
After 30 days	4	5	20/70	5	4	20/40

and by Falavarjani *et al.* in their study of PPV for the removal of the nucleus from the vitreous⁽²³⁾.

Tavares *et al.* observed ocular comorbidities in 35% of patients, with glaucoma being the most frequent condition. These findings are consistent with those of in the present study⁽²⁴⁾.

It is important to emphasize that RCP is a complication that can occur with any surgeon and its proper management requires experience. Its management includes vitrectomy in order to minimize final VA losses⁽²⁵⁾.

As demonstrated, the results obtained in the present study are consistent with existing worldwide literature statistics.

It is crucial to point out the importance of an integrated and readily available team of retina specialists in order to manage such complications, provide the best prognosis, and consequently, increase quality of life.

CONCLUSION

In the present study, the most frequent intraoperative complication during phacoemulsification was the posterior capsule tear, followed by capsular bag detachment.

Almost half of the patients presented improvement in the final BCVA after PPV compared with BCVA prior to phacoemulsification.

Most of the patients who presented improvement in the final BCVA underwent PPV within the first month after phacoemulsification, suggesting that a shorter surgical interval between phacoemulsification with complication and PPV improves the final BCVA.

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