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Original article

Comparison of intra- and postoperative complications of phaco between sequential and combined procedures of 23-gauge vitrectomy and phaco

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Abstract

Purpose: To evaluate the intra- and postoperative complications of phacoemulsification in sequential and combined procedures of 23-gauge vitrectomy and cataract surgery.
Methods: The medical records of 376 patients who underwent phacoemulsification in a vitrectomized eye (sequential group) and 458 patients who underwent combined vitrectomy and phacoemulsification (combined group) were retrospectively reviewed. Main outcome measures were intra- and postoperative complications of phacoemulsification surgery. Surgical indications were a progressed cataract with various retinal conditions.
Results: The most common intraoperative complication during phacoemulsification was posterior capsule rupture in both groups. The rate of this complication was higher in the sequential group (18 eyes, 4.8%) than in the combined group (7 eyes, 1.5%) ($p = 0.006$). The most common early postoperative complication was transient high intraocular pressure (68 eyes, 14.8%) and late postoperative complication was pupillary in the synechia combined group (82 eyes, 17.9%). The most common early postoperative complication was transient high intraocular pressure (29 eyes, 7.7%) and late postoperative complication was posterior capsule opacification (27 eyes, 7.2%) in the sequential group. Fibrinous exudation occurred more in the combined group (57 eyes, 12.4%) than in the sequential group (19 eyes, 5.1%) ($p = 0.000$).
Conclusion: Both sequential and combined cataract surgeries seemed to be safe. Combined surgery could be preferred in harder cataracts and zonular dehiscence.

Keywords: Phacoemulsification, Vitrectomy, Combined, Sequential, Complication

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Introduction

Cataract and vitreoretinal diseases often occur simultaneously or cataract is a predictable consequence of vitreoretinal surgery.[1] The surgical management of patients with cataract and vitreoretinal disease usually represents a challenging problem for vitreoretinal surgeon.

Phacoemulsification in vitrectomized eyes can be difficult because of the lack of vitreous support and unstable anterior chamber depth.[1–3] Combined surgery presents challenges such as longer surgical time and increased postoperative inflammation.[4,5] Both of these procedures have advantages and disadvantages, and there is still a debate, either these procedures are done separately or together.

The aim of the present study was to focus on intra- and postoperative complications of phacoemulsification in sequential and combined procedures of 23-gauge pars plana vitrectomy (PPV) and cataract surgery. The visual acuity was

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not one of the primary outcomes because of the different prognoses of underlying vitreoretinal pathology.

Materials and methods

This retrospective study included 458 eyes of 458 patients who underwent combined 23-gauge PPV and cataract surgery (the combined surgery group) and 376 eyes of 376 patients who underwent cataract surgery in a previously 23-gauge vitrectomized eye (the sequential surgery group) between January 2009 and June 2013. Informed consents were obtained from all patients before surgery. Institutional Ethics Committee of Research and Training Hospital approval has been obtained.

The surgical indications were a progressed, visual acuity reducing cataract in combination with different retinal conditions. In case cataracts interfered with the adequate visualization of the retina or were dense enough to require extraction within the next one year, combined procedure was preferred. Exclusion criteria were previous PPV, penetrating ocular trauma and a follow-up time shorter than 6 months.

All patients had a complete preoperative examination including slit-lamp biomicroscopy, intraocular pressure (IOP) measurement and fundus examination. The intraocular lens power was calculated using the IOL-master (Carl Zeiss Meditec, Germany).

Surgical technique

Combined procedures were performed with retrobulbar anesthesia and cataract surgeries with parabulbar anesthesia. All operations were performed by the same surgeon (S.A.H), using the cataract surgical system (Infiniti Vision System, Alcon Inc. Forth Worth, TX, USA) and DORC Associate 2.500 vitrectomy system (DORC, Zuidland, the Netherlands).

In the sequential group cataract surgery was initiated with two limbal paracenteses created in the superonasal and superotemporal quadrants. After the anterior chamber was filled with viscoelastic material (sodium hyaluronate), the superior corneal incision at the superior quadrant was completed with a disposable, angled, 2.8 mm or 3.0 mm ophthalmic slit knife. An anterior continuous curvilinear capsulorhexis (CCC) was performed with a diameter 5.0 to 5.5 mm. After hydrodissection, phacoemulsification was done using the stop-and-chop technique in almost all cases. A bimanual technique for irrigation/aspiration (IA) was performed for cortex removal. The anterior chamber (AC) was then reformed with viscoelastic material and a hydrophobic acrylic foldable intraocular lens (IOL) was implanted in the capsular bag by an injector. Even in cases with posterior capsular defect, the surgeon could be able to implant a foldable IOL into the capsular bag. Residual AC viscoelastic material was aspirated using bimanual I/A. To ensure AC integrity stromal hydration was performed at the 2 paracentesis sites and 0.1 cc cefuroxime was injected into the AC.

In the combined surgery group, phacoemulsification was performed prior to PPV. In this group, before phacoemulsification, oblique beveled microcannulas were placed 3.5 mm behind the limbus. At the end of the cataract surgery, the corneal wound was closed with a single 10–0 nylon suture to prevent wound leakage and provide anterior chamber depth during PPV. Pars plana vitrectomy was performed using a 23-gauge high-speed vitreous cutter using the wide-field fundus visualization system. Various additional procedures were performed included hyaloid membrane peeling, epiretinal membrane peeling, photocoagulation, fluid-gas exchange and gas or silicone oil injection. For the stabilization of the AC, the viscoelastic material filled during IOL implantation was removed at the end of the vitrectomy. Suturing with 7–0 vicryl suture was seldom needed but may be used if leakage was detected.

Postoperatively, moxifloxacin and prednisolone acetate eyedrops were used 6 times a day for 1 week with eventual tapering during the next 3 weeks. Mydriatics were only used when moderate or severe anterior chamber inflammation had occurred. The suture was removed after 2 weeks postoperatively. Postoperative examinations were conducted at first day, first week, and 1, 3, 6 months, with a final visit at various times.

Statistical analysis was performed using the chi-square test to compare the indications and complication rates. P value < 0.05 was considered to be statistically significant.

Results

There were 286 women, 172 men (mean age: 62.3 ± 10.98 years) in the combined group and 194 women, 182 men (mean age: 59.8 ± 12.35 years) in the sequential group. In the sequential group, the median interval between PPV and subsequent phacoemulsification was 1–12 months (mean: 3.5 months). The mean postoperative follow-up time was mean 16 (6–42) months in the combined group and mean 15 months (6–42) in the sequential group. There wasn't any significant difference in the follow-up time between the groups ($p = 0.001$).

Table 1 shows the characteristics of the patients and the PPV indications in both groups. Proliferative diabetic

Table 1. Characteristics of the patients and pars plana vitrectomy indications in both groups.

	Combined surgery	Sequential surgery	*p*
Characteristics of the patients			
Number of patients	458	376	NS
Mean age, years	62.3 ± 11	59.8 ± 12	NS
Male:Female, *n*	172: 286	182: 194	NS
Diabetes mellitus, *n*	271	241	NS
Systemic Hypertension, *n*	255	203	NS
Indications of vitreoretinal surgery			
Proliferative diabetic retinopathy (Vitreous hemorrhage, taut posterior hyaloid)	215 (46.9)	139 (37)	0.00
Epiretinal membrane	78 (17)	38 (10.1)	0.00
Retinal detachment	73 (15.9)	124 (33)	0.00
Macular hole	23 (5)	45 (12)	0.00
Vitreous hemorrhage due to other retinal vascular disease	69 (15.1)	30 (8)	0.00

P by Pearson chi-square test, NS: not significant.

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