

BOUNDARY OF LENS AND VITREOUS SURGERY

PhD Thesis

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INTRODUCTION

Ophthalmic surgery underwent a very quick technical improvement; interventions became easier and shorter to perform. We achieve phacoemulsification cataract surgery (Phaco) since 1994 and use wide viewing angle lens-system and endolaser photo-coagulator what are indispensable for pars plana vitrectomy (PPV) since 1996 at our department.

AIM OF THE STUDY

Our aim was to investigate the boundary of cataract and vitreous surgery.

1. Complications of cataract surgery treatable with PPV: retinal detachment (RD), endophthalmitis, dropped nucleus.
2. Cataract extraction on vitrectomized eyes can be more difficult.
3. Cataract extraction with vitreous surgery is necessary sometimes in one session.

Numerous patents of our department provided a great possibility to analyze results of different type of surgery.

1. PARS PLANA VITRECTOMY AFTER CATARACT SURGERY

Retinal detachment after extracapsular or phacoemulsification extraction

Purpose: To overview frequency, risk factors and treatment of retinal detachment cases after extracapsular cataract surgery (ECCE) and phacoemulsification in a consecutive group of patients.

Patients and methods: We evaluated 34 RD eyes after ECCE of 34 patients in 2001-2003 periods and 40 eyes of 37 patients after Phaco over a 10-year-period at our department from South Trans-Danube region of Hungary. We assessed risk factors and results of PPV.

Results: The frequency of RD after ECCE seemed to be 4.16%, after Phaco 0.36%. Well-known risk factors were myopia (25mm or longer axial length), age younger than 65 years at the time of cataract surgery, male gender and complications during cataract surgery. Retina reattached after the first intervention in 56% of the cases, after re-operations in 94% of the cases. Final best-corrected visual acuity (BCVA) became 0.5 or better Snellen line in 15% of cases after ECCE and 27.5% of eyes after Phaco.

Conclusion: Rate of RD development after cataract surgery seemed to be low. Risk factors were similar as mentioned in the literature. Mean interval between cataract surgery and RD seemed to be more than 3 years after ECCE, more than 2 years after Phaco.

Endophthalmitis after cataract surgery

Purpose: To overview acute postoperative endophthalmitis (POE) cases developed after cataract surgery.

Patients and methods: We treated 18 eyes of 18 patients with POE at our department in 2001-2004 periods. We assessed clinical data, treatment and visual results retrospectively.

Results: There was 9871 cataract surgery performed at South Trans- Danube region, POE developed on 18 eyes. The incidence seemed to be 0.18 for 1000 cataract surgery. Final BCVA became 0.2 Snellen E or better in a half of the cases.

Conclusion: We observed improvement of Phaco intervention and decrease of ECCE in this period. POE occurred in 0.18% of cases, similarly that mentioned in the literature.

Microbiological investigation of causative bacteria

Purpose: **Our aim was to** investigate in vivo the effect of a single dose antibiotic treatment on the adhesive ability of endophthalmitis producing bacteria to intraocular lenses (IOL).

Patients and methods: We overviewed cases with POE after cataract surgery; identified and investigated the cultured bacteria taken from anterior chamber, vitreous samples and eviscerated tissues. We examined the adhesive ability of the isolated Streptococcus and Staphylococcus strains to the surface of acrylic IOL. **Results:** Antibiotic (ciprofloxacin and tobramycin) administration was able to reduce significantly the number of attached bacteria on the surface of acrylic lenses in the case of both Staphylococcus Aureus and coagulase negative Streptococcus strains. We demonstrated also dependence of the effect from concentration. **Conclusion:** Despite the debate on antibiotic prophylaxis, we presented that a single antibiotic administration can decrease the attachment of bacteria to the surface of acrylic IOL.

Dropped nucleus

Purpose: To overview cases, underwent vitreous surgery for dropped nucleus.

Patients and methods: We treated 31 eyes of 31 patients with PPV for dropped nucleus at our department in 1998-2005 periods.

Results: The causes leading to dropped nucleus were zonulolysis, posterior capsule rupture and incomplete capsular rhexis. Posterior chamber lens implantation could carry out in most of the cases. Most frequent intra- and postoperative complications were hemorrhage of the iris, corneal edema and RD.

Conclusion: Dropped nucleus is a rare complication of Phaco. Depending on the size of the retained lens material, PPV can be necessary as intraocular pressure elevation or RD can occur as serious complications.

2. PHACOEMULSIFICATION AFTER VITRECTOMY

Purpose: To provide an overview of intra- and the postoperative complications and to evaluate the visual results of phacoemulsification cataract surgery on vitrectomized eyes.

Patients and methods: Of 11498 eyes treated with Phaco, 143 (1.2%) had previous PPV during the 10-year-period (1995-2004), 134 eyes were included in this study.

Results: The Phaco procedure seemed to be difficult where there was a deep or fluctuating anterior chamber (93%) and primary opaque posterior capsule (19%). The most frequent intra- and postoperative complications were posterior capsule rupture (9%), incomplete capsular rhexis (5%), intraocular pressure elevation (7%), retinal detachment (6%) and posterior capsule opacity (8%) during the mean follow-up period of 18.2 months (1.5-110 months). Final BCVA increased two or more Snellen E lines in 55% of the cases and became better or equal to 0.5 Snellen line in 10% of the cases.

Conclusion: 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, Phaco proved to be a safe procedure in the hands of experienced surgeons.

3. LENS REMOVAL WITH VITRECTOMY IN ONE SESSION

Phacoemulsification and vitrectomy

Purpose: To perform cataract and vitreous surgery in one session is necessary, when the retina poorly visualized because of lens opacity. Our aim was to overview complications and results of these combined interventions.

Patients and methods: 49 eyes of 49 patients went under Phaco and PPV in 1 session at our department in 2000-2005 periods.

Results: Most frequent intra- and postoperative complications were posterior segment hemorrhage (12%), iatrogenic retinal lesions (10%), fibrinous iritis (22.5%) and intraocular

pressure elevation (20%). Re-operations needed because of RD or vitreous hemorrhage in 26% of the cases.

Conclusion: Phacoemulsification, IOL implantation and vitreous surgery in 1 session seemed to be safe and short intervention in cases when lens opacity is also present.

Phacoemulsification with silicone oil removal

Purpose: To overview, the results of cataract surgery cases on silicone oil filled eyes with phacoemulsification and silicone oil removal.

Patients and methods: 36 eyes of 34 patients composed the study between 2000- 2006 periods. We removed the silicone oil through rhexis of the posterior and anterior capsule, pupil and corneal wound. We discussed the indication for previous PPV, the intra- and postoperative complications and postoperative visual acuity.

Results: Most frequent indication for oil implantation was retinal detachment. Visual acuity improved two or more Snellen E line after the intervention on 23 eyes, worsened on 3 eyes. Retina detached after the procedure on 36% of the eyes, we implanted silicone oil successfully in all eyes.

Conclusion: Phaco combined with silicone oil removal is rational and simple method in one session, but only in cases with stable attached retina.

CONCLUSIONS OF THE THESIS, RESULTS

1. Most frequent complication of cataract extraction was retinal detachment after ECCE (more than 4%). Endophthalmitis seemed to be the rarest one (0.18%), but this complication caused no light perception visual acuity most frequently (17%).

2. Significant risk factors for RD after cataract surgery were male gender, young age and high myopia. Vitreous loss during cataract surgery meant the higher relative risk (20 times). First intervention for RD was successful in more than 50% of the cases. Results of a 10-year-period we publicized first in English literature.

3. Endophthalmitis occurred in 0.18% of the cases in our series, similarly to data mentioned in literature. Success rate of treatment was also similar. We publicized in vitro efficacy of antibiotic therapy on adhesion of bacteria to the surface of IOL.

4. Dropped nucleus developed most frequently after posterior capsular lesion. The data of literature are controversies, how and when to treat it. It is very important to collect our cases and results of interventions. This is the first series of it at our department.

5. Cataract develops very frequently after PPV. The loss of vitreous makes the lens extraction more difficult. There is another problem, when macular disease limits the visual recovery. We collected results of a 10-year-period, so we presented a high number of cases, also in English literature. The number of complications was similar as mentioned in literature. The visual results depended on the macular status; the BCVA became 0.5 or better Snellen line in 10% of the cases.

6. Cataract extraction and vitreous surgery must to perform in one session, when the retina is not enough visible. Silicone oil is removable also together with lens extraction. We did not detect much more complications connected with Phaco. The length of intervention did not increased significantly. Visual result depends on the state of retina. In spite of careful surgical technique and indication, Phaco and silicone oil removal leads to retinal detachment in 36% of cases.

We compared our results with results mentioned in literature successfully, overviewed latest international suggestions.