

# Cataract surgery in exudative uveitis: Effectiveness of total lens removal, anterior vitrectomy, and scleral fixation of PC IOLs

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**PURPOSE.** *Cataract surgery in exudative uveitis is often followed by severe complications (pupillary seclusion/occlusion, dense posterior capsule/anterior vitreous opacification, cystoid macular edema following repeat YAG laser procedures) which often drastically limit functional recovery. Total removal of cataract, anterior vitrectomy, and scleral fixation of a posterior chamber (PC) intraocular lens (IOL) has been tried as a surgical alternative, searching for lessened postsurgical complications and a better outcome.*

**METHODS.** *Group A was a cohort of 12 patients with cataract after exudative (mostly sarcoidosis and Vogt-Koyanagi-Harada) uveitis, subjected to intracapsular cataract extraction, anterior vitrectomy, and scleral fixation of PC IOLs. Group B was the control group, including 12 patients with a similar clinical condition subjected to phacoemulsification or extracapsular cataract extraction plus in-the-bag or in-the-sulcus IOL implantation. Follow-up time for both groups was at least 7 years.*

**RESULTS.** *Postoperative inflammatory signs were substantially less in Group A patients, from 2 days up to >7 years postsurgery. Group A patients showed no cells/exudates adhering to the IOL surfaces, no synechiae, minimal (as compared to Group B) vitreous opacifications, and significantly higher visual acuity ( $p=0.024$  at the seventh year control). Group A patients reported less frequent relapses of uveitis postsurgery, but the relevant clinical data did not allow statistical evaluations.*

**CONCLUSIONS.** *Total removal of cataract in highly exudative uveitic eyes, plus anterior vitrectomy and scleral fixation of PC IOLs, although technically a more demanding surgical procedure, proved to be safe and more effective than classical procedures. (Eur J Ophthalmol 2008; 18: 220-5)*

**KEY WORDS.** *Cataract, Postsurgical inflammation, Uveitic cataract, Uveitis*

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## INTRODUCTION

Lens extraction in cataracts related to severe intraocular inflammation has always carried several problems, both intraoperative and postoperative (1). The current rules that 1) the eye should be operated while completely quiet for at least 2 months, 2) phacoemulsification and in-the-bag implantation should be performed in the cleanest and fastest way, and 3) an adequately intense/prolonged steroid treatment should always follow surgery (2) have minimized these problems. In certain cases of strongly exudative uveitis, however

- particularly sarcoidosis, Vogt-Koyanagi-Harada (VKH), HLA B27+, and Behçet - and notwithstanding adequate therapy, postoperative complications such as dense pupillary occlusion, severe exudation covering both surfaces of the intraocular lens (IOL), thickening and clouding of anterior vitreous, and need for repeat Nd:YAG laser procedures are frequent, and a severe, permanent visual loss due to additional macular changes, such as cystoid macular edema, is not infrequent.

In the past we observed that total removal of the cataractous lens from uveitic eyes - made perioperatively nec-

essary in occasional cases, because of unforeseen intraoperative complications in the course of procedures which had been planned as classic phacoemulsifications or extracapsular extractions (ECCE) + posterior chamber (PC) IOL - followed by anterior vitrectomy and scleral fixation of a PC IOL often did well, with minimal postoperative inflammation also in the long term, and showed an often excellent visual outcome without any significant problem.

Following these anecdotal observations, we decided to do a prospective clinical study, evaluating the post-surgical behaviour of a group of patients with cataract after strongly exudative uveitis, subjected to total removal of the cataractous lens, anterior vitrectomy, and scleral fixation of a PC IOL, compared to a group of similar patients, subjected to phacoemulsification or ECCE and PC IOL implantation.

## MATERIALS AND METHODS

Group A included 12 patients (4.7% of 268 consecutive surgical procedures performed between 1995 and 2000 by the same surgeon, A.G.S.),  $39.42 \pm 11.88$  years of age, with cataract following strongly exudative uveitis (presumed or confirmed sarcoidosis in 8 cases, VKH in 2 cases, HLA B27+ in 1 case, Behçet in 1 case). These patients, after providing informed consent, were subjected under local anesthesia to cryoextraction of the cataractous lens after synechiolysis, anterior transpupillary vitrectomy, scleral fixation (under two lamellar scleral flaps, at 8 and 2 o'clock, 3 mm from the limbus) of a PC IOL with two 10.0 Prolene sutures double-armed with a straight needle, carried out of the vitreous chamber via a 29-G butterfly device connected to an insulin syringe.

Group B included 12 patients with demographic and clinical characteristics similar to Group A: presumed or confirmed sarcoidosis in 6 cases, VKH in 2 cases, HLA B27+ in 2 cases, Behçet in 2 cases,  $50.81 \pm 10.88$  years of age. These patients, collected in parallel with Group A patients between 1995 and 2000, were subjected under local anesthesia to the classic procedure for uveitic cataracts: continuous circular capsulorhexis (CCC), mechanical synechiolysis, phacoemulsification (9 cases) or ECCE (3 cases), in-the-bag (phacoemulsification, 9 cases) or in-the-sulcus (ECCE, 3 cases) IOL implant, one or no sutures. All

the IOLs employed were acrylic lenses.

All patients underwent surgery while in a quiet phase of their uveitis, which had been such for at least the last 2 months.

Systemic prednisone, 25–50 mg/day, plus topical treatment were required in almost all cases in both Group A and Group B patients.

Postoperative treatment was the same in the two groups: systemic prednisone, 25 to 50 mg/day for 2 months, then tapered by 10–20% every week up to total suspension or, more often, to a chronic administration of 10–20 mg/day or alternate day, with or without additional immunosuppressive drugs according to the different subspecies of uveitis; topical antibiotics, BID for 2 weeks; topical steroids, 4 to 6 times a day for the first months, then tapered according to the clinical picture, and prolonged for several months/years. There have been individual differences in treatment among the 24 patients, related to each specific clinical condition, but no substantial differences between the two groups.

Patients were seen 24 hours postoperatively, 14 days after surgery, after 2 years, and after at least 7 years. The presence of inflammatory activity, anterior chamber (AC) cells and flare, AC fibrin, AC blood, vitreous opacities, vitreous hemorrhages, uveal effusion, and retinal detachment were considered and graded on an arbitrary scale from 0 to 3+. Intraocular pressure (IOP) and best-corrected visual acuity as Snellen lines (BCVA) were also recorded.

Statistical analysis was applied to the 2-year and 7-year VA data, using the Student *t* test.

## RESULTS

Table I shows the clinical findings 48 hours after surgery. More inflammatory reaction was present in Group B patients, particularly in the AC. Four out of 12 patients belonging to Group A showed a small, <1 mm, hyphema, as well as traces of blood in the vitreous chamber. Four out of the same 12 patients showed some degree of uveal effusion (likely hemorrhagic in nature) related to the scleral fixation sutures. IOP was below 22 mmHg in all 24 cases.

Table II shows the clinical findings 14 days after surgery. Group A patients had a completely clean AC, while Group B patients showed substantial inflammatory signs

still present in the AC, together with a vitreous clouding more dense than in Group A patients. Four out of 12 Group A patients were still showing some degree of vitreous and choroidal hemorrhages. BCVA was already better in Group A patients.

Table III shows the clinical findings 2 years after surgery. Flare and cells were still present to some extent in the AC of almost all of the patients in Group B. The same patients also showed posterior synechiae and frequently dense exudation on both surfaces of the IOLs, although only 2 out of 12 had complete pupil-

lary occlusion, and dense vitreous opacifications. Group A patients, on the contrary, showed completely clean ACs and IOLs, practically without any cells adhering to the acrylic lens. Hemorrhagic phenomena had disappeared, and the vitreous opacities were less conspicuous than in Group B patients. Seven out of the 12 Group B patients required within the second year after surgery one or more Nd:YAG laser procedures. Figure 1 shows the behavior of BCVA, statistically better in Group A patients, with a  $p=0.050$ .

Table IV shows the clinical findings more than 7 years

**TABLE I - CLINICAL SIGNS 48 HOURS AFTER SURGERY**

	Group A (ICCE +anterior vitrectomy)	Group B (phaco or ECCE)
Reaction	+ - -	+ + -
AC cells/flare	+ - -	+ + +
AC fibrin	+ - -	+ + -
AC blood	+ - -	- - -
Vitreous opacity	+ + -	+ + -
Vitreous hemorrhages	+ - -	- - -
Uveal effusion	+ - -	- - -
Retinal detachment	- - -	- - -
IOP changes	- - -	+ - -
BCVA	+ - -	+ - -
YAG laser	- - -	- - -

ICCE = Intracapsular cataract extraction; ECCE = Extracapsular cataract extraction; AC = Anterior chamber; IOP = Intraocular pressure; BCVA = Best-corrected visual acuity

**TABLE II - CLINICAL SIGNS 14 DAYS AFTER SURGERY**

	Group A (ICCE +anterior vitrectomy)	Group B (phaco or ECCE)
Reaction	- - -	+ + -
AC cells/flare	- - -	+ + -
AC fibrin	- - -	+ + -
AC blood	- - -	- - -
Vitreous opacity	+ - -	+ + -
Vitreous hemorrhages	+ - -	- - -
Uveal effusion	+ - -	- - -
Retinal detachment	- - -	- - -
IOP changes	- - -	- - -
BCVA	+ + -	+ - -
YAG laser	- - -	- - -

ICCE = Intracapsular cataract extraction; ECCE = Extracapsular cataract extraction; AC = Anterior chamber; IOP = Intraocular pressure; BCVA = Best-corrected visual acuity

**TABLE III - CLINICAL SIGNS 2 YEARS AFTER SURGERY**

	Group A (ICCE +anterior vitrectomy)	Group B (phaco or ECCE)
Reaction	- - -	+ - -
AC cells/flare	- - -	+ - -
AC fibrin	- - -	+ - -
AC blood	- - -	- - -
Vitreous opacity	+ - -	+ + -
Vitreous hemorrhages	- - -	- - -
Uveal effusion	- - -	- - -
Retinal detachment	- - -	- - -
IOP changes	- - -	- - -
BCVA	+ + -	+ - -
YAG laser	- - -	+ + -

ICCE = Intracapsular cataract extraction; ECCE = Extracapsular cataract extraction; AC = Anterior chamber; IOP = Intraocular pressure; BCVA = Best-corrected visual acuity

**TABLE IV - CLINICAL SIGNS >7 YEARS AFTER SURGERY**

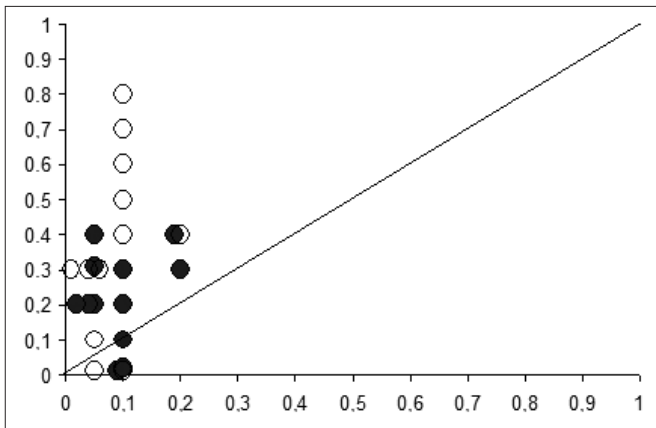
	Group A (ICCE +anterior vitrectomy)	Group B (phaco or ECCE)
Reaction	- - -	+ - -
AC cells/flare	- - -	+ - -
AC fibrin	- - -	+ - -
AC blood	- - -	- - -
Vitreous opacity	+ - -	+ + -
Vitreous hemorrhages	- - -	- - -
Uveal effusion	- - -	- - -
Retinal detachment	- - -	- - -
IOP	- - -	+ - -
BCVA	+ + -	+ - -
YAG laser	- - -	+ + +

ICCE = Intracapsular cataract extraction; ECCE = Extracapsular cataract extraction; AC = Anterior chamber; IOP = Intraocular pressure; BCVA = Best-corrected visual acuity

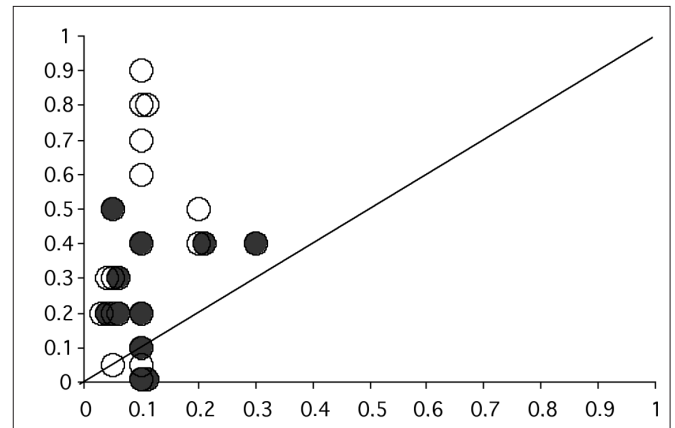
after surgery. All 12 patients belonging to Group A - total removal of the cataractous lens - had quiet ACs, some with minimal traces of flare but no cells, totally clean pupils and IOLs, some degree of deep vitreous opacification, no chorioretinal changes possibly related to the surgical procedure, normal IOP. BCVA showed (Fig. 2) an improvement of  $0.37 \pm 0.28$ , post-surgery versus presurgery. Patients belonging to Group B - phacoemulsification or ECCE - showed, after 7 years, some degree of inflammatory reaction, with frequent substantial flare and cells in their ACs, dense vitreous opacifications, some abnormalities in their IOP (higher than 24 mmHg in 4 cases, lower than

10 mmHg in 3 cases). Ten patients out of 12 required one or more Nd:YAG laser procedures. BCVA showed (Fig. 2) an improvement of  $0.14 \pm 0.15$ , postsurgery versus presurgery. The difference between the two groups, A and B, in terms of visual recovery was statistically highly significant, with a  $p=0.024$  in favor of Group A.

Two out of the 12 patients belonging to Group A showed some displacement of the IOL, one minimal, the other more evident with some tilting which did not interfere with the patient's BCVA. No other significant complication was observed in Group A patients.



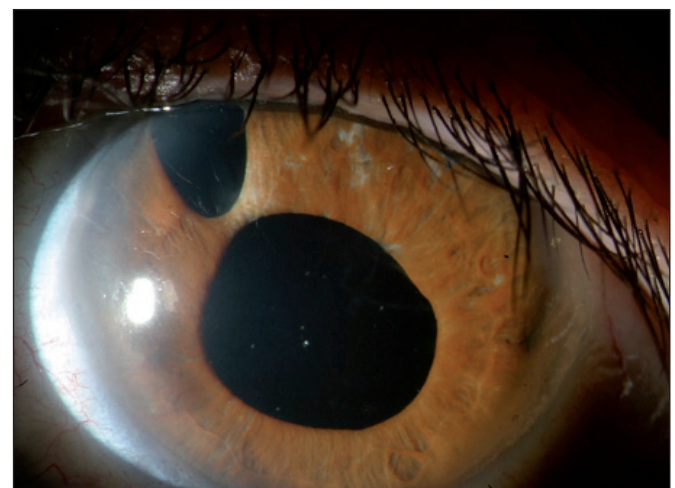
**Fig. 1** - Best-corrected visual acuity (postop vs preop) 2 years after surgery.  
(White dots = Group A (ICCE + scleral fix PC IOL).  
(Black dots = Group B (Phaco/ECCE + PC IOL)



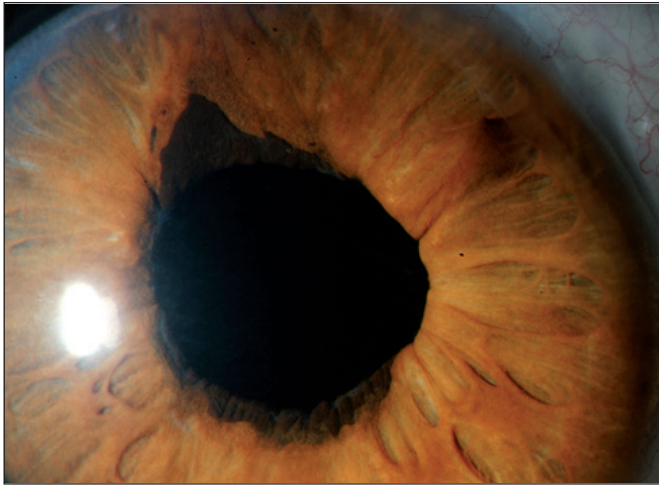
**Fig. 2** - Best-corrected visual acuity (postop vs preop) >7 years after surgery.  
(White dots = Group A (ICCE + scleral fix PC IOL).  
(Black dots = Group B (Phaco/ECCE + PC IOL)



**Fig. 3** - Sarcoidosis. Phaco + in-the-bag intraocular lens, 4 years after surgery.



**Fig. 4** - Sarcoidosis. Intracapsular cataract extraction + anterior vitrectomy + scleral fixed posterior chamber intraocular lens, 12 years after surgery. Best-corrected visual acuity = 0.9.



**Fig. 5** - Vogt-Koyanagi-Harada. Intracapsular cataract extraction + anterior vitrectomy + scleral fixed posterior chamber intraocular lens, 9 years after surgery. Best-corrected visual acuity = 0.8.

## DISCUSSION

The results of our clinical trial indicate that total removal of the cataractous lens in uveitic patients plus anterior vitrectomy, followed by scleral fixation of PC IOLs, is a safe surgical technique which, in our series, proved to be superior in terms of efficacy versus more classic procedures: significantly better outcome in terms of BCVA, less intraocular inflammation throughout the entire postoperative follow-up, totally clean pupils and IOLs, no need for subsequent Nd:YAG laser procedures.

Total removal of the cataractous lens, however, may be a technically more demanding procedure, particularly nowadays, when cryoextraction has virtually been forgotten by older surgeons, and is virtually unknown to the younger generation. If cryoextraction – which would be technically more simple – cannot be performed, there are other surgical ways to obtain a total removal of the cataractous lens plus anterior vitrectomy – for instance, via pars plana – followed by scleral fixation of PC IOLs.

Several authors have already reported on the overall good outcome of this surgical procedure, also after prolonged follow-ups (3-5). Other authors are substantially in favor of it, although recommending the utmost care in selecting patients (6, 7), and pointing out the high rate of possible complications (8). The last publication reports a very high frequency of spon-

taneous breakage of the Prolene suture, a problem we did not encounter.

The efficacy of a combined procedure of lensectomy and anterior vitrectomy, on the other hand, is rather widely accepted in the treatment of complicated cataracts in juvenile patients (9-11), and has been promising in experimental uveitis (12).

We believe that many of the reasons why the lensectomy – vitrectomy procedure is frequently used in juvenile patients – most important of which may be a strong reactivity of these patients, which express severe exudative phenomena – also hold true in selected cases of uveitic cataract.

The question to be clarified, therefore, is whether it is really necessary to use complicated procedures in uveitic cataracts, when the wide majority of authors agree that uveitic cataract may be treated in general with more classical procedures, provided that a “stringent perioperative and postoperative control of inflammation” (13) be reached and, above all, maintained (2, 14-16), pursuing a “model of zero tolerance to intraocular inflammation” (1).

Our answer is that it is not necessary in more than the 90% of the cases (as from our series), where phacoemulsification + in-the-bag IOLs ensure a safe and satisfying outcome. There are clinical conditions, however, where exudation is a peculiar feature of the intraocular inflammation (in sarcoidosis, for instance, but in other diseases as well, such as VKH, Behçet, and HLA B27+) and this exudation may be severe, being hardly overcome by any medical treatment. The final picture, in these cases, is often similar to what is shown in Figure 3, a clinical result to be avoided. This outcome might sometimes be predicted prior to surgery, evaluating the etiology/pathophysiology of the inflammation or, more easily when it is the case, considering the postsurgical behavior of the first eye. In these cases (less than 10% in our series) we believe that a complete removal of the cataractous lens should be carried out, regardless of the procedure, followed by a scleral fixation of PC IOLs. We are aware that such a procedure, besides being technically more demanding than phacoemulsification, carries a number of possible complications which may be higher than the classic procedure. The functional results of the combined procedure we propose (but also the morphologic appearance more than 7 years after surgery; Figs. 4 and 5) are so good, perhaps in correlation with

an overall lower damage of the macula due to less postoperative inflammation, also in the absence of any Nd:YAG laser procedure, that this technique should be considered as a highly valuable option in carefully selected cases of uveitic cataract.

Many patients belonging to Group A believed that the number of inflammatory relapses after total removal of the lens had undergone a dramatic reduction after surgery as compared to prior to surgery. A few patients in Group B reported the same. Since our trial design did not allow the specific recovery of reliable data for a statistical evaluation, we cannot draw any conclusion on this specific issue.

Whether the complete removal of cataractous lens and anterior vitreous in chronic uveitic patients might be

considered, besides being highly effective in terms of functional outcome, also therapeutic - through the complete removal of a reservoir of materials possibly active in the self-maintenance of chronic uveitis (17) - remains to be demonstrated.

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