Inflammation after cataract extraction and intraocular lens implantation in patients with rheumatoid arthritis

Toshihiko Matsuo, Miki Fujiwara, Nobuhiko Matsuo

Abstract

Aims—The purpose of this study was to examine whether preoperative activity of rheumatoid arthritis influences the extent of anterior chamber inflammation after cataract extraction and intraocular lens implantation.

Methods—The medical records of 23 consecutive patients (33 eyes) with rheumatoid arthritis, who underwent cataract extraction with intraocular lens implantation, were reviewed during a 4 year period from April 1990 to March 1994.

Results—Eleven patients who still showed a 1+ level of aqueous cells 1 month after the surgery had significantly higher titres of rheumatoid factor preoperatively, compared with the other 12 patients who showed no aqueous cells (p=0.0019, Mann-Whitney U test). The persistence of aqueous cells also had a significant correlation with extracapsular cataract extraction compared with phacoemulsification (p=0.0391, χ² test). Multivariate analysis showed that the titre of rheumatoid factor was the more significant element to determine the persistent aqueous inflammation. All the eyes, except for four which had a macular hole, optic disc atrophy, or retinitis pigmentosa gained visual acuity of 20/30 or better. The aqueous cells cleared 3 months after the surgery and left no complications in any of the eyes.

Conclusion—Intraocular lens implantation is basically a safe procedure for patients with rheumatoid arthritis, although postoperative aqueous inflammation tends to be persistent in patients with high titres of rheumatoid factor.

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Rheumatoid arthritis is a chronic systemic disease manifested by symmetrical arthritis of small joints, rheumatoid nodules, and a positive test for serum rheumatoid factor (IgG, IgM, or IgA class autoantibodies directed against the Fc fragments of IgG). 1, 2 The ocular manifestations of rheumatoid arthritis include keratoconjunctivitis sicca (Sjögren's syndrome), 3 episcleritis and scleritis, 4, 5 corneal melting disease, 6, 7 and retinal vasculitis. 8–10 Iritis or iridocyclitis seen in patients with rheumatoid arthritis is not a direct consequence of the disease but is secondary to other ocular complications such as scleritis. 11–13

Patients with rheumatoid arthritis often have posterior and anterior subcapsular cataract which quickly reduces their vision to the level low enough to disturb reading and ambulation. 14 Cataract is caused principally by long term use of corticosteroid hormones in the treatment of rheumatoid arthritis. 14 Cataract extraction and intraocular lens implantation have been thought to be a safe procedure in patients with rheumatoid arthritis with no ocular complications. We noted, however, postoperative intraocular inflammation after cataract extraction and intraocular lens implantation varied markedly from patient to patient. To elucidate clinical factors which predispose some patients to have the severer postoperative intraocular inflammation, we reviewed patients with rheumatoid arthritis who underwent cataract extraction and intraocular lens implantation.

Patients and methods

We reviewed medical records of 23 consecutive patients with rheumatoid arthritis who had undergone cataract extraction with intraocular lens implantation at Kurashiki Kosai Hospital during a 4 year period from April 1990 to March 1994. The hospital has a special clinic for the treatment of rheumatoid arthritis. All the patients included in the study satisfied the diagnostic criteria for rheumatoid arthritis published by the American Rheumatism Association in 1987. 15

Planned extracapsular cataract extraction or phacoemulsification was performed based on cataract maturity and intraocular lenses were fixed in the capsular bag with the aid of hyaluronic acid (Healon, Pharmacia). One week before the cataract surgery, each patient underwent systemic examinations including blood pressure, kidney and liver function tests, fast blood sugar, erythrocyte sedimentation rates, complete blood count, serum levels of C-reactive protein, immunoglobulins, α2 globulins, complements (C3 and C4), and rheumatoid factor. Titres of rheumatoid factor and levels of C-reactive protein were determined by nephelometry (turbidimetric immunoassay).

Postoperative follow up examinations were recorded at 3 days, 1 week, 1 month, and 3 months after the surgery. At each examination were recorded visual acuity, refractive errors, keratometric readings, keratic precipitates, aqueous cells and flares, anterior vitreous cells, presence or absence of fibrin formation, clearness of the posterior capsule and intraocular lens, iris atrophy, intraocular pressure, and findings in the fundus and angle. Levels of cells...
from the anterior chamber and anterior vitreous were recorded according to the grading system of Hogan et al. Briefly, both cells and flares were graded increasingly from 1+ to 4+.

Each patient was given postoperatively a combination of 0.1% betamethasone sodium phosphate, 0.1% diclofenac sodium, and 0.3% ofloxacin eye drops four times a day for 4 weeks after the surgery.

For statistical analyses, the eye that underwent cataract surgery earlier was chosen in each patient when both eyes had been operated on. Statistical analyses were done with a software STATVIEW (Macintosh) package.

### Results

Thirty three eyes of 23 consecutive patients with rheumatoid arthritis underwent cataract surgery during the period. Planned extracapsular cataract extraction was performed in 16 eyes and phacoemulsification was done in the other 17 eyes. Extracapsular cataract extraction was concentrated in the initial phase because patients with mature cataract underwent the surgery earlier. The cataract surgery was free of intraoperative complications, including capsular rupture, and intraocular lenses were implanted in the capsular bag of all the eyes. The age of the patients at surgery varied from 59 to 81 years and all the patients except for one (case 19) were female (Table 1). The follow up periods were from 3 months to 4 years.

Patients had the history of rheumatoid arthritis ranging from 5 to 33 years. Most of the patients received a low dose of prednisolone (2.5-7.5 mg) every day combined with other medications such as gold (auranoitin), methotrexate, lobenzarit, bucillamine, or D-penicillamine for rheumatoid arthritis before the surgery (Table 1). Doses of the medication, including prednisolone for rheumatoid arthritis, were not changed during a 3 month period after cataract surgery in all patients. Three patients had diabetes mellitus and seven patients had essential hypertension. Prednisolone was not given to these three diabetic patients. No patient showed exfoliation syndrome, or the previous history of uveitis, episcleritis, scleritis, or keratoconjunctivitis sicca.

All the eyes except four eyes gained best corrected visual acuity of 20/30 or better after cataract surgery. A macular hole, optic disc atrophy, or retinitis pigmentosa was found in these four eyes with poor visual outcome (Fig 1). One eye (case 6) developed transient elevation of intraocular pressure up to 33 mm Hg 3 days after surgery, which returned to normal within 4 days without any medication. Other complications directly linked to the surgery, including cystoid macular oedema, were absent. One patient (case 12) died of lung cancer 6 months after surgery, and another patient (case 19) developed endogenous fungal endophthalmitis in both eyes and died in the course of intravenous hyperalimentation for general debilitation 5 months after surgery.

No eye had preoperative inflammation in the anterior chamber. All the eyes had some degree of aqueous inflammation 3 days and 1 week after the cataract surgery (Table 2). Sixteen eyes still had a 1+ level of aqueous cells 1 month after surgery, while the other 17 eyes had no inflammation. Aqueous inflammation completely cleared in all eyes 3 months after surgery.

The extent of aqueous inflammation both 3 days and 1 week after the surgery did not have any correlation with preoperative activity of rheumatoid arthritis shown by white blood cell counts, erythrocyte sedimentation rates, serum levels of C-reactive proteins, or serum titres of rheumatoid factor. In other words, higher activity of rheumatoid arthritis did not necessarily lead to more marked aqueous inflammation immediately after intraocular lens implantation.

The presence or absence of aqueous cells 1 month after surgery is plotted against preoperative serum titres of rheumatoid factor,
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**Figure 2** Preoperative serum titres of rheumatoid factor are significantly higher in patients with a 1+ level of aqueous cells compared with patients with no aqueous cells 1 month after cataract surgery (p=0.0019, Mann-Whitney U test). Arrowheads indicate patients with diabetes mellitus who show aqueous cells despite lower titres of rheumatoid factor. Eyes which underwent surgery earlier were chosen, when both eyes were operated on.

ECCE=extracapsular cataract extraction; Phaco=phacoemulsification.

**Table 2** Rheumatic activity and aqueous cells after cataract surgery

<table>
<thead>
<tr>
<th>Case no/eye</th>
<th>Aqueous cells</th>
<th>3 Days</th>
<th>1 Week</th>
<th>1 Month</th>
<th>ESR (mm/h)</th>
<th>CRP (mg/dl)</th>
<th>RF (IU/ml)</th>
<th>WBC (×10⁹/l)</th>
<th>Surgical method</th>
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<td>1+</td>
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<td>0.38</td>
<td>566</td>
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ECCE=extracapsular cataract extraction; Phaco=phacoemulsification; OD=right eye; OS=left eye; ESR=erythrocyte sedimentation rate; CRP=C-reactive protein; RF=rheumatoid factor; WBC=white blood cell count; IU=international unit.

Discussion

Serum titres of rheumatoid factors, erythrocyte sedimentation rates, and serum levels of acute phase reactants including C-reactive protein are known to correlate with activity of rheumatoid arthritis. Patients with higher titres of rheumatoid factor, increase of erythrocyte sedimentation rates, and elevation of C-reactive protein have the severer and more progressive disease with extra-articular manifestations.1

The present study demonstrated that the presence or absence of aqueous inflammation 1 month after cataract extraction and intraocular lens implantation had a positive correlation with preoperative serum titres of rheumatoid factors. The patients with higher titres of rheumatoid factor developed persistent aqueous inflammation 1 month after surgery. However, no correlation was found between the presence or absence of aqueous cells and other factors including erythrocyte sedimentation rates, C-reactive protein, and white blood cell counts. This discrepancy can be explained by the fact that erythrocyte sedimentation rates, C-reactive proteins, and white blood cell counts are influenced not only by activity of rheumatoid arthritis but also by inflammation of other origin.
The aqueous cells cleared 3 months after surgery even in those patients who showed aqueous inflammation 1 month after surgery. No patient developed major surgical complications including fibrin deposition, posterior iris synchia, persistent elevation of intraocular pressure, or cystoid macular oedema during the follow up period. Therefore, cataract extraction and intraocular lens implantation seem to be safe procedures for patients with rheumatoid arthritis.

Cataract surgery in patients with various types of uveitis has been reported.19–39 A new technique, with complete aspiration of the lens cortex after extracapsular extraction or phacoemulsification of the nucleus and implantation of intraocular lenses in the capsular bag, is a basically safe procedure even in patients with the previous experience of uveitis. The rate of recurrence of uveitis after cataract surgery varies from report to report. A conclusion drawn from these reports is that good visual outcome with low postoperative inflammation in cataract surgery depends upon the selection of patients based on the type of uveitis and its activity. One series described two patients who had developed severe inflammatory uveitis previously in the course of rheumatoid arthritis who underwent cataract extraction with intraocular lens implantation and had a good outcome without any complications.30 The present study showed that the absence of earlier iritis or scleritis in patients with rheumatoid arthritis did not necessarily ensure the absence of persistent inflammation after cataract extraction.

The best way to avoid persistent postoperative inflammation in patients with rheumatoid arthritis is to postpone cataract surgery and wait until the activity of the disease decreases. In cases where cataract surgery has to be performed in spite of rather high disease activity, preoperative and postoperative oral administration of corticosteroids can alleviate inflammatory reaction in the anterior chamber, although not totally. Recently designed intraocular lenses with a heparin modified surface could be used in place of polymethylmethacrylate lenses in a group of patients at high risk of postoperative severe inflammation.40–43

In the present study, patients with many variables were analysed retrospectively. For example, patients underwent either extracapsular cataract extraction or phacoemulsification. These different surgical methods naturally influenced the extent of postoperative aqueous inflammation. Extracapsular cataract extraction appears to have been performed more frequently on patients with higher titres of rheumatoid factor, possibly because these patients had more mature cataract and were operated on in the initial phase of the study. Although the persistent aqueous inflammation in this series could be attributed in part to extracapsular cataract extraction, multivariate analysis clearly demonstrated that the titre of rheumatoid factor was the more significant element in determining the delayed aqueous inflammation. Furthermore, the patients took different combinations of the medication for rheumatoid arthritis and had systemic diseases other than rheumatoid arthritis. Oral prednisolone can reduce postoperative inflammation, while patients with diabetes mellitus usually have persistent and severe inflammation after cataract surgery. Further study will be required to confirm the positive correlation between rheumatic activity and persistent aqueous inflammation after cataract surgery in patients with rheumatoid arthritis.

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References


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