Is cataract surgery justified in patients with age related macular degeneration? A visual function and quality of life assessment

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Abstract

***Aims*—To determine whether patients with age related macular degeneration (ARMD) benefit from cataract surgery in terms of visual function and quality of life measures, and to assess the impact of surgery on the progression of ARMD.**

***Methods*—A prospective study was carried out of patients with and without ARMD undergoing cataract surgery. Data were collected from 187 patients at the Princess Alexandra Eye Pavilion, Edinburgh and the Oxford Eye Hospital, Oxford. The patients were divided into three groups: (1) a control group with ARMD and no surgery (n=41), (2) a study group of patients with ARMD who underwent cataract surgery (n=90), and (3) a second control group of patients without ocular comorbidities who underwent cataract surgery (n=56). Visual function and quality of life assessments were carried out at baseline and 3–5 months after baseline or surgery.**

***Results*—There were significant improvements both in terms of quality of life and visual function measures in the study group. Benefits were greater in patients with moderate cataract irrespective of the degree of ARMD. No increased incidence in progression to the "wet" form of ARMD was found. Improvements in quality of life measures and visual function were more pronounced in patients with no ocular comorbidities.**

***Conclusions*—Patients with mild and moderate degrees of ARMD do benefit from cataract surgery and the benefits are greater in patients with moderate degrees of lens opacity. Longer follow up is required to assess the risk of increased ARMD progression.**

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Over the last decade it has become evident that visual acuity alone is inadequate as a criterion upon which to decide whether or not, and when, a patient should be operated upon for cataract. This decision is increasingly based on the patient's subjective dissatisfaction with his/her current visual function and objective findings on the ophthalmological examination which confirm the aetiology of the visual loss. A number of questionnaires have been developed to assess patients' subjective impressions of their perceived trouble and satisfaction with vision and the impact of diseases on quality of life.[1–5] In particular, questionnaires have been developed to assess specific aspects of visual function for daily tasks in patients with cataract and the outcome of cataract surgery. Among these are the Activities of Daily Vision Scale (ADVS)[6] and the VF-14 questionnaire.[7 8] More recently Hart *et al*[9] reported on the development of a specific functional index for use in patients with age related macular degeneration (ARMD). A questionnaire intended for use in individuals with common eye conditions that cause visual disability is also under development.[10]

ARMD is the main cause of blindness in patients over the age of 65 in the western world.[11] Studies on the outcomes of cataract surgery have highlighted ocular comorbidities and, specifically, ARMD as predictors of poor visual outcome.[12 13] There is also controversy regarding the possible benefits or risks of cataract surgery in patients with ARMD since some studies have suggested that cataract surgery may worsen the progression of ARMD,[14–16] although a recent report has suggested that cataract surgery may be beneficial in this group of patients.[17] It is clear, therefore, that a prospective study is needed to examine this issue.

The present study aimed to investigate the effect of cataract surgery on patients with ARMD in terms of visual function and quality of life (QOL) measures. The assessment of the relative contribution of the cataract to the patient's decreased visual performance was based on the clinical judgment of the ophthalmologist assessing the patient. No adjunctive tests such as potential acuity meter (PAM) or laser interferometry (LI) were used. Studies on the usefulness of these instruments have reported contradictory results and it would appear that there is no single instrument that is better than experienced clinical judgment.[18] A group of patients with ARMD who underwent cataract surgery was compared with two other groups, one of which included patients with ARMD and cataract who did not have cataract surgery and the other comprised patients who underwent cataract surgery but had no other known ocular comorbidity.

Methods

The study was carried out at two different centres, the Oxford Eye Hospital in Oxford and the Princess Alexandra Eye Pavilion in Edinburgh. Data were collected between September 1996 and September 1998 in Oxford and between January 1998 and December 1999 in Edinburgh. The methodology used was similar in both centres except for the documentation

Table 1 Population demographics of the three study groups

	Group 1 (ARMD only)	*Group 2 (surgery + ARMD)*	*Group 3 (cataract only)*
Mean (SD) age	75.4 (8.13)	81.47 (6.76)	72.11 (6.41)
Male	17 (41.5%)	29 (32.2%)	25 (44.6%)
Female	24 (58.5%)	61 (67.8%)	31 (55.4%)
Total	41	90	56

ARMD = age related macular degeneration.

of the status of maculopathy. This was carried out during the clinical examination in Oxford, while in Edinburgh stereoscopic photographs of the fundus were taken and graded.

A total of 210 patients were studied. Of these, two died, 11 dropped out of the study before completion and data were incomplete for 10, leaving 187 for analysis (Table 1).

Three groups of patients were studied prospectively. Group 1 included patients who were diagnosed with ARMD at the clinic or by fluorescein angiography (n=41). Patients in this group could have cataract but their fundus photographs or fundal view had to be clear enough to allow grading of the underlying maculopathy and they were to have no plans for cataract surgery in the near future. Group 2 included patients who were scheduled for cataract surgery who also had documented in their records the presence of ARMD in the eye on which the operation was to be performed (n=90). Group 3 comprised patients who were scheduled for cataract surgery and who had no other ocular comorbidity (n=56). There were no additional ocular comorbidities in either group at the time of recruitment.

Patients were contacted by letter explaining the aims of the project and were invited to participate. After consenting to participate, they were assessed at baseline and 3–5 months after the baseline examination for the ARMD only group and after surgery for the surgical groups. Ethical approval for the study was obtained at both centres.

Assessment commenced with a brief medical and ocular history. This was followed by refraction and best spectacle correction was used for subsequent visual function tests which included visual acuity for distance and near sight using Bailey Lovie logMAR type charts, and contrast sensitivity using Pelli-Robson charts, both in the presence and absence of glare. Glare was tested using the Mentor Brightness Acuity Tester (BAT). Iris colour was noted and pupil size measured with a millimetre rule under standardised room illuminance. Colour vision was tested using Ishihara plates to exclude inherited defects and the Farnworth-Munsell 100 hue test (using discs nos 30–50 which correspond to the blue/green confusion axis). Stereopsis was assessed using the Frisby test and dark adaptation was measured using the Goldmann-Weekers dark adaptometer. The patients' pupils were dilated using one drop of tropicamide 1% and one drop of phenylephrine 2.5% in each eye. While waiting for pupil dilatation, a questionnaire on quality of life was administered by one of the investigators. The questionnaire consisted of the VF-14 questionnaire, selected questions extracted from the SF-36 questionnaire, and other questions regarding social support and patient expectations of surgery. Once the pupils were dilated the pupil size was measured again and slit lamp biomicroscopy performed. Cataracts were graded for degree of subcapsular opacity, nuclear brunescence, cortical spokes (cuneiform opacities), and vacuoles according to the Oxford clinical grading system.[19] For patients recruited at Oxford, the number and type of drusen, geographical atrophy, or neovascular ARMD was recorded at the clinical assessment using direct ophthalmoscopy with a graticule imaged on the fundus. Patients recruited at Edinburgh had fundus photographs centred on the fovea taken by an experienced medical photographer using a Topcon Imagenet for Windows V 1.52 fundus camera. The 35 mm stereoscopic slides were graded at a later date using the international classification and grading system for age related maculopathy and ARMD.[20]

The ophthalmic examination, as well as the grading of the ARMD status, was carried out by one investigator for the Oxford cohort and one for the Edinburgh cohort. The maculopathy grading of the two visits was masked so that the second assessments were made without knowledge of the first assessments. In the event of inconsistencies the photographs were reviewed by a second investigator and the status of maculopathy determined.

For the purposes of clinical usefulness and statistical analyses, cataract and macular grading were summarised according the following criteria: cataracts were considered "mild" if they scored 2 or less and "moderate" if they scored 3 or more for the grading of posterior subcapsular, brunescence, spokes, or vacuoles.[19] For assessing the clinical status of ARMD, patients with any number of only hard drusen, fewer than 20 intermediate or soft distinct drusen, or fewer than 10 large soft indistinct drusen involving less than 25% of the central subfield and/or granular pigmentary changes were classified as "mild". Patients with 20 or more intermediate or soft distinct drusen, or more than 10 soft indistinct drusen involving more that 25% of the central subfield and/or pigmentary changes larger than 63 μm, were classified as "moderate". Patients with geographical atrophy were classified as "severe dry" and those with evidence of neovascular maculopathy were classified as "severe wet".

All the questionnaire items used a five point response scale. Each question was scored from 0 to 4 according to the degree of difficulty the patient experienced with the named activity where 0 = unable to do, 1 = a great deal of trouble, 2 = a moderate amount of trouble, 3 = a little trouble, and 4 = no problem at all. An item was not included on the scoring if that activity was not applicable to the patient. For the final questionnaire score the scores of all the activities reported by the patient were averaged yielding an average between 0 and 4. The means for each of the activities questioned, as well as the final total VF-14 scores, were analysed independently.

Table 2 Status of eyes: number of patients according to clinical grade of cataract and ARMD for the three groups studied

	Group 1 (ARMD only)	*Group 2 (ARMD + surgery)*	*Group 3 (surgery + no ARMD)*	*All groups*
Cataract grade				
Mild	39 (95.1%)	34 (37.8%)	11 (19.4%)	84 (44.9%)
Moderate	2 (4.9%)	56 (62.2%)	45 (80.4%)	103 (55.1%)
ARMD grade				
0	0	0	56 (100%)	56 (29.9%)
Mild	14 (34.1%)	47 (52.2%)	0	61 (32.6%)
Moderate	13 (31.7%)	35 (38.9%)	0	48 (25.7%)
Severe	14 (34.2%)	8 (8.9%)	0	22 (11.7%)

ARMD = age related macular degeneration.

Table 3 Visual function and quality of life (QOL) results at baseline (visit 1) and at visit 2 in patients with ARMD and no surgery (group 1)

	Visit 1	*Visit 2*	*Change (p values)†*
Visual function tests			
Distance VA (LogMAR)	0.44 (0.37)	0.41 (0.34)	0.408
Near VA (LogMAR)	0.64 (0.41)	0.63 (0.37) (1 unable to do)	0.298
Pelli-Robson CS (log)	1.10 (0.33)	1.11 (0.30) (2 unable to do)	0.399
Pelli-Robson + glare (log)	0.63 (0.34) (7 unable to do)	0.64 (0.31) (9 unable to do)	0.223
Stereo-acuity (min/arc)	55.3 (123.5) 2 had no stereo-acuity	109 (214) 1 had no stereo-acuity	0.183
QOL questions			
Trouble with vision	2.7	2.7	0.989
Small print	1.4	1.2	0.144
Newspaper/book	1.8	1.7	0.528
Large print	3.1	2.9	0.321
Recognise people close	3.3	3.3	0.785
See steps/kerbs	3.2	3.2	0.850
Signs in street	2.8	2.5	0.155
Fine handwork	1.5	1.4	0.574
Writing cheques	2.7	2.4	0.040
Cooking	3.5	3.3	0.266
Watching TV	2.7	2.7	0.858
Getting about indoors	3.9	3.9	0.713
Final VF-14 score	69.2	65.7	0.442

VA = visual acuity; CS = contrast sensitivity.
†Wilcoxon signed ranks test.

Table 4 Visual function and quality of life (QOL) results at baseline (visit 1) and at visit 2 in patients with ARMD and who underwent cataract surgery (group 2)

	Visit 1	*Visit 2*	*Change (p value)*
Visual function tests			
Distance VA (LogMAR)	0.69 (0.34) (2 unable to do)	0.34 (0.36)	0.000*
Near VA (LogMAR)	0.84 (0.29) (4 unable to do)	0.62 (0.33) (1 unable to do)	0.000*
Pelli-Robson CS (log)	0.85 (0.36) (4 unable to do)	1.17 (0.28) (2 unable to do)	0.000*
Pelli-Robson + glare (log)	0.44 (0.35) (22 unable to do)	0.88 (0.34) (13 unable to do)	0.000*
Stereo-acuity (min/arc)	268.39 (357.54) (50 had no stereo-acuity)	296.53 (377.28) (47 had no stereo-acuity)	0.531
QOL items			
Trouble with vision	2.8	2.1	0.000*
Small print	1.3	2.6	0.000*
Newspaper/book	1.8	2.6	0.000*
Large print	2.8	2.8	0.598
Recognise people close	3.1	3.0	0.734
See steps/kerbs	2.5	2.9	0.022
Signs in street	2.3	2.9	0.007*
Fine handwork	1.3	2.6	0.000*
Writing cheques	2.5	2.6	0.830
Cooking	3.3	3.0	0.002 (worse)
Watching TV	2.8	2.8	0.976
Getting about indoors	3.3	3.1	0.044
Final VF-14 score	62.8	71.8	0.002*

*p<0.01 (Wilcoxon signed ranks test).

The results of colour vision tests, dark adaptation, pupil size, iris colour, refraction and associated medical comorbidities are not reported here.

Results

POPULATION DEMOGRAPHICS

The study population comprised 187 subjects of mean age 77.3 years (SD 8.09). Of these, 71 were male (37.9%) and 116 (62.1%) were female. All except two Asian patients were white. The breakdown by study group is shown in Table 1.

STATUS OF THE EYES

At baseline 84 (44.9%) had mild cataracts and 103 (55.1%) had moderate cataracts. With regard to macular grading, 56 (30%) of the subjects had no maculopathy, 61 (32.6%) had mild ARMD; 48 (25.7%) had moderate maculopathy, and 22 (11.7%) had severe wet or dry ARMD. These figures are shown in Table 2.

Of those scheduled to have cataract surgery, 100 (68.5%) were first eyes and 46 (31.5%) were second eyes; of these, 76 (52.1%) were right eyes and 70 (47.9%) were left. For the group of patients with ARMD alone and no surgery (group 1), the results from the better eye were chosen for statistical analyses.

VISUAL FUNCTION TESTS AND QUALITY OF LIFE MEASURES (QOL)

Tables 3, 4, and 5 show the mean scores for visual acuity (logMAR), Pelli-Robson contrast sensitivity (log CS), and stereo-acuity (min of arc) and mean scores for the questionnaire at baseline (visit 1) and at the second visit (visit 2) for groups 1, 2, and 3, respectively.

The change in clinical scores and questionnaire responses between visits was assessed using the non-parametric Wilcoxon signed ranks test. Because of the large number of comparisons being made, significance levels were taken as $p<0.01$ in order to minimise the chance of type I error. Significant differences involving improvements are indicated in tables 3, 4, and 5 by asterisks.

Table 3 shows that, for the group of patients with ARMD alone, there was no significant change in performance on any of the visual function tests either in terms of mean performance or in terms of the number of patients unable to perform a test. There was also no significant change in any of the QOL activities assessed. It should be noted that all the visual function tests were performed with best spectacle correction and not by using low vision aids at the second visit. These findings are therefore consistent with what would be expected from no change in the clinical status of the maculopathy between the two visits separated by 3–5 months.

The results for patients with ARMD who had cataract surgery are summarised in Table 4. They show improvement not only in some of the QOL issues and the final VF-14 scores, but also in most of the visual function tests assessed. This suggests that patients with ARMD do benefit from cataract surgery. Because these patients had different degrees of

Table 5 Visual function and quality of life (QOL) results at baseline (visit 1) and at visit 2 in patients without ARMD who underwent cataract surgery (group 3)

	Visit 1	*Visit 2*	*Change (p value)*
Visual function tests			
Distance VA (LogMAR)	0.81 (0.64)	0.00 (0.13)	0.000*
Near VA (LogMAR)	0.94 (0.50)	0.36 (0.12)	0.000*
Pelli-Robson CS (log)	0.78 (0.64)	1.5 (0.15)	0.000*
Pelli-Robson + glare (log)	0.40 (0.40)	1.34 (0.20)	0.000*
Stereo-acuity (min/arc)	354.91 (365.74) (25 had no stereo-acuity)	415.45 (330.83) (14 had no stereo-acuity)	0.233
QOL items			
Trouble with vision	3.2	1.80	0.000*
Small print	1.6	3.0	0.000*
Newspaper/book	2.1	3.5	0.000*
Large print	3.0	3.8	0.000*
Recognise people close	3.1	3.7	0.000*
See steps/kerbs	2.6	3.5	0.000*
Street signs	2.2	3.6	0.000*
Fine handwork	1.9	3.5	0.000*
Writing cheques	2.4	3.8	0.000*
Cooking	3.1	3.9	0.000*
Watching TV	2.6	3.8	0.000*
Getting about indoors	3.2	3.8	0.000*
Final VF-14 score	64.7	92.8	0.000*

*p<0.01 (Wilcoxon signed ranks test).

maculopathy as well as cataract density, it was decided to carry out a more detailed analysis of the data from this group and this will be described later.

In this group complications were present in two patients. One developed an iris prolapse that was surgically repaired and evolved with moderate anterior uveitis. This had settled down well at visit 2. A second patient developed moderate corneal oedema postoperatively which also settled well with medical treatment and was completely resolved at the second visit.

Patients in group 3 (Table 5) showed significant improvement on all visual function tests except for stereo-acuity, in addition to significant improvement in all reported aspects of visual function related to activities of daily living. These results are better than most studies reported in the literature[21 22] with almost 100% of the patients achieving excellent visual function and QOL results. A possible explanation for this could be the fact that 80% of the patients in this surgical group had moderately dense cataracts with significant visual disability before surgery but they had no other associated ocular comorbidity.

EFFECT OF SURGERY IN GROUP 2 (ARMD + CATARACT SURGERY)

This group was divided into subgroups according to the severity of the cataract and ARMD. Each subgroup was considered independently and changes between the results before and after surgery across all items were assessed using the Wilcoxon signed ranks test. The results are shown in Table 6 in which significant improvements (p<0.01) are indicated by asterisks.

It is evident that in all subgroups there was some degree of benefit except in the group with mild cataract and moderate ARMD, and that the greatest benefits were for patients with moderate cataract irrespective of whether their maculopathy was mild or moderate. While the clinical practice of removing cataract in the presence of ARMD has generally been to wait until lens opacities become at least moderate in degree, we have shown that there is evidence of a significant gain in certain QOL aspects for patients with mild cataract, especially in the context of mild ARMD. The challenge therefore is to identify measures by which the surgeon can assess the predictive benefits of current ways in which questionnaire data can be used to identify these underlying issues. To investigate this further we are considering ways of identifying perceived weightings of value to the patient of alternative outcomes.

There were only eight patients with severe ARMD in the surgical group. Of these, six had "severe dry" changes and two had "severe wet" changes. There were no significant differences in visual function or reported daily living activities between visits 1 and 2 in this group of patients, although numbers are too small to draw statistically significant conclusions. When

Table 6 Change in mean results for visual function tests and self-reported visual disability between baseline (visit 1) and visit 2 in group 2 (ARMD + surgery) subdivided into four subgroups according to degree of cataract and ARMD

	Mild cataract + mild ARMD (n=19)			*Moderate cataract + mild ARMD (n=28)*			*Mild cataract + moderate ARMD (n=12)*			*Moderate cataract + moderate ARMD (n=23)*		
Variable	*Visit 1*	*Visit 2*	*p value*	*Visit 1*	*Visit 2*	*p value*	*Visit 1*	*Visit 2*	*p value*	*Visit 1*	*Visit 2*	*p value*
Visual function												
Distance VA	0.47	0.24	0.004*	0.71	0.21	0.000*	0.58	0.31	0.025	0.75	0.36	0.000*
Near VA	0.66	0.52	0.018†	0.84	0.50	0.000*	0.77	0.65	0.180	0.95	0.67	0.001*
Pelli-Robson	1.05	1.22	0.085	0.85	1.27	0.000*	0.96	1.07	0.341	0.67	1.15	0.000*
Pelli-Robson + glare	0.54	0.85	0.015†	0.46	0.99	0.000*	0.38	0.77	0.079	0.37	0.81	0.011†
Stereo-acuity	294	322	0.688	326	454	0.149	291	51	0.106	239	290	0.554
QOL items												
Trouble with vision	2.6	2.1	0.019†	2.8	1.7	0.000*	2.9	2.5	0 .305	3.1	2.2	0.001*
Small print	0.84	2.6	0.001*	1.8	2.7	0.011†	1.2	2.7	0.014†	1.1	2.8	0.000*
Newspaper/book	1.6	2.5	0.009*	2.1	2.6	0.094	1.8	2.9	0.080	1.6	2.6	0.013?
Large print	3.1	3.0	0.506	3.1	2.7	0.122	2.5	3.2	0.340	2.4	2.6	0.953
Recognise people close	3.2	3.2	0.959	3.1	3.0	0.630	3.1	3.2	0.792	2.9	2.8	0.794
Seeing steps/kerbs	2.6	2.8	0.642	2.7	3.0	0.319	2.7	3.1	0.739	2.2	2.9	0.055
Street signs	2.7	3.1	0.276	2.2	3.1	0.046	2.6	2.8	0.952	2.0	2.9	0.039
Fine handwork	1.1	2.7	0.078	1.4	2.5	0.015†	1.6	2.9	0.061	1.2	2.8	0.004*
Writing cheques	2.8	2.7	0.893	2.8	2.6	0.235	2.5	2.9	0.465	2.2	2.4	0.792
Cooking	3.5	3.2	0.083	3.2	2.8	0.041	3.4	2.9	0.034	3.2	2.8	0.208
Watching TV	2.9	2.9	1.0	2.6	2.8	0.885	3.1	2.9	0.457	2.7	2.8	0.929
Getting about indoors	3.5	3.3	0.248	3.4	3.1	0.089	3.4	3.0	0.279	2.9	2.9	0.816
Final VF-14 score	64.9	74.7	0.112	66.3	71.8	0.100	66.1	74.7	0.308	56.6	70.0	0.094

VA = visual activity; ARMD = age related macular degeneration; QOL = quality of life.
*Significant change (p<0.01); †values approaching significance.

the detailed data were reviewed patients with "severe dry" disease had a tendency towards improvement and patients with "severe wet" disease tended to remain the same.

CHANGE IN MACULOPATHY

In the group with ARMD alone (n=41) change in maculopathy was observed in eight patients; two patients showed "improvement" and six worsened. Of those who got worse, four went from mild to moderate and two developed wet ARMD. In the group of patients with ARMD who underwent cataract surgery (n=90) 13 patients changed from the mild to the moderate form of ARMD and one from moderate to mild. This deterioration was significant (t=3.3, p<0.001). It is important to note, however, that no patients in the surgical group progressed to the wet form of ARMD at the reported follow up time.

DIFFERENCES BETWEEN GROUPS

There were statistically significant differences between the groups both at baseline and at visit 2. These results will be presented and discussed elsewhere.

Discussion

The results of this study suggest that patients with mild and moderate forms of ARMD do benefit from cataract surgery, both in terms of visual function tests and QOL measures. In individuals with both ARMD and cataract, both diseases contribute to the patient's visual disability. Cataracts are known to cause reduced visual performance because they reduce distance and near visual acuity as well as contrast sensitivity by reducing the quality and physical contrast in the retinal image.[23] The reduced contrast sensitivity is an apparent rather than a real sensitivity loss because it is a consequence of the forward scatter of light from the lens producing the effect of veiling glare. It is therefore not surprising that visual function improves when cataracts are removed, that the benefits increase with increasing severity of cataract, even in the presence of mild and moderate degrees of ARMD, and that the effects are more pronounced in the group of patients without other ocular comorbidities. Patients with ARMD have impaired macular function from the early stages of the disease[24] but only lose visual acuity in the late stages when drusen resolve leaving patches of geographical atrophy affecting the fovea or when complications of subretinal neovascular membranes arise.[25 26] The early deficits of macular function will be losses of contrast sensitivity,[24] consequently the improvement in contrast sensitivity achieved with cataract surgery in the presence of ARMD could contribute significantly to daily living activities that involve the detection of objects at low physical contrasts. Previous research has reported a loss of contrast sensitivity at high and medium spatial frequencies in patients with ARMD and involvement of low spatial frequencies in advanced cases.[27 28] It has also been shown that lower spatial frequencies are handled preferentially by the peripheral retina[29] and that peripheral retinal function is preserved in patients with ARMD in whom the retinal function abnormalities are confined mainly to the central retina.[30] Furthermore, patients with ARMD with better contrast sensitivity have better visual performance than those with poor contrast sensitivity.[31] The Macular Photocoagulation Study Group also reported preservation of contrast thresholds in patients with subfoveal choroidal neovascular membranes treated with laser surgery.[32]

It is also reassuring to observe that no patients in the surgical group progressed to the "severe wet" form of ARMD, although it would be desirable to have a longer follow up period. The high incidence of progression from mild to moderate degrees of maculopathy over a 3–5 month interval was an unexpected finding. The development and progression of drusen is a slow process and has been described in a clinicopathological study by Sarks *et al*.[25] 84% of the sample showing this change in maculopathy grading were at Oxford. Furthermore, at Oxford there was a significant but small negative correlation between cataract grading and ARMD grading (r=–0.16, p<0.05) whereas no similar correlation was seen in the Edinburgh data. We believe the most likely explanation for this was an underestimation of disease severity before surgery in patients in whom the maculopathy was observed and graded by direct ophthalmoscopy in the presence of moderate cataract. If the appearance of the maculopathy is to be used to predict QOL, a better indication of outcome will be achieved by using ARMD grading based on fundus photography.

In conclusion, cataract surgery is justified and brings significant visual function and subjective benefits to patients with mild and moderate degrees of ARMD. The benefits are greater in patients with moderate degrees of lens opacity. Although there was no increase in the progression of the disease in this group of patients over a period of 5 months, a longer follow up period is desirable before the risks of cataract surgery in patients with ARMD can be quantified.

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