

## Project Grant Progress Report – Retina Australia 2005

### Cataract Surgery and Risk of Age-related Macular Degeneration (AMD)

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This study, which commenced in 2004, involves recruitment of patients undergoing cataract surgery at a large public hospital (Westmead Hospital) as well as in private ophthalmologist rooms. The Study examines all participants pre-operatively, with retinal photography, and then re-examines the cohort at specified intervals post-operatively (1 month, 6 months, 12 months and two years) to determine whether the risk of age-related macular degeneration (AMD) increases in eyes following cataract surgery. Pooled data from two large population-based, longitudinal studies in Australia (the Blue Mountains Eye Study, BMES) and USA (the Beaver Dam Eye Study) have suggested at least a 3-fold higher risk of progression to late AMD after cataract surgery, while accounting for age, smoking and pre-operative level of early AMD signs.

Phase I of this project (to be completed in 2006) assesses the short-term (1-2 year) risk of AMD in eyes that have undergone cataract surgery. Phase II of the project, (further funding pending), aims to determine the long-term risk of AMD in eyes that have undergone cataract surgery after more than 3 and up to 5 years. The latter phase is the most critical, as it seems likely that any increased risk will be in the long-term.

In the first two years of Phase I, we have recruited more than 1400 cataract surgery patients aged 65+ years. All participants recruited have had baseline retinal photographs taken pre-operatively as well as at one-month post-operatively. Of those recruited, over 1000 have had their cataract surgery performed by April 2006. We will continue to recruit participants during the remainder of 2006 until reaching our recruitment target (n=2000).

In order to assess long-term outcomes, we are currently applying for funding from NHMRC for continuing follow-up of all study participants annually after completion of Phase I, which covers up to the 2-year post-operative visits. Phase II will cover the 3-, 4- and 5-year post-operative visits, using the same photography and assessment procedures used in Phase I.

Preliminary data analysis of Phase I suggests that the incidence of soft indistinct or reticular drusen, 6-12 months after cataract surgery in this surgical cohort, is higher than that observed in a general older Australian population (BMES) over a 5-year period. Of 300+ subjects who have had their 6-month and/or 12-month post-operative photographs graded, new development (incidence) of indistinct soft/reticular drusen in the first eye of subjects without these lesions in either eye pre-operatively was 3.3% in operated eyes. Corresponding new development of retinal pigmentary changes was 6.5%, and new development of late AMD was 0.3%, over the post-operative period of 6 to 12 months in this surgical cohort. The 3.3% first-eye incidence of indistinct soft/reticular drusen over 6 months in this surgical cohort is comparatively higher than the corresponding first-eye incidence of around 10% over 5 years (equivalent to 2% annual incidence), reported from BMES participants aged 70+ years (*Ophthalmology* 2002;109:1092-1097). Large soft or reticular drusen are the advanced stage of early AMD signs, which signal a much higher risk of late AMD. The 6.5% first-eye incidence of retinal pigmentary changes in eyes after cataract surgery over 6 to 12 months is also substantially higher than the 10% first-eye incidence over 5 years found in the BMES cohort with a similar age range, though this could be partially due to a reduced view of the fundus in eyes prior to cataract surgery, as pigmentary changes are less able to be reliably discerned when cataract is present.

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Phase I of this project is progressing well. A methodology manuscript was submitted to *Ophthalmic Epidemiology* last December, and is currently under revision:

Cugati S, de Loryn T, Pham TQ, Arnold J, Mitchell P, Wang JJ. Australian prospective study of cataract surgery and age-related macular degeneration: Rationale & methodology. Submitted to *Ophthalmic Epidemiology* (revision requested, May, 2006)

No further publications have yet arisen from the Study.

We previously conducted a parallel, retrospective study following patients aged 60 years or older who had cataract surgery performed during the period July 2001 to June 2003 at Westmead Hospital, in order to assess the short-term risk of AMD after cataract surgery in this hospital-based cohort. This study was completed in December, 2004. Follow-up examinations, including retinal photographs to document the state of the macula, were performed on 75% of all eligible patients operated on during this period. We have four manuscripts from this retrospective clinical cohort study, of which two are published and another two are electronically published, ahead of print:

Pham TQ, Wang JJ, Rochtchina E, Maloof A, Mitchell P. Systemic and ocular co-morbidity of cataract surgery patients in a western Sydney public hospital. *Clinical & Experimental Ophthalmology* 32:383-387, 2004

Pham TQ, Wang JJ, Maloof A, Mitchell P. Cataract surgery in patients with age-related maculopathy: Pre-operative diagnosis and post-operative visual acuity. *Clinical & Experimental Ophthalmology* 33:360-3, 2005

Pham TQ, Cugati S, Rochtchina E, Mitchell P, Maloof A, Wang JJ. Age-related maculopathy and cataract surgery outcomes: Visual acuity and health-related quality of life. *Eye* (Epub ahead of print, Nov 11, 2005)

Pham TQ, Cugati S, Rochtchina E, Mitchell P, Maloof A, Wang JJ. Early age-related maculopathy in eyes after cataract surgery. *Eye* (Epub ahead of print, Jan. 2006)

Other publications related to this study questions during the grant period include:

Tan AG, Wang JJ, Rochtchina E, Jakobsen KB, Mitchell P. Increase in cataract surgery prevalence from 1992-4 to 1997-2000: Analysis of two population cross-sections. *Clinical & Experimental Ophthalmology* 32: 284-288, 2004

Cugati S, Mitchell P, Rochtchina E, Tan A, Smith W, Wang JJ. Cataract surgery and the 10-year incidence of age-related maculopathy: the Blue Mountains Eye Study. In press *Ophthalmology* (Accepted May 29, 2006)

Prints of the seven articles are enclosed with this report.

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