The incidence and rate of rhegmatogenous retinal detachment seven years after cataract surgery in patients with high myopia.

Michael A Williams1, Stuart McGimpsey1, Salwa Abugreen2, Wing Chan1, James A Sharkey1, Richard M Best1, Patrick B Johnston1

Accepted 12 December 2008

ABSTRACT

Background: Cataract extraction is the most commonly performed surgery in the National Health Service. Myopia increases the risk of postoperative rhegmatogenous retinal detachment (RRD). The aim of this study was to determine the incidence and rate of RRD seven years after cataract extraction in highly myopic eyes.

Methods: Retrospective review was performed of notes of all high myopes (axial length 26.0 mm or more) who underwent cataract extraction during the study period in one centre.

Results: 84 eyes met the study criteria. Follow-up time from surgery was 93 to 147 months (median 127 months). The average axial length was 28.72 mm (sd 1.37). Two eyes developed post-operative RRD; the incidence was 2.4% and the rate one RRD per 441.6 person-years. The results of 15 other studies on the incidence of RRD after cataract extraction in high myopia were pooled and combined with our estimate.

Conclusion: Both patients in our study who developed RRD had risk factors for this complication as well as high myopia. Risk factors are discussed in the light of our results and the pooled estimate.

Our follow-up time is longer than most. Future case series should calculate rates to allow meaningful comparison of case series.

Keywords: Extracapsular cataract extraction, Myopia, Phacoemulsification rate, Retinal detachment

INTRODUCTION

Cataract extraction is the most commonly performed surgery in the United Kingdom’s National Health Service1 and in the United States2. Features of cataract surgery such as short procedure times, day surgery and high success rates can lull patients into believing that it is a risk free procedure. However sight threatening postoperative complications exist, and the most common of these is rhegmatogenous retinal detachment (RRD)3. The normal lifetime risk of RRD in high myopia without surgery has been estimated to be 40 times the lifetime risk of RD in emmetropia4, and myopia also increases the risk of postoperative RRD5. The aim of this retrospective study was to determine our incidence and rate of primary or recurrent RRD following cataract extraction in highly myopic eyes, and to review pertinent risk factors in the light of our and others’ experiences.

METHODS

All high myopes who had undergone cataract surgery in one centre (the Royal Group of Hospitals, Belfast, Northern Ireland (RGH)) between January 1995 and December 1999 inclusive were identified. Their electronic and written medical records in two ophthalmology units were examined retrospectively. The two centres were the RGH and Altnagelvin Area Hospital, Londonderry, Northern Ireland (AAH). High myopia was defined as an axial length of 26.0mm or more as determined by A-scan biometry (Humphrey). Eyes with shorter axial lengths were not included. For patients who had cataract surgery in both eyes within the study period, only the first eye to have surgery was included. Eyes with a history of retinal detachment were excluded. The following details were recorded: sex; age; axial length; use of prophylactic laser photocoagulation; intraoperative and postoperative complications; intraocular lens (IOL) power and position and use of neodymium-doped yttrium aluminium garnet (Nd:YAG) laser capsulotomy. All patients had had a pre-operative assessment. Corneal curvatures were measured with a keratometer. A-scan biometry was performed and IOL power determined by the Sanders Retzlaff Kraff (SRK) II formula. All patients had postoperative education about the symptoms of a retinal tear or detachment. All cataract surgery was performed by consultants or experienced junior surgeons using similar techniques. There were at least two postoperative clinic visits per patient. The nature of any

1Department of Ophthalmology, Eye and Ear Clinic, Royal Victoria Hospital, Belfast, BT12 6BA, UK.
2Royal Blackburn Hospital, Haslingden Road, Blackburn, England, BB2 3LR, UK.
Correspondence to Dr Williams, Department of Geriatric Medicine, Whittla Medical Building, 97 Lisburn Road, Belfast, UK., BT9 7BL.
mikewilliams99@hotmail.com
postoperative ophthalmic problems, which involved either laser or surgical procedures, was recorded. This study adhered to the guidelines of the Declaration of Helsinki.

A search was performed on Medline for studies published after 1993 on retinal detachment following cataract extraction in high myopia. Papers on clear lens extraction for refractive purposes were excluded. Information on the incidence of retinal detachment following extracapsular (ECCE: meaning extraction by nucleus expression) and phacoemulsification procedures was collated and pooled.

### RESULTS

Eighty-four eyes met the study criteria. The average age at the time of cataract surgery was 69.35 years (s.d. 11.81; range 32 – 92 years). Twenty-two patients were male, 62 female. Median follow-up time from cataract surgery was 127 months (93 to 147 months). Six patients died during the follow-up period, a median of 96 months after cataract surgery (range 74 – 131 months). Two eyes had been excluded as they had a history of retinal detachment in the operated eye. Three eyes had a history of RRD in the fellow-eye: these were included. Prophylactic treatment of predisposing retinal lesions was not performed in any case. Phacoemulsification was performed in 71 cases and ECCE in 11 cases. Trabeculectomy was combined with phacoemulsification in one case, and trabeculectomy with ECCE was carried out in one case. The average axial length was 28.72mm (s.d. 1.37; range 26.50 – 32.11mm). The median power of the IOL used was +8 dioptres (D) (0.0D to +10D). (In one case, data on IOL strength was unavailable.) In two cases a capsular tear occurred intraoperatively, but no vitreous prolapse was noted and the IOL was in each case placed in the capsular bag. In one case vitreous was noted in the anterior segment immediately after placement of a +9D IOL in the capsular bag. This was thought to be due to vitreous prolapse. Anterior vitrectomy was not necessary, and when Miochol® (acetylcholine chloride) was applied, the pupil constricted satisfactorily and vitreous was no longer evident. Twenty-seven months later the patient presented with a superior bullous RRD. A posterior and a peripheral retinal

| Case 1 | Case 2 |
|--------|--------|
| Age at time of surgery (years) | 47 | 59 |
| Sex | Male | Male |
| Fellow eye | -3.5 D | Artificial Eye |
| Preoperative Myopia (D) | -7 | -2.5DS / -1.0DC |
| Axial Length (mm) | 29.02 | 26.92 |
| History of previous RD | No | Yes (fellow eye) |
| IOL | +8D (posterior chamber) | +9D (posterior chamber) |
| Type of procedure | Phacoemulsification | Phacoemulsification |
| Intraoperative complications | None | Zonular dehiscence and vitreous prolapse |
| Time of RD post-cataract surgery | 60 months | 27 months |
| Nd-YAG laser for PCO | Yes | No |
| BCVA at final follow up | 20/40 | 20/60 |

Two of the 84 eyes developed post-operative RRD (table I). This represents a rate of one RRD per 441.6 person-years, or an incidence of 2.4%. Both cases with RRD were male, aged 47 years (case one) and 59 years (case two) at the time of cataract surgery.

In case one of RRD, uncomplicated phacoemulsification was performed and a +8D IOL placed in the ciliary sulcus one week later. Thirty-two eyes underwent post-operative Nd-YAG posterior capsulotomy for posterior capsular thickening. The median time from cataract surgery to laser capsulotomy was 46 months (range 5 – 134 months).

Case two had a history of RRD in the fellow eye 19 years prior to the pertinent cataract operation. The fellow eye RRD had presented immediately following a slip, when the eye hit a chair. Two attempts were made to surgically repair the RRD, but these were unsuccessful and the eye became phthisical. The patient wore a cosmetic shell over this fellow phthisical eye. The other eye had an axial length of 26.92mm. During the phacoemulsification procedure a strand of vitreous was noted in the anterior segment immediately after placement of a +9D IOL in the capsular bag. This was thought to be due to vitreous prolapse. Anterior vitrectomy was not necessary, and when Miochol® (acetylcholine chloride) was applied, the pupil constricted satisfactorily and vitreous was no longer evident. Twenty-seven months later the patient presented with a superior bullous RRD. A posterior and a peripheral retinal

### Table I. Data on the cases of post-operative RRD

| Case | Age (years) | Sex | Fellow eye | Preoperative Myopia (D) | Axial Length (mm) | History of previous RD | IOL | Type of procedure | Intraoperative complications | Time of RD post-cataract surgery | Nd-YAG laser for PCO | BCVA at final follow up |
|------|-------------|-----|------------|-------------------------|------------------|------------------------|-----|------------------|-------------------------------|---------------------------|----------------------|----------------------|
| 1    | 47          | Male| -3.5 D     | -7                      | 29.02            | No                     | +8D (posterior chamber)| Phacoemulsification | None                          | 60 months                 | Yes                  | 20/40                |
| 2    | 59          | Male| Artificial Eye | -2.5DS / -1.0DC        | 26.92            | Yes (fellow eye)       | +9D (posterior chamber)| Phacoemulsification | Zonular dehiscence and vitreous prolapse | 27 months                | No                   | 20/60                |

© The Ulster Medical Society, 2009.

www.ums.ac.uk
The incidence and rate of rhegmatogenous retinal detachment seven years after cataract surgery in patients with high myopia.

101

hole were noted. Surgery consisted of pars plana vitrectomy, gas tamponade, laser and cryo retinopexy, and placement of a scleral sponge. Twelve months later the vision in this eye was 20/50, and he was discharged from clinic.

Fifteen other studies published after 1993 were found using Medline on the incidence of RRD after cataract extraction in high myopia (table II)6-20. This figure does not include papers on lens extraction for primarily refractive purposes.

DISCUSSION

RRD is a well recognised complication of cataract surgery. Risk factors include refractive myopia and increased axial length. The aim of the present study was to retrospectively examine our experience and to review selected factors influencing retinal detachment after cataract extraction in highly myopic eyes.

In our series 2.4% of high myopes developed RRD following cataract extraction, and the rate was one RRD per 441.6 person-years. No non-myopic control group was studied, but the incidence of RRD after cataract surgery in eyes of any axial length has been reported to be to be 0.5 to 1.0%.

No data on the rate of RRD following cataract surgery in eyes of any axial length has been published to the best of our knowledge, although the risk at certain postoperative time points has been calculated.

Many risk factors for RRD following cataract extraction have been identified. In summary5, reported risk factors include male sex, younger age, ethnic origin or race, increased axial length, a history or family history of retinal detachment, lack of an intact posterior capsule, vitreous loss, vitreoretinal pathological features such as lattice degeneration or ocular trauma after surgery22. An intraocular lens implant is thought to be protective compared to aphakia 10. The intraoperative maintenance of an intact posterior capsule is important in reducing the risk of RRD23,24. Anterior vitrectomy is thought to be protective by preventing vitreoretinal traction. The two patients who developed RRD (table one) had risk factors for post-cataract surgery RRD as well as high myopia. Both were male. Case one had had Nd-YAG laser posterior capsulotomy. Case two had a history of phakic RRD in the fellow eye and during cataract surgery prolapse of a strand of vitreous occurred. In both cases of RRD in our series, there was a

### Table II.

| Author (yr of pub) | N. of eyes | N. of RRDs | Def. of myopia | Age range (years) | Follow-up (months) |
|--------------------|-----------|-----------|---------------|-------------------|-------------------|
| Phaco +/- IOL      |           |           |               |                   |                   |
| Allo4 (07)         | 439       | 12(2.7%)  | Ax.L. 26.0mm or more & SE -6.0D or more | 21 - 90           | 2 - 147           |
| Alldredge5 (98)    | 80        | 0         | -             | -7.0D or more minus | 9 – 77            |
| Badr6 (95)         | 0         | -         | Ax.L. 26.0mm or more | 30 – 86           | 6 – 86            |
| Fan7 (99)          | 45        | 1(2.2%)   | Ax.L. 26.0mm or more | 29 – 84           | 12 – 89           |
| Jacobsi8 (97)      | 0         | -         | Ax.L. 27.0mm or more | 66 +/- 11.8       | 7 - 103           |
| Ku9 (02)           | 62        | 1(1.6%)   | Ax.L. 26.0mm or more | 61.6 mean +/- 12.27 | 6 – 82           |
| Liang10 (97)       | 0         | -         | Ax.L. 27.0mm or more | 49 – 75           | 27 – 33           |
| Liesenhoff11 (94)  | 0         | -         | Ax.L. 26.0mm or more | 33 - 92           | Minimum 24        |
| Lyle12 (96)        | 109       | 1(0.9%)   | IOL 11D or less & Ax.L. 26.0mm or more | 39 - 89           | 3 - 79            |
| Nissen13 (98)      | 0         | 237       | Ax.L. 25.5mm or more | 40 - 93           | 14 – 32           |
| Ravalico14 * (03)  | 237       | 0         | IOL 11D or less | 21 - 90           | 8 – 146           |
| Ripandelli15 (03)  | 930       | 74(8.0%)  | -15D or more | 39 - 81           | 36                |
| Tosi16 (03)        | 73        | 1 (1.4%) † | Ax.L. 29.1mm or more | 53 - 91           | 48 – 78           |
| Tsai17 (07) ‡      | 36        | 0 ?       | Ax.L. 26.0mm or more | 34 – 91           | 25 – 103          |
| Williams18 (04)    | 72        | 2 (2.8%)  | Ax.L. 26.0mm or more | 32 – 92           | 93 - 147          |
| Zhang19 (04)       | 68        | 0         | Minus 10 D to minus 20D | 27 - 85           | 3 – 12            |
| TOTAL / RANGE      | 2115      | 92 (4.4%) | 1379 21 (1.5%) | 21 - 93           | 2 - 147           |

* Not including four cases of post-operative retinal tears were treated with laser retinopexy. † Not including three cases of post-operative retinal tear, treated with laser retinopexy. ‡ The figures on surgery and RRD numbers of Tsai et al were not included in the totals, as it was unclear how many undergoing each type of surgery had RRD. In this study two eyes developed RRD postoperatively.

Ax.L - axial length, D - dioptries, N- number, Ref. - refraction, SE - spherical equivalent, Yr of pub - year of publication.

---

© The Ulster Medical Society, 2009.

www.ums.ac.uk
history of head trauma temporally related to the apparent onset of an RRD. It would be impossible to accurately determine the prevalence of post-operative trauma in our sample. However we suggest that pseudophakic high myopes should be advised to avoid contact sports and if possible, situations where there is a risk of tripping or falling. It is noteworthy that in one of the two cases, the fellow-eye had no useful vision (table one): this reaffirms the importance of high quality cataract surgery in high myopes.

In this study both rate and incidence of primary or recurrent RRD are reported. The problem with the use of incidence is said to be the dependence on the length of follow-up25. This is illustrated by the fact that in papers in which the incidence of RRD following phacoemulsification is less than our figure of 2.4%, the minimum follow-up is much lower than our minimum follow-up of over 7 years (93 months). In the pooled studies other than our own study, the median minimum follow-up time was 9 months (range 2 - 48 months), and the median maximum follow-up time was 80.5 months (range 12 - 147 months). Our follow-up time, of 93 to 147 months, is longer than most. Our follow-up data highlights that the risk exists for at least 5 years after surgery in high myopes, as one of the RRDs in our sample occurred 60 months after cataract surgery. It has been said that increased risk of RRD after cataract extraction remains up to two decades after surgery25. However RRD occurring years after cataract surgery may be related to the natural history of myopia, rather than pseudophakia per se.

Rate is therefore said to be a more valid measure to report than incidence in case series in which the length of follow-up for each subject varies25. As rate is not reported in any of the collated studies, incidence must be used to compare their results. The purpose of combining study estimates is that the resultant large number of subjects increases the likely accuracy of the estimate of incidence, at least for a minimum of two months follow-up (table II). One weakness of pooling estimates is that studies vary in several ways. Age-range and ethnicity of the sample, use of prophylactic laser, study design, surgical technique, length of follow-up and frequency of post-operative visits all vary. What is being estimated therefore becomes blurred. Conversely the action of pooling studies that vary in certain aspects may be to improve the generalisability of findings. Some studies used axial length to define myopia while others used a refractive criterion. Nevertheless, it is possible to combine the estimates of post-operative RRD incidence and define myopia simply as “high”. In different studies intraocular lens implants were used in all, some or none of the subjects. Information on how many subjects received or did not receive a lens implant was not available in many of the papers. It is merely possible therefore to give a pooled estimate of RRD incidence following phacoemulsification with or without a lens implant, and for ECCE with or without a lens implant.

Jacobi et al10 summarised the results of eight other studies, published from 1984 to 1993, on pseudophakic RD in high axial myopia: in these studies the incidence of RD varied from 1.7% to 7.5%. We summarised findings of studies published from 1994 onwards, a period when the use of ECCE was declining and that of phacoemulsification increasing. When these studies are pooled, including ours, the mean incidence of RRD following phacoemulsification, with or without an IOL, is 4.4% (range 0 to 8%), and following ECCE with or without an IOL the pooled mean is 1.5% (0 to 3.7%).

Both of our patients who developed retinal detachment had undergone phacoemulsification. In Northern Ireland almost all cataract operations are now done by phacoemulsification rather than by ECCE. In our study on surgery performed in the late 1990s, 84.5% of cataract operations were by phacoemulsification, the remainder being ECCEs. The collated results suggest that ECCE is associated with less risk of post-operative RRD than phacoemulsification. Future studies on surgery from more recent periods may show the reverse trend: a lower risk of RRD following phacoemulsification as ECCE is now often reserved for cataracts which are denser or more ‘difficult’ (for example, if there is zonular instability), and higher skill levels for phacoemulsification are established as the technique predominates. Furthermore phacoemulsification fluidics and small incisions are said to reduce forward movement of the vitreous25.

Posterior capsule opacification (PCO) requiring Nd-YAG laser occurred in 37.6% (n = 32) of eyes in our study. One would expect patients, individual clinicians and ophthalmology centres to vary in their tolerance of PCO and their readiness to intervene, and reported rates of laser for PCO vary widely26. Nd-YAG laser capsulotomy is reported to increase the risk of RRD 3.9 fold 21. The incidence of RRD following Nd-YAG posterior capsulotomy varies in the published data from 0% to 0.89% to 10% in highly myopic eyes25. One (3.1%) of the eyes in our study that underwent Nd-YAG laser developed RRD three months following capsulotomy. It is not clear how much the parameters of Nd-YAG laser influence the risk of RRD. For example it is unknown whether many small acoustic shock waves or few large waves passing through the posterior chamber have a greater effect: this may be worthy of further study. It is also not known how rupture of the posterior capsule, intra- or post--operatively, increases the risk of RRD although changes in the nature of the vitreous, rupture of the anterior hyaloid face and vitreoretinal traction caused by forward movement of the vitreous are important.

Some of the studies whose results were pooled used prophylactic laser for predisposing retinal lesions and some did not. In our study prophylactic laser was not performed in any case. Complete fundal examination with scleral depression was not performed in all our cases, and therefore it is impossible to comment on the prevalence of predisposing retinal lesions. In studies by Lyle and Jin14 and Fan9 on retinal complications following cataract extraction in myopia, none of the patients treated prophylactically with argon laser photocoagulation developed retinal detachment. However the benefit of prophylactic treatment of any type of retinal lesion is not established. Retinal tears and subsequent detachment can occur in previously normal areas of retina or at the edge of photocoagulation scars30,31. Evidence for a policy of treatment only of symptomatic retinal tears was reported by Wilkinson12, and we feel our results support this policy.

Although our estimate of the incidence of RRD following cataract surgery in highly myopic eyes is similar to the incidence in the other pooled studies, our figures are subject to several potential sources of error. The two centres where
records were examined were the RGH and AAH, chosen as the only centres in the region in which RRDs were treated during the whole study period. The majority of RRDs in the region are treated at the RGH. However from 1997 RRDs were also treated at another unit (the Mater Hospital). Furthermore it is possible that RRD cases treated elsewhere were missed, or that some patients with RRD failed to seek care or were not referred to an ophthalmologist. We believe it is likely that few, if any, cases of RRD were missed. All of the patients had addresses in Northern Ireland at the end of the follow-up time, reflecting the stability of the population. The possibility remains however that our estimate of this complication is an underestimate. Also the number and timing of follow up visits varied among our patients. More frequent visits may in theory allow identification and treatment of tears before RD develops. The retrospective nature of our study implies reliance on case notes being accurate and complete, which is not certain. Nevertheless the present study serves to highlight RRD as a complication of cataract surgery, especially in high myopes.

Future case series should follow the advice of Jabs\textsuperscript{23} to calculate rates to allow meaningful comparison of case series. A larger sample size than ours would provide more accurate data. Furthermore the precise prevalence of and risk posed by various predisposing retinal lesions, such as lattice and cobblestone degeneration, staphylomata and the state of the posterior vitreous, would be an interesting focus for prospective study. Our retrospective study relied on case notes, which did not uniformly record such details. Risk factors for pseudophakic RRD were present in both cases in our study that developed RRD. The risk of complications and the symptoms of RRD should be explained carefully to all patients who had addresses in Northern Ireland at the end of the follow up time, reflecting the stability of the population. The possibility remains however that our estimate of this complication is an underestimate. Also the number and timing of follow up visits varied among our patients. More frequent visits may in theory allow identification and treatment of tears before RD develops. The retrospective nature of our study implies reliance on case notes being accurate and complete, which is not certain. Nevertheless the present study serves to highlight RRD as a complication of cataract surgery, especially in high myopes.

Acknowledgements: To Ms Y Suessmuth and Ms WW Liu for their help translating some referenced papers. The authors have no conflict of interest.

REFERENCES

1. Great Britain. Department of Health. Chief Executive's report to the NHS: statistical supplement. December 2005. London: Department of Health; 2005. Available from: http://www.dh.gov.uk/en/PublicationsandStatistics/Publications/PublicationsPolicyAndGuidance/DH_4124276. Last accessed February 2009.

2. Learning DV. Practice styles and preferences of ASCRS members--2000 survey. American Society of Cataract and Refractive Surgery. J Cataract Refract Surg 2001; 27(6):948-55.

3. Ranta P, Kivela T. Functional and anatomic outcome of retinal detachment surgery in pseudophakic eyes. Ophthalmol 2002; 109(8):1432-40.

4. Colin J, Robinet A. Clear lensectomy and implantation of a low-power posterior chamber intraocular lens for correction of high myopia: a four-year follow-up. Ophthalmol 1997; 104(1):73-7; discussion 77-8.

5. Lois N, Wong D. Pseudophakic retinal detachment. Surv Ophthalmol 2003; 48(5):467-87.

6. Alio JL, Ruiz-Moreno JM, Shabayek MH, Lugo FL, Abd El Rahman AM. The risk of retinal detachment in high myopia after small incision coaxial phacoemulsification. Am J Ophthalmol 2007; 144(1):93-8.

7. Allredge CD, Elkins B, Allredge OC Jr. Retinal detachment following phacoemulsification in highly myopic cataract patients. J Cataract Refract Surg 1998; 24(6):777-80.

8. Badr IA, Hussain HM, Jabak M, Wagoner MD. Extracapsular cataract extraction with or without posterior chamber intraocular lenses in eyes with cataract and high myopia. Ophthalmol 1995; 102(8):1139-43.

9. Fan DS, Lam DS, Li KK. Retinal complications after cataract extraction in patients with high myopia. Ophthalmol 1999; 106(4):688-91; discussion 691-2.

10. Jacobs FK, Hessemmer V. Pseudophakic retinal detachment in high axial myopia. J Cataract Refract Surg 1997; 23(7):1095-1102.

11. Ku WC, Chuang LH, Lai CC. Cataract extraction in high myopic eyes. Chang Gung Med J 2002; 25(5):315-20.

12. Liang D, Chen J. The incidence of retinal detachment after extracapsular cataract extraction in high myopia. [Chinese]. Yan Ke Xue Bao 1997; 13(2):90-2.

13. Liesenhoff O, Kampaik A. Risk of retinal detachment in pseudophakia and axial myopia. [German]. Ophthalmologe 1994; 91(6):807-10.

14. Lyle WA, Jin GJ. Phacoemulsification with intraocular lens implantation in high myopia. J Cataract Refract Surg 1996; 22(2):238-42.

15. Nissen KR, Fuchs J, Goldschmidt E, Anderson CL, Bjerrum K, Corydon L, et al. Retinal detachment after cataract extraction in myopic eyes. J Cataract Refract Surg 1998; 24(6):772-76.

16. Ravalico G, Micheli C, Vattovani O, Tognetto D. Retinal detachment after cataract extraction and refractive lens exchange in highly myopic patients. J Cataract Refract Surg 2003; 29(1):39-44.

17. Ripandelli G, Scassa C, Parisi V, Gazzaniga D, D’Amilo DJ. Cataract surgery as a risk factor for retinal detachment in very highly myopic eyes. Ophthalmol 2003; 110(12):2355-61.

18. Tosi GM, Casprini F, Malandrini A, Balestrazzi A, Quercioli PP, Caporossi A. Phacoemulsification without intraocular lens implantation in patients with high myopia: long-term results. J Cataract Refract Surg 2003; 29(6):1127-31.

19. Tsai CY, Chang TJ, Kuo LL, Chou P, Young LC. Visual outcomes and associated risk factors of cataract surgeries in highly myopic Taiwanese. Ophthalmologica 2007; 221(1):18-23.

20. Zhang S, Huang H, Zheng Y. Phacoemulsification with intraocular lens implantation through a 2.6 mm incision in high myopia. [Chinese]. Yan Ke Xue Bao 2004; 20(2):84-7.

21. Javitt JC, Tielsch JM, Canner JK, Kolb MM, Sommer A, Steinberg EP. National outcomes of cataract extraction. Increased risk of retinal complications associated with Nd:YAG laser capsulotomy. The Cataract Patient Outcomes Research Team. Ophthalmol 1992; 99(10):1487-97; discussion 1497-8.

22. Tielsch JM, Legrow MW, Cassard SD, Schein OD, Javitt JC, Singer AE. Risk factors for retinal detachment after cataract surgery: A population-based case-control study. Ophthalmol 1996; 103(10):1537-45.

23. Eric JC, Raceker MA, Baratz KH, Schleck CD, Burke JP, Robertson DM et al. Risk of retinal detachment after cataract extraction, 1980-2004: a population-based study. Ophthalmol 2006; 113(11):2026-32.

24. Singalavandi A, Thongpunt T, Tongtai S. Pseudophakic retinal detachment with ruptured posterior lens capsule. J Med Assoc Thai 2005; 88(Suppl 9):537-42.

25. Jabs DA. Improving the reporting of clinical case series. Am J Ophthalmol 2005; 139(5):900-5.
26. Schaumberg DA, Dana MR, Christen WG, Glynn RJ. A systematic overview of the incidence of posterior capsule opacification. *Ophthalmol* 1998;105(7):1213-21.

27. Jahn CE, Richter J, Jahn AH, Kremer G, Kron M. Pseudophakic retinal detachment after uneventful phacoemulsification and subsequent neodymium: YAG capsulotomy for capsule opacification. *J Cataract Refract Surg* 2003;29(5):923-9.

28. Steinert RF, Puliafito CA, Kumar SR, et al. Cystoid macular edema, retinal detachment, and glaucoma after Nd:YAG laser posterior capsulotomy. *Am J Ophthalmol* 1991;112(4):373-80.

29. Koch DD, Liu JF, Gill EP, Parke DW, 2nd. Axial myopia increases the risk of retinal complications after neodymium-YAG laser posterior capsulotomy. *Arch Ophthalmol* 1989;107(7):986-90.

30. Bonnet M, Aracil P, Carneau F. Rhegmatogenous retinal detachment after prophylactic argon laser photocoagulation. *Graefes Arch Clin Exp Ophthalmol* 1987;225(1):5-8.

31. Ripandelli G, Billi B, Fedeli R, Stirpe M. Retinal detachment after clear lens extraction in 41 eyes with high axial myopia. *Retina* 1996;16(1):3-6.

32. Wilkinson CP. Evidence-based analysis of prophylactic treatment of asymptomatic retinal breaks and lattice degeneration. *Ophthalmol* 2000;107(1):12-15; discussion 15-8.