Prevalence of aphakic retinal detachment

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SUMMARY A retrospective analysis of 1324 eyes showed a statistically significant influence of the extracapsular approach in preventing aphakic retinal detachment (ARD) and a significant propensity for high myopes and for eyes containing iris clip lenses to develop ARD. After exclusion of the association with vitreous loss ARD occurred in 1.9% of 482 control intracapsular eyes, 4.8% of 185 eyes containing iris clip lenses (both groups having a mean follow-up of 4.1 years), 11.1% of 72 highly myopic intracapsular eyes, one of 46 highly myopic extracapsular eyes, and none of 439 nonmyopic extracapsular eyes.

There is at present a dearth of information concerning the true incidence of aphakic retinal detachment (ARD). This communication seeks to determine the incidence retrospectively over 10 years of cataract surgery by a single surgeon (S.P.B.P.) and the influence of (a) high myopia, (b) the extracapsular approach, and (c) intraocular lens implantation.

Material and methods

The records of 1123 consecutive adults undergoing cataract extraction between January 1972 and December 1981 were assessed individually. Where possible each patient was examined personally, and when the patient had died or left the district the most recently recorded visual acuity together with interval since surgery was tabulated. Attention was drawn to recorded vitreous loss, to the presence of peaking or updrawing of the pupil (implying vitreous adherence to the section), and the recording of postoperative vitreous haemorrhage.

The age range was 23 to 99 years at the time of surgery. Twenty-one cases of traumatic cataract were included. 1355 eyes had undergone surgery (219 being bilateral). Twenty-seven were excluded because of a follow-up shorter than 6 months. Two eyes were excluded because of preoperative retinal detachment, and 2 were excluded because postoperative detachment was associated with preoperative retinal trauma. There remained 1324 eyes for analysis.

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Table 1 *Incidence of retinal detachment among 1324 eyes from 10 years of cataract surgery*

	<i>Ra</i>	<i>Rb</i>	<i>IOL</i>	<i>Total</i>
Planned IC	12/485	8/72	10/279	30/836 (3.6%)
Planned EC	2/46	1/46	1/396	4/488 (0.8%)

Eyes were divided into 6 categories (Table 1). First according to postoperative refraction, *Ra* signified more than +8.0 D spherical equivalent in the aphakic eye and *Rb* +8.0 D or less (high myopia). A third category comprised primary intraocular lens implantation (*IOL*): all these had postoperative refraction less than -6.0 D spherical equivalent save one myopic surprise, which was grouped with *Rb* aphakes. There were 45 secondary implants, but none were associated with ARD, and these were grouped with primary aphakes (*Ra*).

Eyes were also categorised as to surgical approach: planned intracapsular extraction (*IC*) involved zonulysis with alpha-chymotrypsin followed by cryoextraction; planned extracapsular extraction (*EC*) involved nucleus extraction after clean removal of a disc of anterior capsule with nontoothed Kelman McPhearson forceps followed by manual aspiration of residual cortex with the Pearce irrigation aspiration cannulas.

Results

The overall incidence of retinal detachment for each of the 6 categories is shown in Table 1. It will be seen

Table 2 Incidence of ARD after exclusion of 6 detachments associated with vitreous loss

	Ra	Rb	IOL	Total
Planned IC	9/482 (1.9%)	8/72 (11.1%)	10/279	27 (3.3%)
Planned EC	0/44	1/46	0/395	1 (0.2%)

Table 3 Influence of lens implantation and EC approach on ARD after exclusion of high myopia

		Number	Mean follow-up (years)	ARD	%
IC Controls	1° aphakia	482	4.1	9	1.9
IC IOL	Binkhorst lenses only	185	4.1	9	4.8
IC IOL	Choyce and Boberg-Ans lenses	94	1.4	1	1.1
EC IOL	Binkhorst lenses only	239	3.0	0	0
EC	All other cases	200	1.6	0	0

that overall it was more than 4 times more frequent after planned IC than planned EC surgery. However, in some cases retinal detachment could be attributed to vitreous loss at surgery, and as this is a preventable complication these eyes should be excluded before a true analysis of ARD can be made. Vitreous loss was responsible for U tears, causing detachment in 3 eyes of group IC Ra and in 2 eyes of EC Ra, in one of EC IOL, but in none of the high myopes (Rb). In the EC groups there were 39 other eyes in which an unplanned break in the posterior capsule occurred surgically and 37 which required secondary capsulotomy before the final date of follow-up, but none of these eyes were associated with ARD. Occasionally posterior capsule rupture occurred spontaneously many months after surgery, and this in fact had happened to our one and only EC eye with myopic ARD.

Table 2 breaks down the incidence of ARD after exclusion of cases caused by vitreous loss. All these eyes with ARD had central and circular pupils and none had been associated with blunt or penetrating trauma. The group IC Ra (Table 2) should be taken as controls with an incidence of 1.9% ARD. It will be seen that apart from the high myopes 439 EC extractions were performed without ARD, which is statistically significant ($p < 0.01$). The group IC Rb (72 high myopes) showed an incidence of 11.1% ARD ($p < 0.001$). Comparison of this group with the 46 EC high myopes shows a significant fall in the incidence of ARD.

TIME INTERVAL

Unfortunately the situation is complicated by variation in the period of follow-up, for the mean

follow-up of controls (IC Ra) was 4.1 years and for EC eyes as a whole 2.4 years. There was, however, no particular variation between mean follow-up of high myopes and other patients in each group. Two-thirds (6/9) of ARD in high myopes occurred in the first year following cataract surgery and all (100%) occurred in the first 2 years (mean follow-up of 4.0 years). But less than half (4/9) of the ARD in the IC control group occurred in the first year, one in the second, and 3 after the completion of 4½ years.

VITREOUS HAEMORRHAGE

Vitreous haemorrhage complicated cataract surgery in 14 of the 836 IC eyes. Three of these were in high myopes, 2 of which were associated with later ARD despite there being no particular surgical problem with vitreous. Three of the others were associated with diabetes mellitus, and in one other emmetrope it was associated with ARD. Vitreous haemorrhage occurred in none of the EC high myopes and in one EC emmetrope who suffered a broken posterior lens capsule during surgery.

LENS IMPLANTATION

It will be seen from Table 2 that there was a higher than expected incidence of ARD among the IOL group after IC surgery. On breaking this down we found that 9 had occurred after insertion of the pre-pupillary Binkhorst lens. Table 3 has excluded all cases of high myopia and shows a significant ($p < 0.05$) increase in ARD among the 185 IC Binkhorst eyes at 4.8% compared with controls despite a similar mean follow-up period of 4.1 years. Interestingly the time interval was similar to that of the controls, with 3 occurring during the first year and 3 after completion of 4½ years.

Of the 395 extracapsular IOL cases none developed ARD, and this group included 239 Binkhorst lens insertions of mean follow-up 3.0 years.

Discussion

Our definition of a highly myopic eye in aphakia is similar to that of previous work,¹ and we confirm the previous reports¹⁻³ that these eyes have a significant propensity for developing ARD after uncomplicated cataract surgery. What is not generally known is that the extracapsular approach affords protection against ARD probably because the vitreous base and lens zonule remain undisturbed. Hyams *et al.*¹ estimated the incidence of ARD after IC extraction in the emmetropic population to be less than 1% but in the highly myopic population to be 7% (9/136 cases).

Our incidence of ARD in high myopes is 11.1%. Other larger series of ARD have been reported but do not give information on the incidence of myopia,

vitreous loss, or duration of follow-up. Thus Scheie *et al*⁴ reported 2.2% ARD out of 5541 eyes, 5417 of which were IC. Pearce (personal communication) reports 3 cases out of 2000 EC eyes and Arnott (personal communication) 5 cases out of 1400 EC eyes, and of these 8 cases of ARD only 3 had occurred in the presence of an intact posterior capsule. It is possible among large surveys that not every case is followed up individually, but with this reservation and on the basis of these and our own findings we estimate that retinal detachment is at least 7 times more common following intracapsular than extracapsular surgery for a surgeon already practised in either technique.

Our finding that 8/19 (42%) of ARD in nonmyopic eyes occurred during the first year following cataract surgery approximates closely to the report of others^{2,3}, so also does the earlier occurrence of ARD in highly myopic eyes,¹ where we report 6/9 (67%) in the first year. But in terms of follow-up it appears significant that 6/19 nonmyopic ARD did not occur until after the fifty fourth postoperative month.

Our numbers are relatively small but large enough to be statistically significant, and we have attempted to seek a true incidence of ARD by eliminating cases of vitreous adherence to the section. We have been encouraged by the protection afforded by the extracapsular approach, particularly for myopes, and when carefully executed this also obviates operative or postoperative problems with vitreous, including haemorrhage. One criticism is that when detachment does occur it is more difficult to treat because of poor visibility of the peripheral retina. However, it should be no more difficult than in the pseudophakic eye with an iris-supported lens, and in this subgroup our results of successful reattachment were 8 out of 10.

It has been suggested⁵ that, because an intraocular lens provides a barrier to anterior vitreous prolapse after IC extraction, implants may reduce the incidence of ARD; however, our findings do not support this. Rather, because the anterior vitreous may become

Table 4 Final visual results after exclusion of 133 eyes with pre-existing visual defects

Number			Visual acuity		
			6/5-6/12	6/18-6/60	<6/60
485	IC	1° aphakia	435 (90%)	26	24
262	IC	1° implant	235 (90%)	14	13
73	EC	1° aphakia	66 (90%)	5	2
371	EC	1° implant	361 (97%)	4	6

lipped into the anterior chamber between iris and implant at some postoperative point in time, we think that pseudophakodonesis and endophthalmodonesis are factors enhancing the likelihood of ARD and explain our higher incidence with iris clip lenses.

ARD is known to be a bilateral disease,^{2,3,6} and it is not without interest that it occurred in 4 patients who had undergone bilateral surgery, IC one eye and EC in the fellow, but that the detachment in each case occurred in only the IC eye.

The final visual results are shown in Table 4, and the fact that these are superior following the EC approach leaves us with the conclusion that modern extracapsular techniques for cataract extraction are both safe and effective.

References

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