Myopia-aphakia

II. Vitreous and peripheral retina

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The high incidence of retinal detachment after cataract extraction in myopic eyes is discussed in the previous paper, page 480.

The study reported below was undertaken in order to establish the prevalence of degenerative changes in the vitreous and peripheral retina in myopic-aphakic eyes, with particular emphasis on those changes which might lead to the development of retinal detachment. No such study has been reported previously.

Material and methods

Biomicroscopical examination of the vitreous and retina was performed on 103 aphakic eyes with axial myopia of at least -6.0 dioptres (83 patients). The refraction was calculated according to the formula: phakic correction = (aphakic correction - 11) × 2 (Borish, 1970). The study was performed from 1967 to 1972 and included all such eyes operated upon for senile cataract during this period (79 eyes), and 24 eyes of patients who had been operated on earlier and were recalled for examination. All the patients referred to in this paper were therefore also subjected to the follow-up study reported in the preceding paper, but not *vice versa*. Four eyes had suffered vitreous loss at the time of lens extraction.

Altogether 41 eyes were examined within 3 months of cataract extraction, 38 eyes were examined between 3 and 12 months after cataract extraction, and 24 eyes were examined 1 to 3 years after cataract extraction. Of the 83 patients, 32 were men and 51 were women. Eight patients were between 40 and 50 years of age, 32 were aged 51 to 60 years, 28 were aged 70 years, and 15 were aged 70 to 75 years.

Maximum dilation of the pupil was achieved by one or more instillations of 1 per cent tropicamide and 10 per cent phenylephrine and the fundus was examined with Goldmann's three-mirror contact lens and the Haag-Streit slit lamp. The state of the vitreous was noted using the central part of the contact lens with the patient looking up, straight-ahead, and down. The entire fundus periphery was examined using both fundus mirrors of the contact lens, turning the slit into the horizontal position for the examination of the nasal and temporal periphery.

Results

VITREOUS BODY

Some degree of liquefaction of the vitreous and clumping of vitreous fibres was present in each case. Some degree of posterior vitreous detachment was present in all but one of the 103 eyes, in six eyes the posterior vitreous face was seen to be separated from the retina only in the upper part of the eye, in 47 eyes the posterior vitreous face was also detached in the posterior pole, and in 44 eyes there was total posterior vitreous detachment with collapse.

RETINAL BREAKS

There were 25 full-thickness retinal breaks in 19 of the 103 eyes examined (18.4 per cent), including six horseshoes and 19 round breaks. Eleven of the breaks were in the equatorial region of the peripheral retina—that is, more than 2 disc diameters from the ora serrata (Rutnin, 1967) and 14 breaks were in the oral region; 14 of the 25 breaks were in the upper temporal quadrant. Eighteen breaks were up to one-quarter disc diameter in size, three were one-half disc diameter, two were one disc diameter, and two were larger than one disc diameter. Retinal breaks were present in three of the four eyes in which vitreous loss had occurred during cataract extraction. There was no significant correlation between the prevalence of retinal breaks and age.

Lattice (fish-bone) degeneration

This was found in seven quadrants of five eyes, and was most frequent in the upper temporal quadrant, see Table.

Snail-tract degeneration

This is often regarded as an early form of lattice; it was found in 34 quadrants of 15 eyes and was equally distributed throughout the four quadrants, see Table.

Table *Distribution of retinal breaks and other chorio-retinal lesions in 103 myopic-aphakic eyes*

<i>Lesion</i>	<i>Quadrant</i>				<i>Total</i>
	<i>Upper temporal</i>	<i>Lower temporal</i>	<i>Lower nasal</i>	<i>Upper nasal</i>	
Retinal breaks	13	5	2	5	25
Vitreo-retinal adhesions without retinal breaks	2	3	1	2	8
Lattice degeneration	5	1	—	1	7
Snail-track degeneration	9	7	9	9	34
Marked cystoid degeneration	10	1	1	8	20
Retinoschisis	2	3	3	1	9
Paving-stone degeneration	14	17	15	9	55
Pigmentary degeneration	33	30	27	34	124

Vitreo-retinal adhesions

These, without retinal breaks, were found in eight eyes.

Cystoid degeneration

Minimal cystoid degeneration near the ora serrata was present in every eye, and marked cystoid degeneration was present in 20 quadrants of 13 eyes.

Retinoschisis

This was present in nine quadrants of five eyes.

Paving-stone degeneration

This was present in 55 quadrants of 39 eyes and pigmentary degeneration in 124 quadrants.

Discussion

Retinal breaks and other degenerative lesions of the peripheral retina are found particularly frequently in eyes prone to retinal detachment: 11.1 per cent of myopic eyes have breaks (Hyams and Neumann, 1969) as do 9 per cent of emmetropic aphakic eyes (Friedman, Neumann, and Hyams, 1973) and 19 per cent of 'fellow eyes' in patients who have suffered a retinal detachment in one eye (Merin, Feiler, Hyams, Ivry, Krakowski, Landau, Maythar, Michaelson, Scharf, Schul, and Ser, 1971). In the present study 19 out of 103 aphakic eyes with myopia of at least -6.0 dioptres had full-thickness retinal breaks (18.4 per cent). Apart from the four eyes (three of them with breaks) in which vitreous was lost at surgery, 16 out of 99 eyes (16.2 per cent) had breaks.

The prevalence of lattice, snail-track, and cystoid degeneration in the myopic-aphakic eyes in the

present series was similar to the prevalence of these lesions in phakic myopic eyes reported previously (Hyams and Neumann, 1969). The significance of the almost constant presence of superior or posterior vitreous detachment has been discussed in the paper on page 480.

Attempts to prevent retinal detachment are based largely upon the prophylactic treatment of retinal breaks. As emphasized in the preceding paper, at least 6.7 per cent of eyes with high myopia will develop retinal detachment after cataract extraction, so that, if it is true that established retinal breaks may lead to the development of a retinal detachment, one would be justified in treating breaks in such eyes, on the assumption that approximately one-third of them will cause a detachment. However, recent studies suggest that most detachments are caused by fresh, as opposed to established, retinal breaks (Neumann and Hyams, 1972; Hyams, Meir, Ivry, Krakowski, Barkai, Jedwab, and Neumann, 1974), in which case the high prevalence of retinal breaks in aphakic eyes with high myopia is simply a reflection of the tendency of such eyes to develop both breaks and detachment. In fact, none of the eyes with breaks in the present series developed a retinal detachment. Both eyes of one patient, without breaks, did develop retinal detachment (Cases 2 and 3 in the accompanying paper).

Summary

Biomicroscopical examination of the vitreous and peripheral retina was performed on 103 aphakic eyes with myopia of at least -6.0 dioptres. Retinal breaks were found in 19 eyes (18.4 per cent). Posterior vitreous detachment was present in all but one of the eyes. The high prevalence of retinal breaks in aphakic eyes with high myopia is compatible with the high incidence of retinal detachment in such eyes.

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