Extraction of Soemmerring's ring

Before retinal surgery in aphakic detachment

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Norton (1964) showed that retinal detachment in aphakia has a more favourable prognosis than previous workers had suggested (Schepens, 1951; Hughes, 1952; Colyear and Pischel, 1956). A small group of cases remains in which the outcome of retinal surgery is prejudiced by dense lens remnants. The major factors contributing to failure in such cases are inadequate fundus view and vitreous retraction.

This paper reports experience of preliminary anterior segment surgery to clear the ocular media in five unfavourable cases of aphakic retinal detachment. The operating microscope has made this type of surgery feasible, safe and highly effective.

Case reports

The reports are arranged in the chronological order in which cases presented for treatment. Clinical details are shown in Tables I and II. Dense capsulo-lenticular remnants (Soemmerring, 1828) obscured the fundus periphery in each case.

Table I *History before anterior segment surgery*

Case No.	RVEEH. Unit No.	Age (yrs)	Previous surgery to eye with retinal detachment				Number of retinal operations
			Cataract operations				
			Number	Type	Age at operation (yrs)	Years since operation	
1	329257	45	At least 2	Needling	4 to 13	41	1
2	324148	30	At least 2	Needling	6 to 18	24	2
3	369930	35	2	Needling and curette	25	11	0
4	345523	34	3	Needling	10	24	0
5	371182	46	1	Extra-capsular extraction	29	17	3

Operative technique

Apart from minor modifications in the individual case, the following procedures were adopted in clearing the anterior segment.

During the hour before surgery, 500 ml. 20 per cent. mannitol solution was administered intravenously.

Under general anaesthesia, an appropriately sized Flieringa ring was sutured to the episcleral tissue using four 5-0 braided Dacron sutures situated just anterior to the rectus insertions. Under a Zeiss (Oberkochen) operating microscope, a limbus-based conjunctival flap was turned down and

Table II Findings before anterior segment surgery

Case No.	Eye with retinal detachment				Visual acuity of second eye
	Visual acuity	Aphakic refraction	Degree of retinal detachment	Hole visible	
1	3/36	+9.25 D sph., +1.5 D cyl., axis 180°	2 quadrants	Yes	6/36
2	6/9	+9.0 D sph., +2.0 D cyl., axis 45°	1 quadrant	No	Perception of light
3	Hand movements	+13.75 D sph., +1.0 D cyl., axis 20°	Total	No	6/9
4	6/36	+7.0 D sph., +1.5 D cyl., axis 95°	3 quadrants	No	6/6
5	Hand movements	+9.5 D sph., +1.0 D cyl., axis 100°	Total	No	No perception of light

an *ab externo* corneo-scleral groove cut at the limbus from 10 to 2 o'clock. One pre-placed McLean stitch of 7-0 atraumatic black silk was inserted at 12 o'clock. The anterior chamber was opened by razor blade, and the section completed with Vannas scissors. At this stage, any vitreous bands running up to the cornea were divided with the scissors and posterior synechiae separated by a cyclodialysis spatula. A broad iridectomy and a sphincterotomy were then performed at 12 and 6 o'clock respectively. 1 ml. alpha-chymotrypsin was injected behind the iris.

After zonulolysis the capsule remnants were grasped with capsule forceps or toothed iris forceps and slowly extracted by sliding. If, during extraction, the vitreous body was pulled forward by any adhesion to the posterior aspect of the capsule remnants, an attempt was made to separate it with a sable brush. When this was not possible, vitreous abscission was performed to release the capsule remnants.

The section was closed with the pre-placed suture and two post-placed sutures on either side. The anterior chamber was reformed with air, using a Rycroft cannula. The conjunctival flap was then closed with 6-0 catgut.

Results

After anterior segment surgery, all the patients developed slight to moderate vitreous haemorrhage, which absorbed within 3 weeks. Corneal oedema occurred in three of the cases but resolved within 4 days. The most striking and unexpected outcome was reduction or disappearance of subretinal fluid. Flattening of the retina was complete and permanent in one case (Table III).

Table III Reduction in subretinal fluid

Case No.	Degree of reduction	Time after operation that most reduction occurred (days)	Later increase in subretinal fluid
1	Complete	15	Yes, 3 weeks after operation
2	Partial	14	No
3	Complete	36	No
4	Partial	6	No
5	Nil	—	—

Once haziness of the media had resolved, retinal breaks became apparent in four of the five cases where, before surgery, none had been identified (Table IV).

Table IV *Retinal holes*

Case No.	Visualization		Holes		
	Preoperative	Postoperative	Number	Site	Type
1	Yes	Yes	Single	Equatorial	Linear tear with vitreous traction
2	No	Yes	Single	Adjacent ora serrata	Small round with operculum
3	No	Yes	Single	Adjacent ora serrata	Small round with operculum
4	No	Yes	Single	Adjacent ora serrata	Small round
5	No	Yes	Multiple	Pre-equatorial	Linear tears with vitreous retraction

Intraocular pressure, which had been raised preoperatively in Cases 1 and 3 (48 and 30 mm. Hg respectively), fell after anterior segment clearing (14 mm. Hg).

The interval between Soemmerring's ring extraction and subsequent retinal surgery varied from 1 to 4½ months.

Only two of the five patients required drainage of subretinal fluid at operation for the retinal detachment. One case of total detachment was eventually cured by simple cryopexy alone (Table V). Results of retinal surgery are shown in Table VI.

Table V *Subsequent retinal surgery*

Case No.	Time after extraction (mths)	Procedure	Subretinal fluid drained
1	1	Cryopexy and buckle	Yes
2	4½	Cryopexy and buckle	No
3	3	Simple cryopexy	No
4	1	Cryopexy and buckle	No
5	1½	Cryopexy and buckle	Yes

Table VI *Result of retinal surgery*

Case No.	Retina	Visual acuity	
		Before extraction	After surgery
1	Flat for 3 weeks then redetached	3/36	Perception of light
2	Flat	6/9	6/6 after 2 years
3	Flat	Hand movements	6/5 after 2 years
4	Flat	6/36	6/6 after 1½ years
5	Flat	Hand movements	Hand movements*

* Case 5. 6 weeks after retinal surgery. Retina in apposition

Discussion

Capsulo-lenticular remnant extraction (Soemmerring's ring), followed by air injection into the anterior chamber, can be a most rewarding operation in unfavourable cases of aphakic retinal detachment.

The procedure can be made relatively safe with the use of mannitol, Flieringa's ring, the operating microscope, and fine surgical instrumentation. Under these conditions, vitreous loss is not a problem. Alpha-chymotrypsin produces excellent zonulolysis,

thereby reducing operative traction to a minimum. Vitreoretinal bands can be identified readily under the microscope and divided by Vannas scissors to relieve traction on the retina.

While the manoeuvres were designed and undertaken primarily to obtain a better view of the fundus, a most dramatic and unexpected outcome was reduction in the amount of subretinal fluid. This finding, in Case 1, stimulated us to apply this technique more widely.

Case 3 was unique in that a total ballooning retinal detachment before anterior segment surgery reattached completely after operation. Subsequent simple cryopexy to a retinal break resulted in a complete cure with a corrected visual acuity of 6/5 at a 2-year follow-up.

Vitreous haze was seen in the early postoperative period in all cases; this was due to haemorrhage, apparently from the iris.

Only Case 1 had a retinal break visible preoperatively. Previously unidentified retinal breaks were discovered in the remainder after anterior segment surgery. This finding contrasts with the report of Shapland (1934) who recorded breaks in only five of his 33 cases.

Reduction in the amount of subretinal fluid emphasizes the importance of vitreous traction in the causation of retinal detachment.

Traction might arise in such cases in a number of ways (Cordes, 1960): contracture of vitreous strands passing through the aperture in the lens remnants and up to old corneal wounds; contracture of vitreous bands attached to lens remnants; contracture of the Soemmerring's ring itself with resulting tension on the ora serrata *via* the orbiculocapsular fibres of the zonule.

In all cases subsequent retinal surgery was undertaken within 18 weeks of Soemmerring's ring extraction. Case 1 failed as a result of massive vitreous retraction, but a satisfactory outcome was obtained in the other four cases.

Conclusion

Every case of retinal detachment associated with dense lens remnants merits careful appraisal with a view to anterior segment surgery before any retinal operation.

Summary

The results of dense lens remnant removal before retinal surgery in five cases of aphakic retinal detachment are presented. Reduction in subretinal fluid was observed after operative clearing of the anterior segment. The significance of this is discussed briefly. Subsequent retinal surgery was simplified. Three of the four cases with a 2-year follow-up have a visual acuity of 6/6 or better.

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