

# Retinal detachment treated with encircling silastic sponge

## Further experience

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This technique, which has already been described in detail (Chawla, 1970), was used on two aphakic eyes which had already undergone unsuccessful surgery for retinal detachment and had shown early signs of preretinal retraction.

Briefly, a 7 mm. silastic sponge is halved lengthwise to produce a broad shallow implant. Monitored cryopexy is applied to the retinal tears and any suspect areas. Subretinal fluid is released as completely as possible through a meridional scratch incision, the sponge is sutured circumferentially with 5/0 Ethiflex (Ethicon No. Special 135/70) on a micro-point spatulated 8mm. half-circle needle, and its ends are secured with a clove-hitch ligature. Any extra reaction required can be produced with the light coagulator.

Since the first two cases were reported, several patients have presented with retinal detachments in which particular features called for a special approach, and this procedure has now been employed in twelve cases (13 eyes). (See Table, overleaf).

All patients were examined with the binocular indirect ophthalmoscope, a +30 D aspheric lens, and scleral depression, and all were treated with the same basic procedure described above. Manoeuvres peculiar to each case are noted in the following case reports. In all but Case 3 the retinae have remained flat and useful vision has been retained. The minimum follow-up period to date is 6 months.

### Case reports

#### CASES 1 and 2

These have already been discussed in detail in the first paper (Chawla, 1970).

#### CASE 3

This girl suffered an intralenticular foreign body in August, 1969. Subsequent lens extraction was complicated by enormous vitreous loss, and shortly afterwards she developed a bullous inferior retinal detachment with an infero-nasal linear tear. There were fixed folds and a severe anterior uveitis. The left eye was normal.

#### *Treatment*

The retina did not settle with rest in bed. At operation initially, subretinal fluid was released at the 6.30 o'clock position to make sure there were no further tears, but the fixed folds prevented the retina from flattening. Monitored cryopexy was applied to the torn area and scleral buckling was carried out with a circumferential strip of 5 mm. silastic sponge and a No. 40 encircling band. The

**Table** *Clinical features of twelve cases of retinal detachment*

<i>Case No.</i>	<i>Age (yrs)</i>	<i>Sex</i>	<i>Refraction</i>	<i>Preoperative visual acuity</i>	<i>Operation date</i>
1	53	M	+5 D sph., +1.5 D cyl., axis 80°	6/36 N8	Dec. 1969
2	48	F	+5 D sph., +1 D cyl., axis 80°	6/24 N10	Jan. 1970
3	21	F	+13 D sph., +1 D cyl., axis 90°	Counting fingers	Jan. 1970
4	77	F	+3.25 D sph., -0.5 D cyl., axis 180°	Hand movements	Jan. 1970
5	43	F	-20 D sph.	Hand movements	Apr. 1970
6†	16	M	+13 D sph.	6/60 N24	May 1970
7	45	F	-16 D sph. +1.5 D cyl., axis 90°	Bare perception of light	May 1970
8	61	F	+3.25 D sph.	6/9 N5	Jun. 1970
9	46	F	-15 D sph.	6/36 N10	Jul. 1970
10	68	M	+11 D sph.	Hand movements	Jul. 1970
11	53	F	R. -6 D sph., -4 D cyl., axis 40° L. -6 D sph., -4 D cyl., axis 140°	Hand movements Hand movements	Jul. 1970
12	21	M	Emmetropic	6/60 N48	Jul. 1970

\*RD = Retinal detachment

† See Addendum

<i>Type of retinal detachment</i>	<i>Special features</i>	<i>Postoperative visual acuity</i>
Upper RD* Circular involvement Chakic Vitreous Arruga string Red folds and tear astride string at 5 o'clock	Vitreous loss ++ at lens extraction	6/24 N8
Upper half RD extending up nasal side Chakic Vitreous Arruga string Red folds and tear astride string at 10 o'clock	Bilateral intraocular pressure ~ 40 mm.Hg	6/24 N8
Partial RD Chakic Refractive procedures Superior retro-oral round tears	Intraocular foreign body April, 1969 Lens extraction with vitreous loss	No perception of light
Lower RD involving macula Horseshoe tears with taut opercula at 3 and 4 o'clock	Nuclear sclerosis +	6/24 N10
Partial RD Superior staphyloma Multiple equatorial tears	Amblyopic eye Previous squint surgery	Counting fingers +
Superior half RD involving macula Red folds and lower equatorial tear	Congenital cataracts Repeated needlings Nystagmus	6/24 N10
Partial RD Anterior dialysis Large equatorial round tear	Retinal flap hanging over disc and macula	6/60 N48
Temporal RD Large equatorial horseshoe tear at 2.30 o'clock	Old scleritis Marked scleral thinning	6/18+ N10
Lower half and temporal RD Multiple round retro-oral tears	Subluxated lens Nuclear sclerosis ++ Only eye	6/24 N5
Most total RD Red folds and equatorial tears	Extracapsular lens extraction 6 needlings	6/60 N48
Lateral lower 2/3 balloon RD involving macula Large inferior temporal dialyses and much retro-oral Innervation	Pigmentary glaucoma	R. 6/18 N6 L. 6/36 N24
Extensive vitreous haemorrhage Superior half RD secondary to scleral rupture	Late subluxation of lens forwards	6/36 N24 with -8 D sph.

operation, and a further similar one, failed to contain the detachment and at a third operation the encircling 7 mm. sponge was placed around the eye. (This had just proved successful with the two aphakics of the first report). The retina stayed flat for one month, but advancing shrinkage pulled it beyond the scope of further surgery.

#### CASE 4

This woman had a 2-week-old lower temporal detachment in the left eye; the macula was involved and moderate nuclear sclerosis allowed only a limited view of the fundus. However, two horseshoe tears with taut opercula were found at the equator at 3 and 4 o'clock, but there was no certainty that the remaining retina was intact. The right retina showed equatorial pigmentary disturbance and some lattice degeneration in the 8 o'clock position. The left vitreous had some taut strands, but the right showed nothing grossly abnormal.

#### *Treatment*

The retina did not settle with rest in bed. At operation, cryopexy, monitored as possible, was applied to the tears and at intervals around the equator. A moderate volume of thick subretinal fluid was released at the 5.30 o'clock position and it was necessary to lower the intraocular pressure with intravenous Diamox 500 mg. and by paracentesis to facilitate the buckling procedure. A small patch of subretinal fluid remaining behind the buckle has gradually disappeared since the operation and the visual acuity in the eye has continued to improve. Sporadic subconjunctival haemorrhages have occurred adjacent to the clove-hitch ligature used to secure the ends of the implant; these have cleared spontaneously but must be related to the presence of the implant.

#### CASE 5

This highly myopic woman had multiple round holes of different sizes scattered around the temporal and inferior equator; there was much chorio-retinal degeneration and a posterior staphyloma. The left eye had similar, though less marked, equatorial degeneration. There was extensive bilateral vitreous syneresis.

#### *Treatment*

The retina remained elevated despite rest in bed. The surgical approach was hampered by previous strabismus surgery and the sclera was very thin. Monitored cryopexy was applied to the tears and to the suspect equator. Copious thin subretinal fluid was released at 6.30 o'clock. Minimal light coagulation was used after a week to reinforce the seal at 9 o'clock. She had one small subretinal haemorrhage adjacent to the light-coagulated area and behind the buckle at 10 o'clock in July, 1970. This has resolved without damage to the retina.

#### CASE 6

This 16-year-old boy had bilateral curette evacuations for congenital cataract, followed by needlings, in infancy. Nystagmus and right amblyopia complicated the situation. A repeat left needling in February, 1970, was followed 3 months later by a lower half retinal detachment with an inferior large round equatorial tear, some fixed folds, and macular detachment.

#### *Treatment*

The retina did not settle with rest in bed. At operation, monitored cryopexy was applied to the tear and the retro-oral area. Subretinal fluid release at the 5.30 o'clock position was moderate and intravenous Diamox and a paracentesis were necessary to reduce the intraocular pressure. A small cyst developed around the tied ends of the sponge 2 months after surgery; this was opened and removed without interfering with the implant.

## CASE 7

In this patient the right retina, which was totally detached, was torn just behind the ora from 12.30 to 4 o'clock and the free flap had fallen across the disc and macula. A finely thinned and perforated degeneration continued around the retina in the long axis of the tear, and a large round equatorial sieve-like tear completed the picture. A degeneration similar in position and type was found in the left eye. Extensive vitreous syneresis was present in both eyes.

*Treatment*

The retina did not flatten with rest in bed. At operation, monitored cryopexy was applied in a circle behind the ora, where it was hoped the edge of the flap would settle, and also to the equatorial tear. A large volume of thin subretinal fluid was released at 1 o'clock and the flap was coaxed over the buckle produced by the 7 mm. sponge with intravitreal air injected through the pars plana at 6 o'clock. Postoperative positioning for 9 days allowed the air to keep the flap in contact with the treated choroid and only minimal light coagulation was required to complete the seal. Prophylactic cryopexy was applied to the left eye.

## CASE 8

This woman had vitreous haemorrhage and a temporal detachment which has recently arisen from an upper temporal equatorial horseshoe tear. The latter lay in the line of a strip of lattice degeneration extending down the temporal equator. Both sclerae were markedly thinned following long-standing burnt-out scleritis. The right retina was normal.

*Treatment*

Rest in bed produced some flattening, and monitored cryopexy was applied to the tear and the suspect equator. An attempt to place a radial sponge with an encircling No. 40 band failed, because the sutures cut out and, although the intraocular pressure had been adjusted for that procedure, it was still possible to buckle the sclera as described with the 7 mm. sponge by lowering the pressure further with intravenous Mannitol and a paracentesis. A moderate flow of subretinal fluid was obtained below the lateral rectus. One week later some leakage from the tear raised the retina as far as the macula. This settled with rest in bed and light coagulation was applied to seal the tear. A tiny fold from the buckle to the macula has prevented a better visual result.

## CASE 9

This highly myopic woman had an almost total retinal detachment in her left and only eye, vision in the right eye having been lost from an untreated detachment 10 years previously. Both lenses were subluxated from birth: the right had gone on to dislocation and the left partially obscured the fundal view because of nuclear sclerosis. Clearly, only half dilatation of the pupil was permissible and with difficulty a series of fine tears were seen, placed at random behind the ora. No useful vitreous study could be made.

*Treatment*

The retina settled slightly with rest in bed. At operation, monitored cryopexy was applied to the tears and in a circle behind the ora. Copious quantities of subretinal fluid were released at 6.30 o'clock. Before the final tightening of the sutures holding the 7 mm. sponge, 4 per cent. pilocarpine was instilled to hold back the lens.

## CASE 10

This man had a year-old detachment in his right aphakic eye. Extracapsular lens extraction, followed by six needlings, had been carried out elsewhere the previous year. The right retina was detached in the upper temporal quadrant and lower half of the eye. A large horseshoe tear with a taut

operculum was found at 8 o'clock just behind the equator, and there were four further small peripheral round tears lying on a circumferential field behind the ora at 7, 9, and 12 o'clock. The vitreous was very fluid with much syneresis and the vitreous face was broken. The left eye was normal.

#### *Treatment*

Rest in bed was not helpful. At operation, monitored cryopexy was applied to the tears and to the retro-oral area. Copious thick subretinal fluid was released at 6.30 o'clock and the volume restored with intravitreal Ringer's solution injected through the pars plana. The retina was flat postoperatively and the vision improved dramatically.

#### CASE 11

This patient had enormous bilateral balloon detachments obscuring the discs and involving both maculae. They arose from large inferior dialyses and the retro-oral area had many erosions and much thinning. There was extensive vitreous syneresis.

#### *Treatment*

Rest in bed was not helpful. At operation on each eye, monitored cryopexy was applied around the edges and to the suspect retro-oral areas. Enormous volumes of subretinal fluid were coaxed out at 6 o'clock and the ocular volume was restored with intravitreal Ringer's solution injected through the pars plana. The left retina was flat postoperatively, but some residual subretinal fluid in the right eye took a week to absorb.

#### CASE 12

This young man suffered a right traumatic scleral rupture at 7 o'clock, which required suturing from the limbus almost to the equator, and there was vitreous loss. Vitreous haemorrhage thwarted fundus examination until June, 1970, when a temporal detachment involving the macula from 4 to 10 o'clock was found; tears were not clearly seen. The zonular ligament must have been damaged at the original injury, as there has been some anterior lens subluxation 2 months after the operation.

#### *Treatment*

Rest in bed was not helpful. At operation, cryopexy, monitored as possible, was applied around the extent of the scleral wound and behind the ora extending just beyond the limits of the detachment, and a moderate volume of subretinal fluid was released below the level of the lateral rectus.

### **Discussion**

The aim of all retinal detachment surgery is to replace a functioning retina with as little trauma as possible. This implies minimal derangement of the eye at a single operation. To achieve this first-time success, therefore, the procedure should meet both the immediate and any potential cause of retinal detachment. This has been the central principle of treatment in this series of cases, and the use of the technique described has made clear its advantages in attaining the above aim in twelve out of thirteen eyes.

Intravitreal air injection without scleral buckling is becoming more popular in the treatment of retinal detachment with giant tears (Norton, Aaberg, Fung, and Curtin, 1969). In Case 7 such a method might have been employed, but it was considered that, in the presence of a large inferior equatorial tear in addition to a giant dialysis, it would have failed. The broad buckle induced by the 7 mm. sponge dealt with the tear and also allowed the edges of the giant flap to flatten more readily than similar flaps had been seen to do in other cases which we treated by air injection alone.

In Case 9, where there were multiple retro-oral tears and a subluxated lens, it is not apparent that any other technique would have been more effective. The oral pathology was easily contained by the buckle and, with the subluxated lens threatening to dislocate at all times, there was every need for speed and simplicity.

Where the sclera is thin (through myopia or scleromalacia), or where it has been accidentally or surgically injured, scleral dissection can be perilous. In those cases reported, in which the full fundus view was obscured by cataract or vitreous haemorrhage, the sponge could have been adjusted much more simply than a buried implant had a second operation been required.

There was one failure (Case 3). The encircling sponge had not been used until she came for her third operation, by which time massive vitreous retraction had set in. It is possible that the triple cryogenic insult was at least partly to blame for this development, although from our later experiences it is possible that the sponge encirclement might have been effective as a first procedure.

The two patients from the original report continue to do well and no serious complications have been observed. To date there has been no instance of glaucoma, hypotony, migration or erosion of the sponge, hampered eye movement, or ptosis in any of the twelve successfully treated eyes.

### Summary

The treatment of retinal detachment with an encircling halved 7 mm. silastic sponge is described.

The technique is discussed in relation to twelve new cases (13 eyes) and the results show it to be effective, simpler than scleral dissection, and safer than the supramid suture (Manson, 1964).

I should like to thank Prof. G. I. Scott and Dr. J. F. Cullen for allowing me to manage these cases and for permission to publish the results.

### References

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### Addendum

Since the submission of this paper for publication, two further cases have been successfully treated by this method. In addition, the implant in Case 6 finally became infected and had to be removed after 6 months.