Silastic rod encirclement in retinal detachment surgery

AMIN ZAYED, BAHY SHALASH, AND PIERRE AMALRIC
From the Department of Ophthalmology, Cairo University, and the Ophthalmic Centre, Albi, France

Various techniques have been described for the surgical repair of retinal detachment. In the forefront of retinal detachment surgery, stands the encircling operation. A variety of materials have been utilized to create a permanent annular indentation of the sclera.

In this communication we report our experience with silastic rod cerclage for the treatment of retinal detachment. Silastic is white inert silicone sponge. It is soft, elastic, and compressible, and can be readily sterilized by dry heat in a hot-air oven. It is available in cylindrical forms with diameters varying from 1.5 to 7 mm.

Materials and methods
Silastic rod encirclement was performed in 200 cases of rhegmatogenous retinal detachment.

Three techniques were adopted for the cases reported below (Table I):

<table>
<thead>
<tr>
<th>Operation</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silastic rod cerclage only</td>
<td>71</td>
</tr>
<tr>
<td>Silastic rod cerclage + circumferential buckle</td>
<td>75</td>
</tr>
<tr>
<td>Silastic rod cerclage + meridional buckle</td>
<td>54</td>
</tr>
<tr>
<td>Total cases</td>
<td>200</td>
</tr>
</tbody>
</table>

(1) Simple silastic rod encirclement, using a 3 mm. rod, was performed in 71 cases of detachment, all associated with multiple small or medium-sized breaks, lying at or peripheral to the equator (Fig. 1).
(2) Silastic rod encirclement combined with an additional circumferential silastic implant was used in 75 cases which had, in addition to multiple peripheral breaks, a large break with the longest axis lying parallel to the limbus (Fig. 2).
(3) Silastic rod encirclement combined with a meridional silastic implant was used in 54 cases which had, in addition to multiple peripheral breaks, either a large break with its long axis perpendicular to the limbus, or a break which lay well behind the equator of the globe (Fig. 3).

Surgical procedure
The retinal breaks are localized by scleral indentation under continuous observation with the indirect ophthalmoscope. The posterior edge of the most posterior break is marked with gentian violet.

The retinal breaks are then surrounded with confluent cryoapplications. Mattress anchoring scleral sutures are placed at least one in each quadrant. The scleral sutures over the silastic rod are tied with temporary knots. More scleral sutures, also with temporary knots, may be inserted if there is an indication for the use of an additional circumferential or meridional silastic implants.

The fundus is then examined with a binocular indirect ophthalmoscope to check the break-to-buckle relationship, as well as the patency of the central retinal artery. The surgeon then proceeds as follows:
(1) If the buckle is recognized to be in a faulty position, the overlying scleral sutures are cut and the buckle is readjusted to cover the retinal breaks.
(2) If the buckle lies in the proper place, the retinal breaks are close to its summit, and the central retinal artery is patent, the subretinal fluid is not drained, but is left for spontaneous absorption which is usually achieved within 24 to 48 hrs after the operation.
(3) If the buckle is located in the proper place, the retinal breaks are close to its summit, and the central retinal artery is occluded, an immediate paracentesis is done to restore the arterial pulsations, and the subretinal fluid is not drained.
(4) If the buckle lies in the proper place and the retinal breaks are lifted off the buckle as occurs in ballooned detachment, the subretinal fluid is drained.

Additional indications for fluid drainage are set out in Table II.

Table II  Indications for fluid drainage

<table>
<thead>
<tr>
<th>Indication</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullous detachment</td>
<td>42</td>
</tr>
<tr>
<td>Long-standing detachment</td>
<td>24</td>
</tr>
<tr>
<td>Posterior breaks</td>
<td>23</td>
</tr>
<tr>
<td>Macular holes</td>
<td>6</td>
</tr>
<tr>
<td>Co-existing glaucoma</td>
<td>7</td>
</tr>
<tr>
<td>Co-existing retinitis pigmentosa</td>
<td>2</td>
</tr>
<tr>
<td>Total cases</td>
<td>104</td>
</tr>
</tbody>
</table>
The subretinal fluid was not drained in 96 cases, and was drained in 104 cases; in 26 of the latter, an intravitreal injection of saline or air was given to combat ocular hypotony, to flatten meridional retinal folds which appeared across the annular buckle and to assist the closure of those breaks which failed to be apposed to the underlying buckle despite the release of subretinal fluid.

The intravitreal injection was given just anterior and to one side of the inferior rectus muscle insertion in order to be sure that the vitreous was entered rather than a syneresis pocket. The tip of the needle was seen to be free in the vitreous before the injection was attempted. The injection was given slowly with repeated testing of the intraocular pressure with a sterile tonometer held perpendicular to the cornea. The injection was terminated when the apposition of the breaks to the buckle was achieved and the intraocular pressure was below normal to allow for adjustment of the encircling rod.

Results

The retina was successfully re-attached in 164 cases (82 per cent.). This may be considered satisfactory, in view of the unfavourable condition of the detached retina before the encirclement operation.

The postoperative complications are listed in Table III.

Choroidal detachment (8 cases) occurred only in cases in which the subretinal fluid was drained. The choroidal detachment absorbed spontaneously in all cases.

In the four cases of postoperative infection, the wound was reopened and irrigated with the appropriate antibiotic, and the silastic and retaining sutures were removed. Three eyes were saved but one was lost. Two of the three eyes which were saved by removal of the silastic had recurrence of the detachment, because the buckle was removed too early, before the formation of water-tight adhesions around the retinal breaks.

There were twelve cases of postoperative uveitis. Systemic corticosteroid therapy was effective in suppressing the inflammation; in two cases the silastic was removed, but fortunately without recurrence of the detachment.

Dehiscence of the overlying conjunctiva with extrusion of the silastic was observed in four cases, in all of which the silastic implants were 5 mm. in diameter or more, and the implant was placed radially.

Subconjunctival presentation of the silastic, with an intact overlying conjunctiva, was seen in twenty cases, which were left alone.

Anterior segment necrosis did not occur, probably because cryopexy was used instead of diathermy, and

![FIG. 1 Silastic rod encirclement in a case of detachment with multiple peripheral breaks](http://bjo.bmj.com/download/silastic-rod-encirclement-retinal-detachment-surgery.png)

![FIG. 2 Silastic rod encirclement with an additional circumferential silastic implant covering a large break with the longest axis parallel to the limbus](http://bjo.bmj.com/download/silastic-rod-encirclement-retinal-detachment-surgery2.png)

![FIG. 3 Silastic rod encirclement with an additional meridional implant covering a large break with the longest axis perpendicular to the limbus](http://bjo.bmj.com/download/silastic-rod-encirclement-retinal-detachment-surgery3.png)

### Table III Postoperative complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choroidal detachment</td>
<td>8</td>
</tr>
<tr>
<td>Infection</td>
<td>4</td>
</tr>
<tr>
<td>Uveitis</td>
<td>12</td>
</tr>
<tr>
<td>Spontaneous extrusion of silastic</td>
<td>4</td>
</tr>
<tr>
<td>Subconjunctival presentation of silastic</td>
<td>20</td>
</tr>
</tbody>
</table>

were removed. Three eyes were saved but one was lost. Two of the three eyes which were saved by removal of the silastic had recurrence of the detachment, because the buckle was removed too early, before the formation of water-tight adhesions around the retinal breaks.

There were twelve cases of postoperative uveitis. Systemic corticosteroid therapy was effective in suppressing the inflammation; in two cases the silastic was removed, but fortunately without recurrence of the detachment.

Dehiscence of the overlying conjunctiva with extrusion of the silastic was observed in four cases, in all of which the silastic implants were 5 mm. in diameter or more, and the implant was placed radially.

Subconjunctival presentation of the silastic, with an intact overlying conjunctiva, was seen in twenty cases, which were left alone.

Anterior segment necrosis did not occur, probably because cryopexy was used instead of diathermy, and
the rectus muscles were not tenotomized. The former
saves the posterior ciliary arteries, and the latter
the anterior ciliary arteries.

Intraocular erosion of the encircling silastic rod has
not occurred in a follow-up period ranging from 6
months to 4 years. Erosion was probably avoided by
the soft and compressible character of the silastic.
Moreover the underlying sclera is not undermined by
scleral dissection or weakened by diathermy appli-
cations.

Discussion

The encircling operation is indicated for cases of
retinal detachment associated with marked degree of
vitreous traction, multiple peripheral breaks lying in
different meridia, subtotal detachments with extensive
degenerative areas in the remaining attached retina,
as well as for aphakic cases.

Silastic rod encirclement was reported by (Chawla,
1971), who used a 7 mm. silastic sponge, halved
lengthwise, to produce a broad shallow implant,
the subretinal fluid being released as completely as
possible through a meridional scratch incision.

The following year Mortada (1972) reported using
a 3 mm. silastic rod in 100 cases of detachment without
evacuation of subretinal fluid.

Our technique differs from these in two respects:

(1) The encircling rod is supplemented, if necessary,
with circumferential or meridional silastic sponge
implants in order to obtain a more localized buckling
effect at the site of the retinal break. The additional
local implant can be tailored to cover big breaks,
as well as those which lie in awkward positions
and cannot easily be sealed with an encircling rod.
The combination of encircling rod with segmental
implant has increased the chances of success.

(2) We were more flexible in managing the subretinal
fluid. We prefer not to drain the subretinal fluid, but
did not hesitate to evacuate it if necessary.

Lincoff, Baras, and McLean (1965) listed the
indications for fluid drainage as follows: ballooned
detachments, long-standing detachments, and pos-
terior retinal breaks. Other indications for releasing
the subretinal fluid include:

(1) Macular holes. These cannot be closed unless the
retina around the hole is dry at the end of the
operation, thus allowing the edges of the hole to
touch the underlying choroid at the posterior pole of
the eye.

(2) Co-existing glaucoma. The association of open-
angle glaucoma with rhegmatogenous retinal detach-
ment is not rare (Linner, 1966; Schwartz, 1973). We
noted that attempts at buckling without drainage of
the subretinal fluid in these cases is resisted by a high
intraocular pressure, so that the height of the buckle
is insufficient to close the retinal breaks. Furthermore,
if the fluid is not released, the intraocular pressure
rises to high levels, thus compromising the patency
of the central retinal artery.

(3) Co-existing retinitis pigmentosa. We had two
cases of retinitis pigmentosa associated with rheg-
matogenous retinal detachment. Absorption of the
subretinal fluid is delayed in such cases by the morbid
state of the choroidal vessels.

One possible disadvantage of silastic rod en-
circlement, is forward displacement of the iris-
 lens diaphragm if the globe is opened for an intra-
ocular operation at some later date. This compli-
cation was seen in one of our patients who had a
silastic rod encirclement and required cataract
extraction 6 months later. Immediately after making
the corneo-scleral section, the silastic rod recoiled by
virtue of its inherent elasticity. The iris and lens
prolapsed into the wound and the cataract extraction
was attended by vitreous loss. This complication
might have been avoided if the encircling rod had
been cut before the cataract extraction.

Conclusion

Silastic rod encirclement, combined if necessary with
additional circumferential or meridional silastic
implants to obtain a more marked buckling effect at
the site of a large or post-equatorial retinal break,
has appreciably increased the chances of success
of surgery for retinal detachment. Further indications
for the release of subretinal fluid are described.
The operation is easy to perform and the operative
hazards few. Trauma to the ocular tissues in the
primary operation is slight and this renders easy any
subsequent operation which may be required.

References

SCHWARTZ, A. (1973) Amer. J. Ophthal., 75, 205
Silastic rod encirclement in retinal detachment surgery.

A Zayed, B Shalash and P Amalric

doi: 10.1136/bjo.59.2.78

Updated information and services can be found at:
http://bjo.bmj.com/content/59/2/78.citation

Email alerting service

These include:
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/