Modern Problems in Ophthalmology
Editor: E. B. Streiff, Lausanne
Publishers: S. Karger, Basel
Reprint (Printed in Switzerland)

Mod. Probl. Ophthal., vol. 20, pp. 157–163 (Karger, Basel 1979)

Diagnostic Uses for an Unsecured Balloon Buckle[1]

Harvey Lincoff and Ingrid Kreissig

Department of Ophthalmology of The New York Hospital-Cornell Medical Center, New York, N. Y., and Universitäts-Augenklinik, Bonn

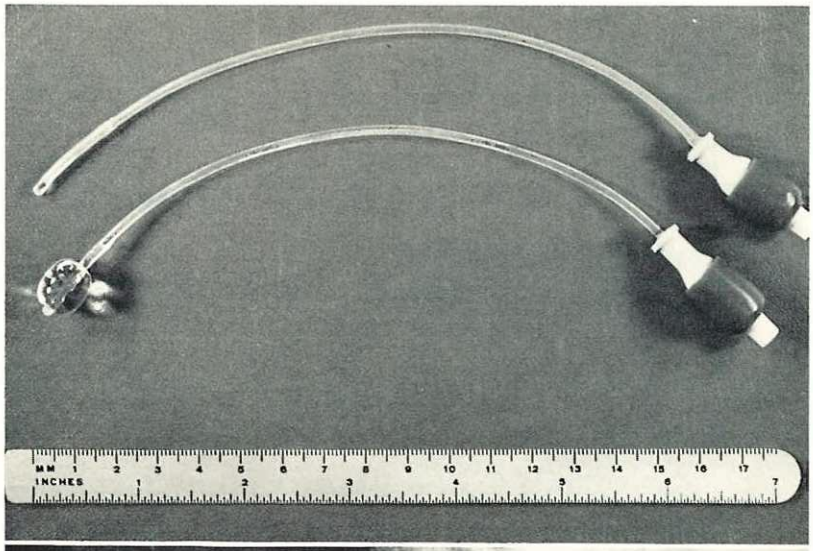
Introduction

In a paper provided to the *Transactions of the American Academy*, we described the use of a temporary silicone balloon for the treatment of small retinal detachments [1]. The purpose of this paper is to suggest the use of the balloon as an exploratory technique in more complicated retinal detachments.

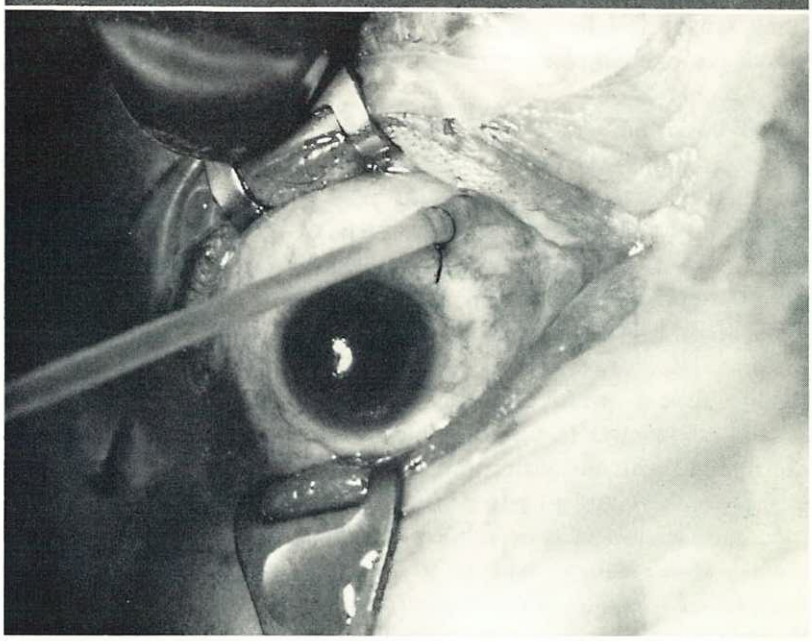
Balloons have been used before in the treatment of retinal detachment. *Schepens* and co-workers [2, 3] use an intraocular balloon for manipulating giant tears. *Banuelos* and co-workers [4–6] developed an expandable implant to be inserted beneath scleral flaps. *Hoepping* [7] sutured a balloon to sclera to buckle large posterior breaks and drained subretinal fluid to obtain retinal attachment.

The balloon device and the technique for insertion are outlined in the previous publication. Essentially a small silicone balloon at the end of a silicone tube is inserted into the parabulbar space through a 2-mm incision in conjunctiva (fig. 1). The balloon is directed to a position beneath the retinal break and then inflated. A single suture is used to stabilize the exit of the tube and to pursestring conjunctiva about it (fig. 2). The balloon itself is unsecured by sutures. It maintains its position initially by fixation between the eye and the bony orbit. Subsequently, as the eye decompresses it creates a depression in the globe in which it is maintained by counterpressure from the epibulbar tissues. Subretinal fluid absorbs when the intrusion of the balloon closes the retinal break. The balloon is left in place 5–7 days while the retinal adhesion gains strength and then is

[1] Supported in part by a grant from Drs *Albert and Daphne Roe.*



1



2

Fig. 1. Silicone balloon deflated (above); inflated (below).
Fig. 2. Balloon is in place and tube is exiting through conjunctival incision.

deflated and withdrawn. The long-term attachment is dependent on the thermally induced adhesion, either transconjunctival cryopexy at the time the balloon is inserted, or laser coagulation around the break after the subretinal fluid has absorbed.

Clinical Application

To Confirm the Presence of a Doubtful Break

An inferior detachment extending from 2:30 around the clock to 9:00 was studied without finding a retinal break. There was a round hole at 6 o'clock in peripheral schisis that was thought to be only through internal layers of retina. A point of traction on the retina at 3:15 posterior to the equator was selected as the most likely place for a break. Transconjunctival cryopexy localized the area but did not clarify whether or not a break was present. A balloon inserted beneath the area caused subretinal fluid to absorb in 48 h, confirming the presence of a retinal break (fig. 3a, b).

To Indicate the Position of a Secondary Break

A 58-year-old black woman with peripheral neovascularization developed a retinal detachment while waiting for photocoagulation therapy. A vitreous hemorrhage was the cause for the delay. Examination through hazy media revealed a temporal detachment with a probable round hole at 12:15, appropriate to the detachment. Transconjunctival cryopexy confirmed the hole and a balloon buckle flattened the superior retina to a level below the macula in 16 h. The residual detachment which persisted suggested another break inferiorly in the area still concealed by hemorrhage. With further clearing a horseshoe break at 6 o'clock was revealed. When it was buckled the remaining fluid absorbed (fig. 4a, b).

To Determine the Patency of an Apparent Macular Hole

An elderly myope presented with a detachment of 2 weeks duration. In addition to a number of small breaks in cystic retina there was an apparent macular hole. While macular holes are usually only through the internal layers of retina, in the thin retina of high myopes the probability of the hole being through full thickness increases. It was decided to test for it by ballooning the peripheral breaks as an initial procedure. The retina flattened in 24 h confirming that the macular hole was only through the internal layers of the retina (fig. 5a, b).

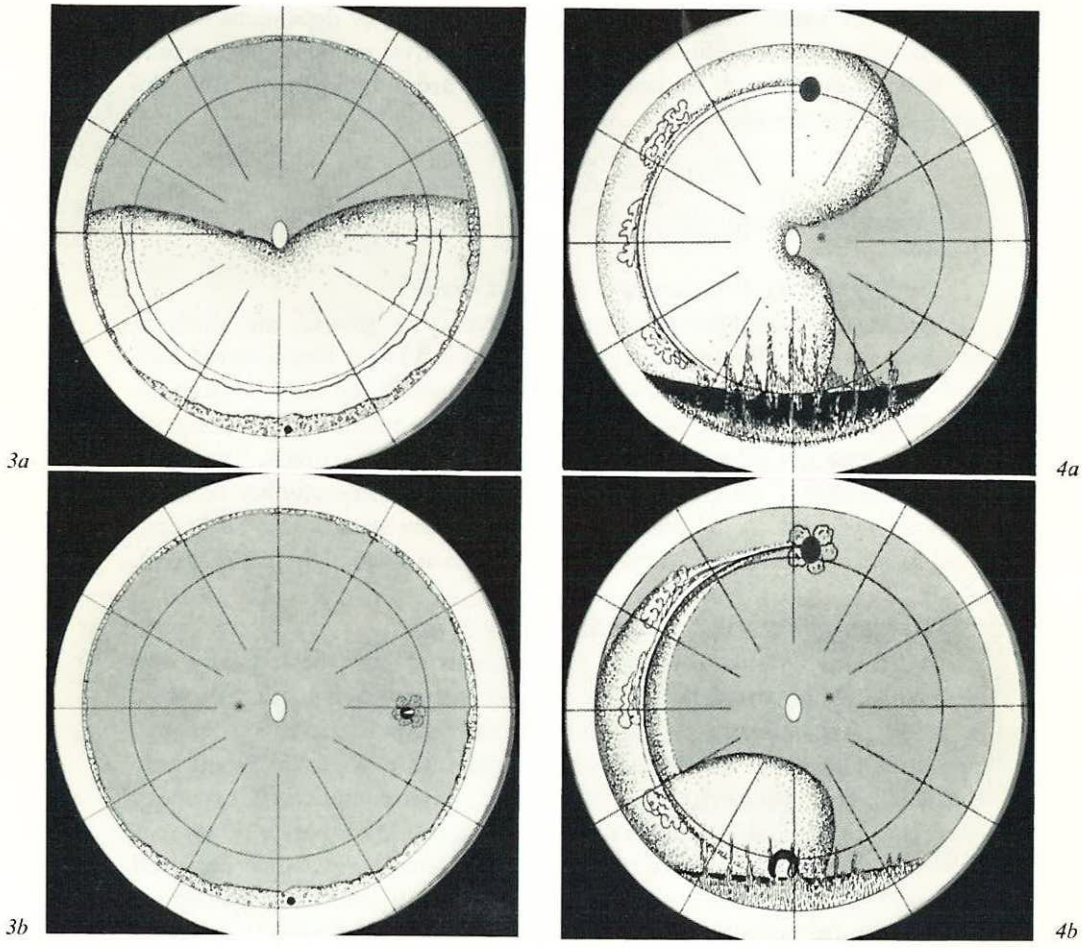


Fig. 3. a Inferior detachment with a hole at 5:45 in the internal layer of peripheral schisis and a suspicious traction tit at 3:15. *b* After a balloon buckle was applied beneath the suspected break at 3:15, the subretinal fluid absorbed.

Fig. 4. a Temporal detachment in a patient with bleeding neovascularization, and a retinal hole at 12:15. *b* After the superior hole was treated with a balloon the residual pattern of fluid indicated the presence of the concealed hole at 6 o'clock.

To Define Traction

An elderly aphake presented with a total detachment of 1 week's duration. There was a horseshoe tear at 11:45 in an extensive line of apparent peripheral traction. A balloon buckle flattened the superior retina in

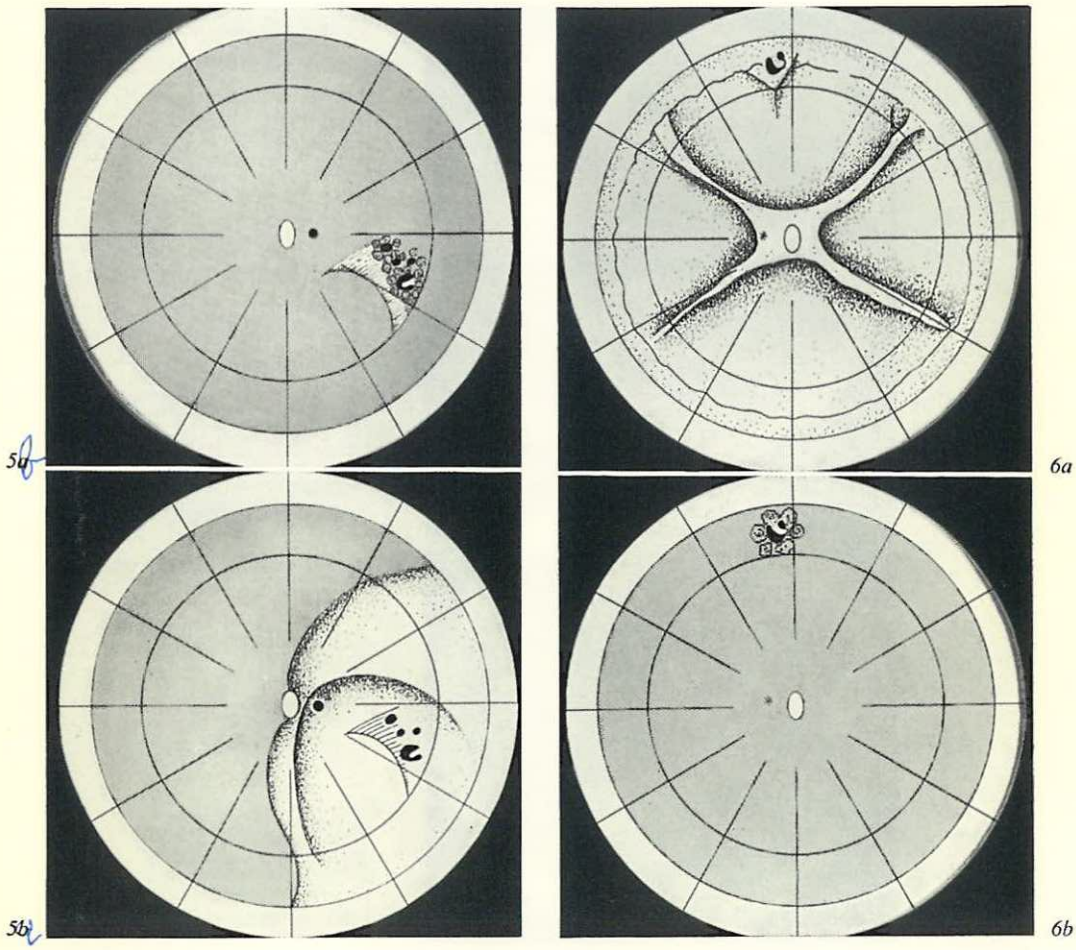


Fig. 5. a Temporal detachment in a myope due to multiple tears beneath a membrane at 9:30 and a possible macular hole. *b* After the temporal tears were treated with a balloon buckle the retina flattened.

Fig. 6. a Total detachment secondary to a retinal tear at 11:45 in an apparent line of traction. *b* After temporary buckling the retina flattened and the traction line was no longer evident.

48 h and by the 7th day, when the balloon was removed, only a small amount of residual fluid remained centrally. There was no evidence of significant traction peripherally, nor has it appeared during 14 months of observation (fig. 6a, b).

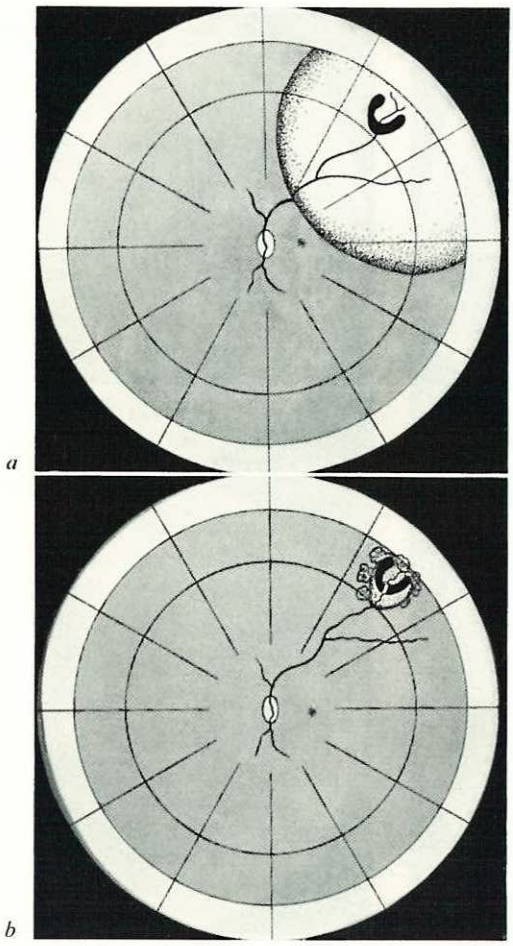


Fig. 7. a Supero-temporal detachment caused by a tear at 1:30. *b* After the balloon was removed the detachment is recurring because of traction by a bridging vessel on the posterior edge of the tear.

On the other hand, a 58-year-old aphake with only a superior quadrant detachment began to redetach after deflation. A small bridging vessel that had escaped notice preoperatively was lifting the posterior edge of the break and was an indication that a more permanent buckle was required (fig. 7a, b).

References

1 Lincoff, H.; Kreissig, I., and Hahn, Y. S.: A temporary balloon buckle for the treatment of small retinal detachments. Ophthalmology (in press, 1978).
2 Schepens, C. L. and Freeman, H. M.: Current management of giant retinal breaks. Trans. Am. Acad. Ophthal. Oto-lar. *71:* 474–487 (1967).
3 Freeman, H. M.; Couvillion, G. C., and Schepens, C. L.: Vitreous surgery. IV. Intraocular balloon: clinical application. Archs Ophthal., Chicago *83:* 715–721 (1970).
4 Banuelos, A.; Refojo, M. F., and Schepens, C. L.: Expandable silicone implants for scleral buckling. I. Introduction of a new concept. Archs Ophthal., Chicago *89:* 500–502 (1973).
5 Refojo, M. F. and Banuelos, A.: Expandable silicone implants for scleral buckling. II. Experiments *in vitro*. Archs Ophthal., Chicago *90:* 127–130 (1973).
6 Huamonte, F.; Refojo, M. F., and Banuelos, A.: Expandable silicone implants for scleral buckling. III. Experiments *in vivo*. Archs Ophthal., Chicago *93:* 354–356 (1975).
7 Hoepping, W.: Die Ballonplombe. Mod. Probl. Ophthal., vol. 5, pp. 289–291 (Karger, Basel 1967).

Dr. H. Lincoff. The New York Hospital, 525 E. 68th Street,
New York, NY 10021 (USA)