Surgical Approach for Retinal Detachments at High Risk for Proliferative Vitreoretinopathy

A scleral buckle may lead to superior outcomes in high-risk retinal detachments

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Rhegmatogenous retinal detachment (RRD) can be surgically treated with scleral buckling (SB), pars plana vitrectomy (PPV), or a combination of the 2 procedures. Responses to the American Society of Retina Surgeons’ Preferences and Trends Survey suggest a declining use of SB over the past decade. The biggest reason for this trend is advances in the techniques and instrumentation used to repair RRDs with primary PPV. Although this trend may be justified in general by similar success rates reported with primary PPV and SB, not all RRD cases are the same.

With decreasing utilization of SB, an important question arises: Are there certain situations in which the addition of SB provides superior outcomes in RRD repair? In recent years, a number of randomized controlled trials and retrospective reviews have evaluated SB with or without PPV versus PPV alone for patients with RRD. In general, these studies have found no significant differences in outcomes. However, the majority of these trials and reviews have focused on simple to moderately complex cases and excluded patients with high-risk characteristics.

HIGH-RISK REPAIR

The most common cause of failure of surgical repair in RRD is proliferative vitreoretinopathy (PVR), a complex process involving cellular proliferation, migration, and inflammation (Figures 1 and 2). We hypothesized that there may be a role for the addition of [scleral buckle] in eyes at high risk for [proliferative vitreoretinopathy] and primary surgical failure.

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We initiated a retrospective study that included 678 patients with RRD treated with a combination of PPV and SB or PPV alone between April 1, 2010, and August 1, 2012, at a large retina practice. After reviewing published literature of risk factors for PVR, we classified patients as being at high risk for failure if they had a RRD in 2 or more quadrants, retinal tears greater than 1-clock hour, preoperative PVR grade B or higher, or vitreous hemorrhage obscuring 5 or more clock hours of central or peripheral retinal RRD in 2 or more quadrants. Patients were excluded if they lacked...
high-risk features, had less than 3 months follow-up, were treated with SB without PPV, or were previously treated with SB or PPV in the study eye.

Patients underwent a standard 3-port 23-gauge PPV using a noncontact wide-angle viewing system. Endolaser photocoagulation was applied either around the retinal tear or around 360° to the vitreous base. In all cases, patients received nonexpansile C3F8, SF6, or silicone oil for tamponade. Patients in the SB group received a 360° encircling band secured with a Watzke sleeve.

Of 678 patients reviewed, 65 (9.6%) qualified as high-risk and were included in the study. A group of 13 surgeons performed PPV-SB in 36 patients and PPV alone in 29 patients. Baseline demographics including age, lens status, baseline visual acuity, and high-risk features did not differ between the surgical groups.

The primary outcome for our study was single surgery anatomic success, defined as 1 operation to anatomically reattach 100% of the retina for at least 3 months. The overall success rate regardless of surgical procedure for the 65 high-risk patients was 63.1%, which is consistent with previously reported rates of high-risk cases. We found that the addition of SB was associated with significantly higher success rates compared with PPV alone. For patients treated with PPV-SB, surgical success was 75.0% (27 of 36) compared with 48.3% (14 of 29) for patients treated with PPV alone, giving an odds ratio of 3.24 (95% CI 1.12-9.17; \( P = .029 \)).

**BASELINE CHARACTERISTICS**

Among baseline characteristics evaluated, 1 factor significantly affected surgical success: age. For patients 65 years of age and younger, PPV-SB had a significantly higher success rate compared with PPV alone (84.6% for PPV-SB vs 46.2% for PPV), with an odds ratio of 6.42 (95% CI 1.40-29.5; \( P = .017 \)). For patients older than 65 years, there was no difference in anatomic outcomes between the surgical approaches. Interpretation of these results suggests that, as the vitreous gel becomes more syneretic, the benefit of SB declines. This may provide a useful guideline as surgeons plan repairs for high-risk patients.

Lens status has been considered to play an important role in surgical planning for PPVs based on previously reported studies. One randomized trial, which excluded patients with high-risk characteristics including preoperative PVR and tears in more than 2 quadrants, found that SB resulted in better functional success in phakic patients while PPV achieved better anatomic outcomes in pseudophakic patients. Another study found that SB had superior outcomes compared with PPV alone in phakic eyes but that outcomes were no different in pseudophakic eyes.

In contrast, our study found that lens status did not have an impact on surgical outcomes in this high-risk cohort. For both phakic and pseudophakic patients, the addition of SB was associated with superior surgical success compared with PPV alone, but the differences were not statistically significant.
“A number of randomized controlled trials have explored surgical management for patients with uncomplicated [rhematogenous retinal detachment] with variable conclusions.”

SHOULD SURGICAL APPROACH DIFFER?

Surgical approaches for low to moderate complexity RRDs have been well studied, and success rates have generally been similar among the procedures studied. However, less is known concerning comparative surgical outcomes in patients at high-risk for failure. Our study was the first to specifically evaluate surgical outcomes in patients at high risk for PVR, and we found that the addition of SB resulted in significantly higher success rates.

Success rates of surgical repair of RRD in low- and medium-risk eyes have ranged from 68% to 99%.

The cohort of high-risk patients in our study—the roughly 10% of patients at highest risk for failure—had a single-surgery success rate of 63.1%. The primary reason for this lower success rate was, as expected, a substantially higher rate of postoperative PVR: 3% to 12% in previous studies of low- and medium-risk patients compared with our rate of 23.1%.

A number of randomized controlled trials have explored surgical management for patients with uncomplicated RRD with variable conclusions. Some randomized trials found no difference in single-surgery anatomic success between SB alone versus PPV.

One study found that PPV had significantly higher attachment rates than SB alone. However, in all of these randomized trials, eyes with PVR grade C or D were excluded, and some studies excluded patients with vitreous hemorrhage or large tears, all of which were inclusion criteria for our study of high-risk eyes. Additionally, we compared the combination PPV-SB to PPV alone, while the vast majority of published trials have compared SB alone to PPV alone.

CONCLUSION

Given the declining use of SB for primary repair of RRD, the results of our recent study are notable. Improvement of instrumentation for PPV surgery, shorter operating times, and decreased need for suturing have all contributed to increased preference of PPV over SB. While a surgeon’s comfort with a particular operation may also guide his or her choice, procedures should be selected to meet the needs of the individual patient and should be based on the strength of clinical evidence. Our study suggests that, when a patient presents with RRD at high risk for failure to reattach, and the patient is 65 years or younger, the surgeon should consider use of a SB in addition to PPV to increase the likelihood of successful repair.

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No conflicting relationship exists for either author.