

When to repair a retinal detachment?

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Rhegmatogenous retinal detachment (RRD) is the most common retinal emergency, threatening visual acuity, with an incidence of 1/10 000^[1]. The number of RRDs is increasing^[2-3].

I recently had to prepare two expert reports about the correct timing of RRD surgery. In both patients, the exact time of the onset of the symptoms, particularly the loss of vision, was unknown. Only the time of the RRD diagnosis was precisely known. The first patient with an RRD macula-on demanded that surgery be performed within 3h after diagnosis. After presenting to the emergency department, the second patient had a 70-hour delay due to treatment for headaches in the neurology department. Is this demand reasonable, and is this delay still acceptable?

RRD With/Without Macular Involvement Visual outcome after RRD repair is dependent on the duration of macular involvement^[4]. The rationale is that permanent functional damage occurs once the macula has detached. Therefore, the timing of RRD repair depends on the assessment of the macula or fovea (RRD macula-on vs RRD fovea-off). Traditionally, surgery for macula-on RRD should be performed “before the sun rises again”. It also led to a policy of treating macula-off RRD with less urgency^[5]. However, there were always some exceptions, e.g., the national meeting effect. Patients diagnosed with RRD during national ophthalmology conference dates waited slightly longer for surgery, were less likely to receive surgery within a day, and were more likely to undergo a second surgery within 30d of the primary procedure^[6].

New studies show that this attitude for RRD repair needs to be revised. The paradigm of “within 24h” surgery for macula-on cases and “as soon as convenient” for recent macula-off cases requires modification.

Definition of Treatment Success The treatment success of an RRD surgery is assessed as the single operation anatomical success (SOAS) and the postoperative visual acuity (VA). The anatomical outcome following pars plana vitrectomy repair is not affected by symptom duration and time to surgery^[7-8]. SOAS and preoperative VA are correlated with improved visual outcomes^[9]. Preoperative VA is associated with fovea attachment but does not precisely prove attachment^[10]. Critical morphologic changes following RRD are crucial in understanding why anatomical and functional outcomes can vary^[11]. Photoceptor apoptosis occurs as early as 12h after retinal detachment, and although most cells survive, there is extensive remodeling. RRD repair is, therefore, time-sensitive. The question is, however, how much time is allowed to elapse for a good postoperative VA because other factors also play a role in SOAS. As with any surgical procedure, treatment should be carried out in a center with sufficient experience and the appropriate number of operations.

Recommendations: Macula-Sparing RRDs It is unclear how long the macula will remain attached in the case of macula-sparing RRDs; therefore, standard practice dictates emergency surgery. Macula-on RRD repair within 0-24h of presentation may have a better final best corrected visual acuity (BCVA) than in >24h. An RRD-fovea-on should, therefore, be operated on within a day (24h). These results were supported by moderate- and low-quality evidence and may have been influenced by differences in baseline VA^[12-13].

RRD with a so-called split fovea should be treated the same way as RRD fovea-on as they have a similar chance of vision improvement^[14-15].

A slight delay in the time of surgery for macula-on RRD did not adversely affect the outcome (SOAS and VA) of the patients^[8-9]. This can be explained by the fact that 80% of fovea-on RRD do not progress within 48h. However, a bullous RRD configuration was a highly significant predictor for progression in macula-on detachments in a prospective study^[16]. This data supports prompt surgery in patients diagnosed with bullous macula-on RRD. Timing of presentation, examination findings, case complexity, co-existing medical conditions, surgeon expertise, and timing and quality of access to operating facilities and staff, however, should all be considered in determining whether a macula-sparing RRD requires immediate intervention or if equivalent

visual and possibly better overall outcomes can be achieved with scheduled surgery within an appropriate time frame^[17].

The surgeon's experience, the team's experience, and the type of surgery (buckling, vitrectomy) are also crucial for good postoperative VA^[18]. The number of breaks, inferior positioning of breaks, the extent of RRD, and proliferative vitreoretinopathy (PVR) are associated with failed primary surgery^[19].

SOAS and VA outcomes in primary extramacular RRDs were favorable, with an urgent and semi-urgent approach to repair. There was no difference in visual and anatomic outcomes between patients who were operated on the day of presentation and those treated a short time later when clinical decisions were made by the treating surgeon on a case-by-case basis^[20].

Recommendations for RRD with Macular Detachment

Retinal detachment is progressive due to the forces on the retina by the ocular and head movements and gravity. The accurate timing of foveal detachment is a significant limitation faced by all studies investigating surgical timing in fovea-off RRDs^[10]. The inability to determine the moment the macula came off may explain why different clinical studies fail to validate each other regarding the correlation between the duration of macular detachment and visual outcome^[21].

RRD with a detached macula at diagnosis should be treated within two days. A substantial deterioration in VA follows a longer delay. The most critical modifiable risk factor in achieving better visual results was the duration of central visual loss (roughly corresponding to foveal detachment) less than 72h^[19,22]. Patients with macula-off RRD at the presentation of short duration (≤ 72 h) achieve only marginally worse visual acuity outcomes than patients with macula-on. Therefore, those with recent macula involvement (1–3d) should have their surgery prioritized.

CONCLUSION

Operating an RRD on the same day with a good team is always the right thing to do. However, a balance must be established between the push to perform surgery sooner and the availability of experienced operating room teams and resources. If, for whatever reason, there is a delay, some prioritization must be done. The treating surgeon should then make clinical decisions on a case-by-case basis^[20]. Positioning and patching may help in the waiting time^[23].

- Evidence-based prioritization should treat superotemporal macula-on RRD and near-fovea or fovea-split RRDs as most urgent^[14-15,18].

- Superotemporal RRDs extending to the retinal arcades are at the most significant risk of progression to macula-off but have the highest SOAS rate. These detachments require early surgery and preoperative posturing to limit progression to totality and the recruitment of inferior breaks. Surgery within

one day after spectral-domain optical coherence tomography (SD-OCT) diagnosis of RRD resulted in better vision compared to surgical interventions that were further delayed^[10].

- Other macula-on RRD and recent (1–3d) macula-off RRD are second priority and semi-urgent^[5,22]. Macula-on RRD repair within 0–24h of presentation may have a better final BCVA than in >24h. Macula-off RRD repair in 0–3d from symptom onset may have a better final BCVA than in 4–7d^[12-13,22,24].

To further improve the results of RRD surgery, the following aspects should be considered:

- Preoperative OCT scanning (fovea-on, macula-on, split macula) is essential in allocating RRD patients and finding new biomarkers for surgical success^[25-26].

- All pseudophakic patients and patients with incomplete posterior vitreous detachment should be educated about the possibility and symptoms of retinal detachment so that the delay from the beginning of symptoms to diagnosis is short.

- Physicians should be aware that socioeconomic disparities can negatively impact the prognosis of patients with RRD^[27-28].

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