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ORIGINAL ARTICLE

Retinal breaks in retinal detachment: comparison of amniotic membrane graft with laser photocoagulation versus choroidectomy with laser photocoagulation versus laser photocoagulation alone.

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ABSTRACT… Objective: To compare the effectiveness of Human amniotic membrane grafts with LASER vs choroidectomy with LASER vs LASER only in treating retinal breaks in retinal detachments. **Study Design:** Retrospective Cohort study. **Setting:** Department of Ophthalmology, Post Graduate Medical Institute, Ameer ud Din Medical College, Lahore General Hospital, Lahore, Pakistan. **Period:** Twelve Months 1st March 2023 to 1st March 2024. **Methods:** A total of 60 patients, 42 males (70%) and 18 females (30%) with a mean age of 47 years were enrolled in this study and randomly divided into three groups of 20 patients each, in which retinal breaks were treated with AMG and LASER, choroidectomy and LASER and with LASER only respectively. The patients were followed up for six months after surgery. **Results:** Complete anatomical closure was used to gauge the success of the surgery. Patients treated with AMG and LASER achieved full anatomical closure in 90% cases whereas patients who underwent choroidectomy and LASER had anatomical closure in 75% cases. In patients where no such intervention except LASER was done, rates of spontaneous closure were 60% of the cases. **Conclusion:** The retinal breaks plugged with AMG had better closure rates than those treated by choroidectomy and those without any intervention.

Key words: Amniotic Membrane Graft, Choroidectomy, Laser Photocoagulation, Retinal Breaks, Retinal Detachment.

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INTRODUCTION

An important part of ophthalmology is treating retinal breaks, especially to avoid retinal detachment and the ensuing loss of vision. For doctors around the world, retinal breaks—whether they happen naturally, as a result of trauma, or as a result of risk factors like severe myopia or diabetic retinopathy—present serious difficulties. Therapeutic strategies have historically included anything from sophisticated surgical procedures to conservative maintenance. However, the therapy landscape has changed dramatically with the recent introduction of physiologically novel options, such as the use of human amniotic membrane (hAM) grafts. The relative efficacy of three approaches to treating retinal breaks—choroidectomy, amniotic membrane grafting, and no intervention—is examined in this research. Because of its regenerative and anti-inflammatory qualities, amniotic membrane grafting has become a viable treatment that can help with difficult cases of retinal breaks by promoting tissue regeneration and provide mechanical support.[1,2-5] Originally performed to treat diseases like choroidal melanoma, choroidectomy has occasionally been modified to treat intricate retinal disorders. However, if action is not taken, the illness may worsen and eventually result in retinal detachment and irreversible visual loss.

Because it transforms light into neural impulses that are sent to the brain, the retina is essential to vision. If left untreated, retinal breaks can cause vitreous fluid to leak into the subretinal region and result in retinal detachment. Preserving visual function requires early detection and suitable intervention. Although cryotherapy and laser photocoagulation are still first-line therapies, their drawbacks in complicated or recurring cases call for different approaches.[2]

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For many years, hAM has been used in ophthalmology, mostly to treat surface conditions like corneal ulcers.[4] Its use has expanded to include retinal problems due to recent developments. Research has shown that hAM promotes cellular adhesion, lowers inflammation, and offers a scaffold for tissue regeneration. In eyes with diabetic tractional retinal detachment (TRD), it has demonstrated exceptional effectiveness in sealing retinal fractures and restoring macular holes.[1] Furthermore, the membrane's immunomodulatory qualities foster a healing environment, making it a good substitute for traditional therapies when they don't work.[3]

Choroidectomy has a specific function in treating sub-retinal diseases, although being less frequently utilized for retinal breaks. This technique can reduce vascular or mechanical disruptions that cause retinal damage by excising the choroid's damaged sections. This method's presence in the conversation emphasizes how crucial it is to design solutions that are specific to the underlying disease. The lack of symptoms or the perceived low risk of progression are frequently used as justifications for delaying treatments in retinal breaks. But there are drawbacks to this strategy. If left untreated, retinal fractures can develop into detachment, which can have catastrophic consequences for vision.

This article attempts to shed light on the relative benefits and drawbacks of different strategies by critically comparing them. It will point out clinical situations in which one approach might be better than the others and provide suggestions for putting these tactics into practice.

METHODS

We conducted a retrospective cohort study in the department of Ophthalmology, Lahore general hospital after approval from ethical review board letter #717, spanning over a period of twelve months from 1st March 2023 to 1st March 2024. A total of 60 patients, 42 males (70%) and 18 females (30%) with a mean age of 47 years were enrolled in this study. After careful examination and evaluation, & after taking informed consent, patients were randomly divided into three groups of 20 patients each, in which retinal breaks were treated with AMG and LASER, choroidectomy and LASER and LASER only respectively. The patients were followed up for six months after surgery.

Inclusion Criteria

- Patients aged 18 years and above
- Patients with retinal breaks associated with rhegmatogenous retinal detachment
- Patients treated with laser photocoagulation, amniotic membrane graft or choroidectomy
- Minimum follow-up of six months
- Informed consent obtained

Exclusion Criteria

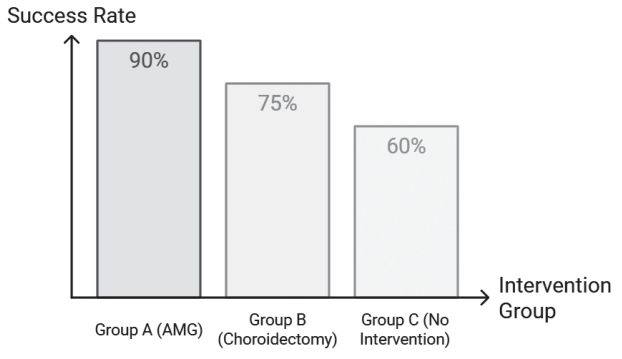
- Previous vitreoretinal surgery
- Tractional or exudative retinal detachment
- Giant retinal tears (>90 degrees)
- Advanced proliferative vitreoretinopathy (Grade C or higher)
- Active ocular infection or inflammation
- Inadequate follow-up (<6 months)

A one-way ANOVA was performed using SPSS version 29.0 to compare anatomical closure rates among the three treatment groups. The mean success rate was 90% in the amniotic membrane graft with laser group, 75% in the choroidectomy with laser group, and 60% in the laser-only group. The analysis yielded an F-value of 2.61 with a p-value of 0.08. Although the difference did not reach statistical significance at the 0.05 level, a trend toward improved anatomical outcomes with more extensive interventions was observed.

RESULTS

A total of 60 patients, 42 males (70%) and 18 females (30%) which were included in this study were divided into three groups randomly, each group having 20 patients each. Group A in which AMG and LASER was used to treat the retinal breaks showed 90% success rate in terms of retinal breaks closure after six monthly follow-up. Group B in which Choroidectomy and LASER was done showed a success rate of 75% with 15 out of 20 patients achieving anatomical closure of the retinal break. Group C where only LASER was done showed a success rate of 60% with only 12 out of 20 patients achieving full anatomical closure at 6 months interval.

FIGURE-1



Success Rates of Retinal Break Closure Interventions

DISCUSSION

The choice of procedure has a major impact on patient outcomes, making the management of retinal breaks in ophthalmology a challenging problem. The effectiveness of choroidectomy, human amniotic membrane (hAM) grafts, and no intervention in repairing retinal fractures is examined in this topic. Based on the literature, it seeks to provide light on their relative benefits, drawbacks, and clinical significance. Because of its anti-inflammatory and regenerative qualities, hAM has attracted a lot of interest for usage in ophthalmology. The hAM, which comes from the placenta's deepest layer, is a great scaffold for tissue regeneration because it is abundant in growth factors, cytokines, and extracellular matrix proteins. Its use for retinal breakdowns has showed potential, especially when refractory macular holes and severe retinal detachments are involved. The capacity of hAM grafts to provide a physical barrier that stops additional fluid intrusion into the subretinal area is one of their main advantages. Studies showing better anatomical results in cases of diabetic tractional retinal detachment (TRD) and combined tractional and rhegmatogenous retinal detachment (CTRRD) emphasized this mechanism.[6] Furthermore, because of their immunomodulatory qualities, hAM grafts have been linked to decreased fibrosis and inflammation. High rates of retinal reattachment and visual improvement after hAM implantation in posterior tears were observed in studies by Caporossi et al. and Zeydanlı et al.[7,8]

Notwithstanding these advantages, there are drawbacks to using hAM grafts. One significant drawback is the requirement for exact surgical placement, since incorrect placement can result in graft migration or insufficient break closure. Furthermore, research on the long-term stability of hAM grafts is still ongoing. According to Tartaro et al., hAM grafts work best in particular subgroups of cases of retinal detachment, underscoring the need of patient selection.[9]

A well-established treatment for diseases like choroidal melanoma is choroidectomy, which involves surgically removing a section of the choroid. Although it has been investigated in situations involving severe subretinal diseases or vascular disruptions, its use in retinal break healing is relatively restricted. Choroidectomy may help stabilize the retina by reducing vascular compromise and mechanical stress.In a study by Zeydanlı et al., it was demonstrated that choroidectomy improved results in complex retinal detachments when combined with other procedures. But the procedure's invasiveness raises questions about possible side effects like bleeding, scarring, and vision loss in nearby retinal regions. Choroidectomy might be less adaptable than hAM grafts because it doesn't have the same immunomodulatory or regenerative advantages. However, because of its focused approach, it is a useful choice in some situations, especially when alternative approaches are not appropriate.

Patient comorbidities, the lack of symptoms, or the break's perceived stability are some of the variables that frequently influence the choice to defer care in retinal breaks. Although the hazards of surgery are avoided with this cautious approach, there may still be repercussions. If left untreated, retinal fractures can become detached, resulting in severe vision loss and more difficult surgery later on. Even asymptomatic retinal breaks have the potential to worsen, according to studies, especially in high-risk groups like those with myopia or lattice degeneration. Additionally, the absence of intervention eliminates the possible use of regenerative methods such as hAM grafts, which may be able to stop or even reverse the progression of the disease. Thus, a no-intervention approach must include close observation and patient education.

A number of aspects need to be taken into account when comparing these three methods, such as the underlying condition, patient-specific traits, and the resources that are accessible. Particularly appropriate for tough or refractory situations, hAM grafts provide a biologically novel option that may encourage healing and lessen problems. Despite being more invasive, choroidectomy offers a focused method for treating particular conditions such subretinal tumors or significant vascular disruption. On the other hand, no intervention is only effective in a small number of situations with little chance of advancement. Studies have repeatedly demonstrated better reattachment rates and visual improvement using hAM grafts in comparison to conventional techniques in terms of clinical results.

However, it is difficult to reach firm findings because there aren't any randomized controlled trials that directly compare choroidectomy and hAM grafts. Furthermore, hAM grafts' availability and cost could be obstacles to their broad use, especially in environments with limited resources.

CONCLUSION

Retinal break management is a dynamic field that necessitates a sophisticated comprehension of the various therapies that are accessible. With their regenerative and immunomodulatory advantages, hAM grafts provide a promising development that overcomes the drawbacks of conventional techniques. Despite being more intrusive, choroidectomy is still a good choice in some circumstances. The choice of whether or not to intervene must be carefully considered for each patient, with a focus on weighing the advantages and disadvantages. The field is well-positioned to provide better results for individuals with retinal fractures through continued research and innovative treatment practices.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
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2	**Hafiz Atteq Ur Rehman:** Data analysis.
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5	**Rayyan Zakir Shaikh:** Technical support.
6	**Neeta Maheshwary:** Data entry.
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