2024 | Vol 5 | Issue 45

Ophthal Focus

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you 'Ophthal Focus' which contains latest and interesting news in the field of Ophthalmology.

This issue contains

- **Utilization of Lyophilized Amniotic Membrane Patch (LAMPatch) as a Primary Treatment for Myopic Traction Maculopathy with Macular Detachment- A New Approach**
- **Efficacy and safety of the commercially disposable heating eye masks for treating dry eye disease resulting from Meibomian gland dysfunction**
- **Features of Peripheral Retinal Refraction and Its Impact on Children with Varying Refractive Conditions**
- **Retinal neovascularization resembling a sea fan in a case of rickettsial retinitis**

Contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

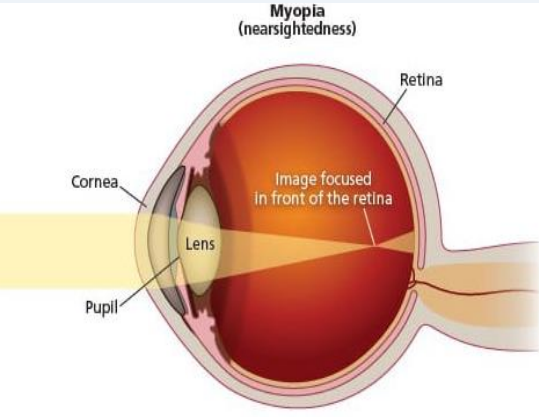
Best Regards,

Medical Team, Micro Labs Limited

Utilization of Lyophilized Amniotic Membrane Patch (LAMPatch) as a Primary Treatment for Myopic Traction Maculopathy with Macular Detachment- A New Approach

INTRODUCTION

Pathologic myopia (PM) is becoming a leading cause of visual impairment and blindness globally. PM is an eye condition defined by a spherical equivalent (SE) greater than –6.0 diopters (D) or an axial length (AL) exceeding 26.5 millimeters (mm). It was often linked to myopic maculopathy (MM) or myopic tractional maculopathy (MTM), which refers to a range of retinal issues in individuals with severe myopia, including macular foveoschisis and macular hole formation.[1] The authors proposed a new ATN grading system that incorporates three key elements of myopic maculopathy: atrophy (A), traction (T), and neovascularization (N). The traction component primarily consists of conditions such as foveoschisis (FS), foveal detachment (FD), full-thickness macular hole (MH), and macular hole with retinal detachment (MHRD).[2] Pars plana vitrectomy (PPV) was one of the initial surgical procedures performed to address the tractional aspect of MTM and MHRD.[3] There have been cases where re-operations, including internal limiting membrane (ILM) peeling during a second vitrectomy, were necessary due to the persistence of foveoschisis. An important factor in myopic traction maculopathy was the presence of posterior staphyloma (PS), which was typically managed with macular buckling. Although macular buckling shows higher success rates, concerns remain about the potential long-term effects of chronic compression caused by indentation. Additionally, various tissue transplant techniques have been attempted to restore macular continuity, such as autologous ILM transplantation or anterior lens capsule transplantation for refractory macular holes, as well as using the ILM flap as a primary treatment for myopic macular holes. The variety of these treatments, along with their mixed outcomes, underscores the need for new methods that consistently address myopic maculopathy.[1] Thereby, this study introduces a new technique



MYOPIA

The Lyophilized Amniotic Membrane Patch (LAMPatch) provides better visual acuity maintenance and gain than other treatments by providing functional success connected to tissue permanence without recurrence of traction.

utilizing lyophilized amniotic membrane as an adjunct in pars plana vitrectomy for patients with FD, MH, and MHRD.

METHODS

This prospective, consecutive case series was conducted across two centers, with the following criteria for patient selection: (1) a diagnosis of high myopia, (2) age over 18 years, and (3) a diagnosis of FD, MH, or MHRD according to the ATN classification system, assessed using spectral-domain optical coherence tomography with a 55° widefield lens. Given that the human amniotic membrane (HAM) has been shown to be safe for intraocular use and supports retinal healing, it was used as an adjunct in pars plana vitrectomy for patients with various myopia-related tractional disorders. This study details a prospective case series of seven high myopia patients who underwent 25-gauge vitrectomy with ILM peeling and HAM transplantation.

RESULTS

This study presented the outcomes of seven patients who completed a 6-month follow-up. Representative images of the cases are shown in Figures 1 and 2 for macular hole with retinal detachment (Case 2), Figure 3 for foveal detachment (Case 4), and Figure 4 for macular hole (Case 7). The results at six months indicate that this novel technique achieves functional success regarding tissue stability without recurrent traction, resulting in visual acuity improvements and maintenance that are superior to those of other methods.

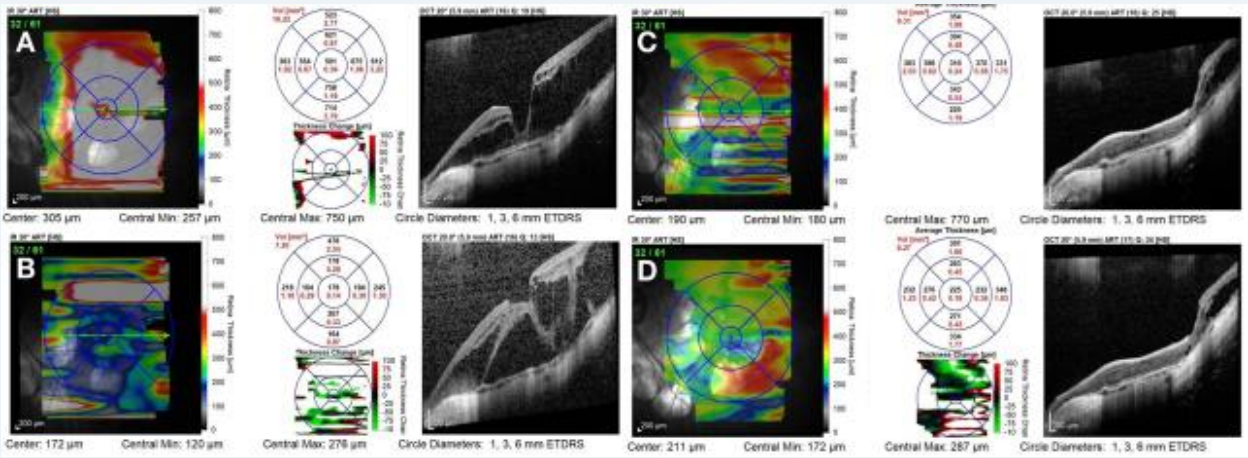


Figure 1. Thickness map change report (Case 2). a) Foveoschisis (April 2021); b)MHRD (February 2023); c) One month following surgery; and d) Six months following surgery

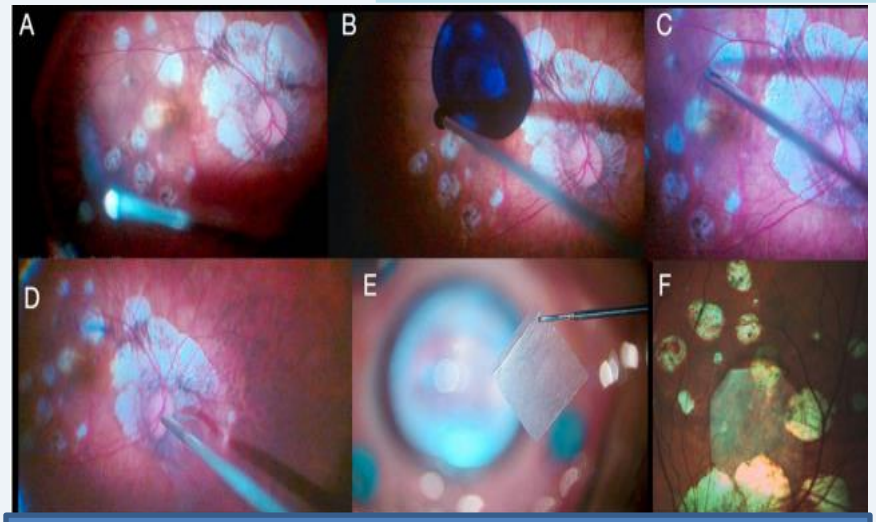


Figure 2. Color photos of the LAMPatch processes (Case 2) (A) Vitrectomy; (B) Injection of Membrane Blue; (C) Limitorhexis; (D) Air-fluid exchange; (E) Amniotic membrane; (F) Closing of the surgical procedure.

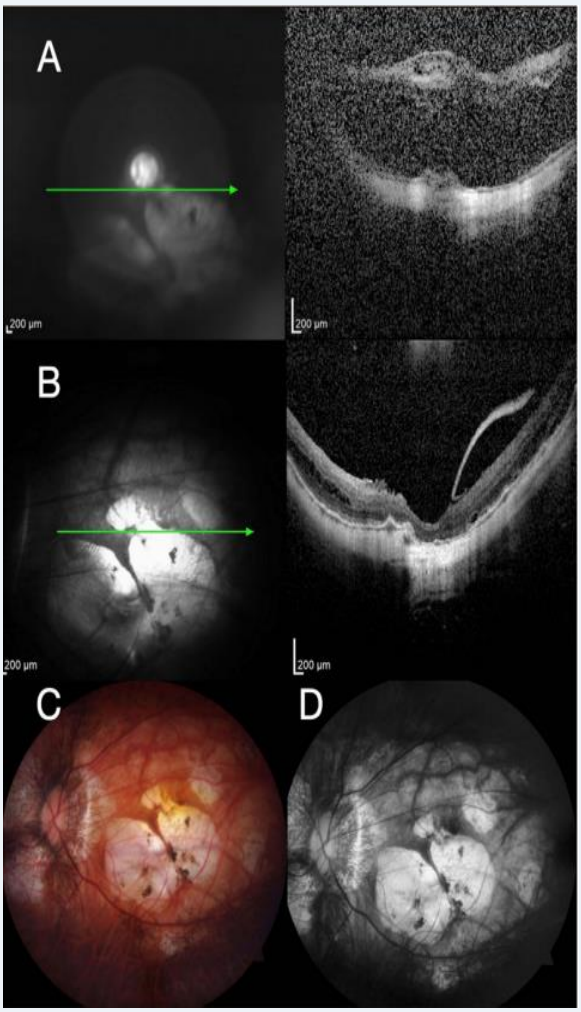


Figure 3. (Case 4) (A) an OCT B-scan with FD demonstrating foveoschisis; (B) an OCT B-scan at the 6-month follow-up demonstrating adhesion of retinal layers with a visible amniotic membrane separated from the inner retinal layers; (C) a color picture with a blue filter demonstrating (D) a faint amniotic membrane on the retinal surface at the 6-month follow-up.

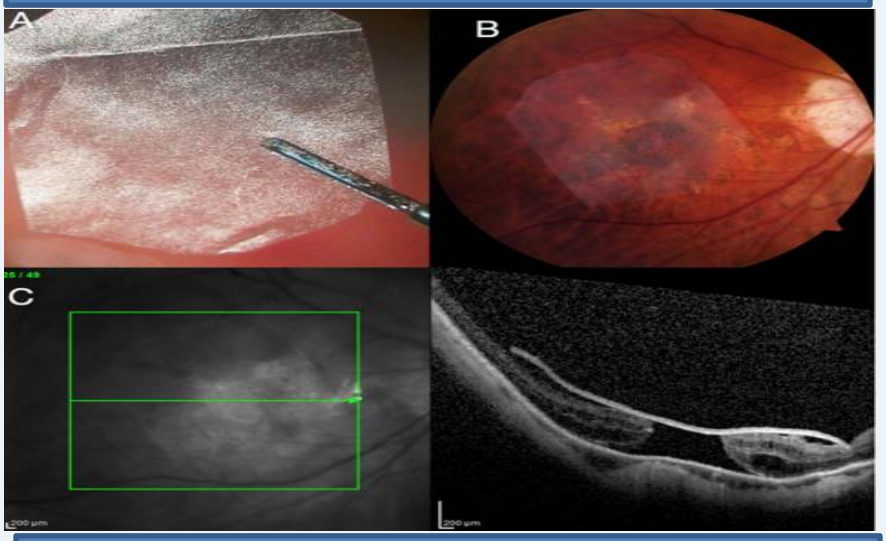


Figure 4. (Case 7) (A) Amniotic membrane secured with an internal limiting membrane clamp; (B) Color image displaying the amniotic membrane patch; (C) B-scan demonstrating the amniotic membrane's adherence along the macular hole's margins

DISCUSSION

Tractional myopic degeneration with foveoschisis and accompanying tangential traction pose a considerable challenge, as the standard treatment—PPV combined with limitorhexis—often fails to keep the retina attached to the posterior pole. To address this issue, various scleral buckling techniques have been developed, but these options are not always easily accessible. Amniotic membrane is available in three forms: fresh, cryopreserved, and freeze-dried. The fresh variety is

hard to obtain, carries infectious risks due to being human-derived, and has complex regulatory and logistical requirements. These limitations have led to the development of cryopreserved membranes, which are more readily available and have been widely utilized in ophthalmology, including as plugs transplanted into the subretinal space.[4] Conversely, lyophilized amniotic membrane (LAM) is comparable to cryopreserved membrane and was first employed in ophthalmology in 2004.[5] Subsequently, other researchers have confirmed the benefits of LAM, including its ease of use and accessibility, among other factors.[6] As a result, LAMPatch is a useful alternative. It alleviates tangential traction by employing an amniotic membrane graft that has been approved and utilized for various ocular procedures, particularly those involving the anterior segment.

CONCLUSION

In a series of cases involving FD, MH, and MHRD, the use of lyophilized amniotic membrane as an adjunct following vitrectomy with limitorhexis demonstrated both structural and clinical stabilization, as confirmed by OCT at the 6-month follow-up. While further long-term structural and functional follow-up was necessary, the findings from this study provide a foundation for a prospective, randomized, controlled clinical trial.

REFERENCE

1. Ramirez-Estudillo A, Rojas-Juarez S, Ramirez-Galicia X, Garcia-Vasquez A, et al. A Novel Technique Using Lyophilized Amniotic Membrane Patch (LAMPatch) as Primary Procedure in Patients with Myopic Traction Maculopathy with Macular Detachment. Clin Ophthalmol. 2024 Sep 2;18:2473-2480.
2. Ruiz-Medrano J, Montero JA, Flores-Moreno I, Arias L, et al. Myopic maculopathy: Current status and proposal for a new classification and grading system (ATN). Prog Retin Eye Res. 2019 Mar;69:80-115.
3. Jiang X, Zhang S, Zhang Z, Zhou X, Wei Y. Comparative Study of 27-Gauge Versus 25-Gauge Vitrectomy With Air Tamponade in the Treatment of Myopic Foveoschisis. Ophthalmic Surg Lasers Imaging Retina. 2018 Oct 1;49(10):e135-e142.
4. Rizzo S, Caporossi T, Tartaro R, Finocchio L, et al. A Human Amniotic Membrane Plug to Promote Retinal Breaks Repair and Recurrent Macular Hole Closure. Retina. 2019 Oct;39 Suppl 1:S95-S103.
5. Nakamura T, Yoshitani M, Rigby H, Fullwood NJ, et al. Sterilized, freeze-dried amniotic membrane: a useful substrate for ocular surface reconstruction. Invest Ophthalmol Vis Sci. 2004 Jan;45(1):93-9.
6. Garcin T, Gain P, Thuret G. Epiretinal large disc of blue-stained lyophilized amniotic membrane to treat complex macular holes: a 1-year follow-up. Acta Ophthalmol. 2022 Mar;100(2):e598-e608.

Efficacy and safety of the commercially disposable heating eye masks for treating dry eye disease resulting from Meibomian gland dysfunction

INTRODUCTION

The masks showed good efficacy and safety in the management of DED resulting from MGD

Meibomian gland dysfunction (MGD) is a prevalent ocular surface condition that can lead to changes in the tear film and cause discomfort.[1] Obstruction of the terminal duct and orifice, along with qualitative and quantitative changes in the meibum, are the primary mechanisms underlying the condition.[2] Multiple clinic-based cohort studies have demonstrated a high prevalence of MGD among individuals with dry eye. Current treatment options for MGD include lid hygiene, warm compresses, mechanical massage, artificial lubricants, topical anti-inflammatory medications, and both systemic and topical antibiotics. Warm compress therapy is currently a commonly recommended approach in clinical settings due to its convenience, cost-effectiveness, and good patient tolerance. However, with traditional hot towels, patients often need to frequently replace the compresses to maintain a consistent temperature. Since MGD is a chronic condition, effective treatment requires ongoing management, which can increase the burden on patients and affect their compliance. Therefore, a more convenient method for administering warm compresses could enhance patient adherence to treatment.[3] This study examined the short-term clinical efficacy and safety of commercially available disposable heating eye masks for treating dry eye disease (DED) caused by MGD.

METHODS

This was a randomized, controlled, non-masked clinical trial conducted at two centers, with a follow-up period of 12 weeks that included visits at 4 and 12 weeks. Consecutive patients were randomly assigned in a 1:1 ratio to either the treatment group (disposable heating eye masks) or the control group (folded hot towel) using a random numerical table. The inclusion criteria included: (1) participants aged 18 to 70 years, (2) reports of ocular discomfort symptoms, (3) ocular surface disease index (OSDI) scores of 13 or higher, (4) tear break-up time (BUT) of 5 seconds or less, (5) Schirmer I test without anesthesia showing 5 mm or more after 5 minutes, (6) abnormalities in meibum quality and expressibility, (7) ability to understand and sign informed consent, willingness and ability to comply with study requirements, and (8) agreement to use a reliable form of contraception for patients of childbearing potential. A total of 144 patients received treatment with either the masks or the hot towel twice daily for 12 weeks. Patients were assessed at baseline, 4 weeks, and 12 weeks for subjective symptoms, objective signs, and safety evaluations, including ocular symptom scores, OSDI, tear break-up time (BUT), corneal fluorescein staining (CFS), Schirmer I test (SIT), meibum quality, meibum expressibility, and adverse events (AEs).

Table 1. Meibum quality and expressibility at each visit for both groups, as well as ocular symptom ratings, OSDI, BUT, CFS, and SIT.

Clinical parameters	Treatment	Severity score (mean±SD)

RESULTS

A total of 134 patients participated in the study. The average age of the participants in the masks group (14 males and 52 females) was 43.7 ± 13.5 years, while in the hot towel group (20 males and 48 females), it was 39.5 ± 13.9 years. Both groups showed varying degrees of improvement in ocular symptom scores, OSDI, tear BUT, CFS, meibum quality, and meibum expressibility at the 4-week and 12-week visits compared to baseline. At the 4-week visit, there were significant statistical differences in ocular symptom scores, OSDI, and CFS between the two groups. By the 12-week visit, the eye masks group exhibited greater improvements in subjective symptoms and objective signs than the hot towel group, except the SIT. Detailed clinical parameters from the study were outlined in Table 1. Additionally, 40 AEs were reported in 27 patients (37.5%) in the treatment group, while 34 AEs occurred in 21 patients (29.17%) in the control group. No serious AEs were noted.

		Baseline	4 weeks	12 weeks
Ocular symptom scores	Hot towel	7.85±2.81	6.22±2.51*	5.28±2.37*
	Eye masks	8.86±3.18	4.79±2.37* △	2.91±2.09* △
OSDI	Hot towel	25.89±13.34	21.63±13.51*	19.24±11.55*
	Eye masks	27.03±13.71	13.31±9.53* △	6.28±5.51* △
BUT (seconds)	Hot towel	2.90±1.71	3.22±2.01*	3.24±2.36*
	Eye masks	2.67±1.69	3.73±2.19*	5.02±3.03* △
CFS	Hot towel	1.94±3.09	1.76±2.33*	1.35±2.51*
	Eye masks	1.76±2.41	0.82±1.79* △	0.45±1.34* △
SIT (mm)	Hot towel	10.26±9.34	9.01±7.25	9.37±7.06
	Eye masks	11.26±9.02	11.24±8.32	12.52±8.83
Meibum quality	Hot towel	9.37±6.20	8.47±5.29*	8.07±5.35*
	Eye masks	10.35±5.69	8.88±4.29*	5.97±4.24* △
Meibum expressibility	Hot towel	1.24±0.69	0.90±0.72*	0.62±0.60*
	Eye masks	1.24±0.79	0.86±0.68*	0.27±0.48* △

OSDI- ocular surface disease index, BUT- tear break-up time, CFS- corneal fuorescein staining, SIT- Schirmer test without anesthesia
*** Compared with before treatment, P<0.05**
△ compared with the control group, P<0.05

DISCUSSION

This study indicated that disposable eyelid warming masks can be effective, and the overall symptom improvement may be attributed to a significant enhancement in the function of the meibomian glands. A randomized, controlled trial found that the effectiveness of disposable eyelid-warming masks was comparable to that of warm towels, which differs from the findings of this study.[4] One possible explanation is that variations in the products used, as well as the baseline severity of symptoms and signs of MGD, may have influenced the study results.[4]

CONCLUSION

The current study indicated that disposable eyelid warming masks demonstrate good efficacy and safety in treating DED caused by MGD, potentially providing an appealing treatment option for certain patients.

REFERENCE

1) Nelson JD, Shimazaki J, Benitez-del-Castillo JM, Craig JP, et al. The international workshop on meibomian gland dysfunction: report of the definition and classification subcommittee. Invest Ophthalmol Vis Sci. 2011 Mar 30;52(4):1930-7.
2) Knop E, Knop N, Millar T, Obata H, Sullivan DA. The international workshop on meibomian gland dysfunction: report of the subcommittee on anatomy, physiology, and pathophysiology of the meibomian gland. Invest Ophthalmol Vis Sci. 2011 Mar 30;52(4):1938-78.
3) Wang DH, Guo H, Xu W, Liu XQ. Efficacy and safety of the disposable eyelid warming masks in the treatment of dry eye disease due to Meibomian gland dysfunction. BMC Ophthalmol. 2024 Aug 26;24(1):376.
4) Sim HS, Petznick A, Barbier S, Tan JH, et al.; Collaborative Research Initiative for Meibomian Gland Dysfunction (CORIM). A Randomized, Controlled Treatment Trial of Eyelid-Warming Therapies in Meibomian Gland Dysfunction. Ophthalmol Ther. 2014 Dec;3(1-2):37-48.

Features of Peripheral Retinal Refraction and Its Impact on Children with Varying Refractive Conditions

INTRODUCTION

The peripheral defocus in the horizontal direction, particularly in the NRDV30 range, has a stronger influence on children's development of myopia. Longer AL and lower SER are correlated with higher NRDV30 values.

Myopia is a major contributor to visual impairment and has become a significant global concern in recent decades. Research has demonstrated that peripheral defocus plays a crucial role in eye growth. Specifically, peripheral hyperopic defocus is a significant risk factor for the development and progression of myopia. Eyes that are emmetropic or hyperopic exhibit a relative peripheral myopic refractive state, whereas myopic eyes show a relative peripheral hyperopic refractive state.[1] Previous research has examined the relative refractive status in various regions of the peripheral retina. Some studies focused solely on the retinal relative difference value (RDV) across multiple concentric areas, while others looked at the RDV specifically in four sectors: superior, inferior, nasal, and temporal.[2,3] The advancement of modern technology has significantly enhanced the development and use of medical diagnostic devices. Multispectral refractive topography (MRT) is a new tool that utilizes multispectral imaging technology to conduct a comprehensive analysis of peripheral refraction in the regional retina. The introduction of MRT facilitates research related to peripheral defocus.[1] So, this study was carried out to examine the peripheral refractive status in children with varying refractive conditions and its influence on the onset and progression of myopia.

METHODS

This was a descriptive cross-sectional study conducted from July 2021 to April 2022, involving 814 subjects (814 eyes) admitted to the Pediatric Ophthalmology Department. The inclusion criteria included: (1) subjects aged 6 to 12 years, (2) subjects with refractive errors between +0.50 D and −6.00 D, and astigmatism of −2.00 D or less, (3) subjects with a best corrected visual acuity of 20/20 or better, and (4) subjects who could cooperate to complete the eye examinations. The participants were categorized into three groups based on their central spherical equivalent refraction (SER): emmetropia (E), low myopia (LM), and moderate myopia (MM). MRT was utilized to measure the absolute and relative RDV in various regions, divided into superior, inferior, temporal, and nasal RDV (SRDV, IRDV, TRDV, and NRDV), based on concentric circles extending outward from the macular fovea (RDV15, RDV30, RDV45, RDV30–15, RDV45–30, and RDV-45). The Kruskal-Wallis test was employed to analyze the differences in peripheral refraction among the three groups, while Spearman rank correlation was used to assess the relationships between SER and RDV, as well as between axial length (AL) and RDV.

RESULTS

The absolute value of the RDV decreased as the degree of myopia increased across all regions ($P < 0.01$). Participants with varying degrees of refractive error displayed different relative RDV values. In the nasal position within 45° and the temporal position within 30°, the peripheral retina showed significantly different relative hyperopic refractive statuses among Group E, Group LM, and Group MM ($P < 0.05$). The SER had a negative correlation with NRDV within 30° (particularly in the NRDV30–15 range) ($r = −0.141$, $P < 0.01$), a positive correlation with TRDV within 15° ($r = 0.080$, $P = 0.023$), and no significant correlation with SRDV and IRDV when the retina was analyzed in four segments. Additionally, axial length (AL) was positively correlated with NRDV within 30° (especially in the NRDV30–15 range) ($r = 0.109$, $P = 0.002$) and negatively correlated with TRDV within 15° ($r = −0.095$, $P = 0.007$) (Table 1).

	NRDV15	NRDV30	NRDV45	NRDV30–15	NRDV45–30	NRDV-45
r	0.109	0.110	0.050	0.109	0.025	−0.029
P	0.002**	0.002**	0.150	0.002**	0.482	0.409
	TRDV15	TRDV30	TRDV45	TRDV30–15	TRDV45–30	TRDV-45
r	−0.095	−0.041	0.011	−0.026	0.031	−0.029
P	0.007**	0.242	0.764	0.455	0.380	0.409
****P < 0.05.**						

Table 1. Results of correlation analysis between RDV at the nasal and temporal retina and AL

DISCUSSION

This study suggested that peripheral defocus in the horizontal direction has a more significant impact on the progression of myopia in children than defocus in the vertical direction. Xiaoli et al. investigated the relative peripheral refraction of the horizontal and vertical retina in children with

low myopia and hypothesized that there could be an imbalance in vertical and horizontal eye development during myopia progression.[2] In this study, it was found that nasal RDV within 30° was the factor most closely linked to the development of myopia. Spearman correlation analysis indicated that SER had a negative correlation with nasal RDV within 30°, a positive correlation with temporal RDV within 15°, and no significant correlation with vertical RDV. Xiaoli et al. studied 90 Chinese children aged 5 to 18 and found that peripheral refraction of RDV in the 45−30° range may be strongly associated with the progression of myopia.[2] Zheng et al. showed that the eccentricities of RDV between 20 and 35° may be strongly linked to refractive development and eye growth in individuals aged 18 to 28 years.[3] These discrepancies were primarily due to their differing classification system compared to that used in this study.

CONCLUSION

Peripheral defocus plays a crucial role in the development of myopia. Specifically, horizontal peripheral defocus, particularly within the NRDV30 range, has a more pronounced impact on myopia progression in children. Increased NRDV30 was linked to lower SER and longer AL.

REFERENCE

1. Zhao Q, Wang Y, Liang T, Nie W, et al. Characteristics of Peripheral Retinal Refraction and Its Role in Children with Different Refractive States. J Ophthalmol. 2024 Aug 8;2024:7712516.
2. Xiaoli L, Xiangyue Z, Lihua L, Yuting H, et al. Comparative Study of Relative Peripheral Refraction in Children With Different Degrees of Myopia. Front Med (Lausanne). 2022 Mar 10;9:800653.
3. Zheng X, Cheng D, Lu X, Yu X, et al. Relationship Between Peripheral Refraction in Different Retinal Regions and Myopia Development of Young Chinese People. Front Med (Lausanne). 2022 Jan 18;8:802706.

Retinal neovascularization resembling a sea fan in a case of rickettsial retinitis

INTRODUCTION

Rickettsial infections are caused by several types of obligate intracellular, Gram-negative bacteria.[1] Ocular involvement, whether asymptomatic or symptomatic, is frequently observed in patients with rickettsial disease, typically presenting as mild vitritis, superficial retinitis, retinal vasculitis, and optic neuropathy. However, retinal neovascularization is a rare occurrence in this context and has been infrequently documented in the literature.[2] The researcher presents a case of rickettsial retinitis that was complicated by the formation of sea-fan retinal neovascularization, as documented through various imaging techniques, including fundus photography, swept-source optical coherence tomography (SS-OCT), fundus fluorescein angiography, and SS-OCT angiography (SS-OCTA).

People who have rickettsial retinitis may experience an inflammatory response leading to a sea-fan retinal neovascularization and eventual vitreous hemorrhage. Accurate diagnosis and accurate monitoring of the progression of retinitis, retinal neovascularization, and other retinal abnormalities are made possible by multimodal imaging, which includes OCT, fluorescein angiography, and OCT-angiography.

CASE PRESENTATION

A 26-year-old woman presented with a history of fever one week prior and sudden vision loss in her left eye (LE). Her best-corrected visual acuity (BCVA) was 20/20 in the right eye (RE) and 20/2000 in the LE, with no relative afferent pupillary defect detected. Slit-lamp and fundus examinations of the RE were normal, while the LE showed 1+ vitreous cells. The intraocular pressure was measured at 14 mmHg in both eyes. The fundus examination of the LE revealed a superficial white retinal lesion along the superotemporal retinal vascular arcade, accompanied by retinal hemorrhages, edema, serous retinal detachment (SRD), and hard exudates arranged in a stellate pattern in the macula (Figure 1A). Abnormal retinal telangiectatic changes were also noted in the area surrounding the retinitis. Fundus autofluorescence imaging displayed a large hypoautofluorescent region extending beyond the white retinal lesion and associated hemorrhages, with hyperautofluorescent streaks indicating the presence of hard exudates (Figure 1B). SS-OCT indicated increased inner retinal reflectivity and thickening with posterior shadowing at the site of the white retinal lesion (Figure 1C). Multiple hyperreflective dots were seen, corresponding to hard exudates, as well as a macular serous retinal detachment featuring subretinal hyperreflective material (Figure 1C, D). Fluorescein angiography of the LE showed early hypofluorescence and late staining of the white retinal lesion, along with significant leakage from adjacent telangiectatic

retinal vessels (Figure 1 E, F). SS-OCTA revealed a dark area indicating no flow signal due to blockage in both the superficial and deep capillary plexuses, attributed to the white retinal lesion and surrounding edema. Indirect immunofluorescence testing was positive for Rickettsia conorii, with an IgM titer of 1/160 and a negative IgG titer. The patient was treated with doxycycline (200 mg/day) and oral prednisone (0.75 mg/kg/day, gradually tapered). Four weeks after her initial presentation, during treatment, her BCVA in the LE improved slightly to 20/1000. Fundus examination and SS-OCT indicated resolution of the retinal infiltrate and associated serous retinal detachment, but there was a notable increase in retinal hard exudates, appearing as multiple hyperreflective dots with changes in the outer retinal layers on SS-OCT. A significant sea-fan preretinal neovascularization was observed along the superotemporal retinal vascular arcade. A horizontal SS-OCT scan through the healed retinitis and sea-fan fibrovascular lesion showed retinal thickening and increased reflectivity in the inner layers, along with posterior shadowing and focal vitreoretinal adhesion. Fluorescein angiography revealed early hyperfluorescence and late leakage from the sea-fan neovascularization, with no areas of retinal capillary non-perfusion. En-face OCTA of the superficial retinal plexus showed a well-defined, large filamentous vascular complex corresponding to the sea-fan neovascular area. A B-scan OCTA indicated a superficial flat flow signal complex consistent with preretinal neovascularization. The patient continued her treatment with doxycycline and tapering corticosteroids, receiving a single dose of 1.25 mg intravitreal bevacizumab in the LE. Upon reevaluation two weeks later, her BCVA in the LE had improved to 20/100, and the retinal neovascularization had decreased. Sixteen months after the intravitreal injection, examination revealed mild vitreous and preretinal hemorrhages. The hard exudates and sea-fan neovascular

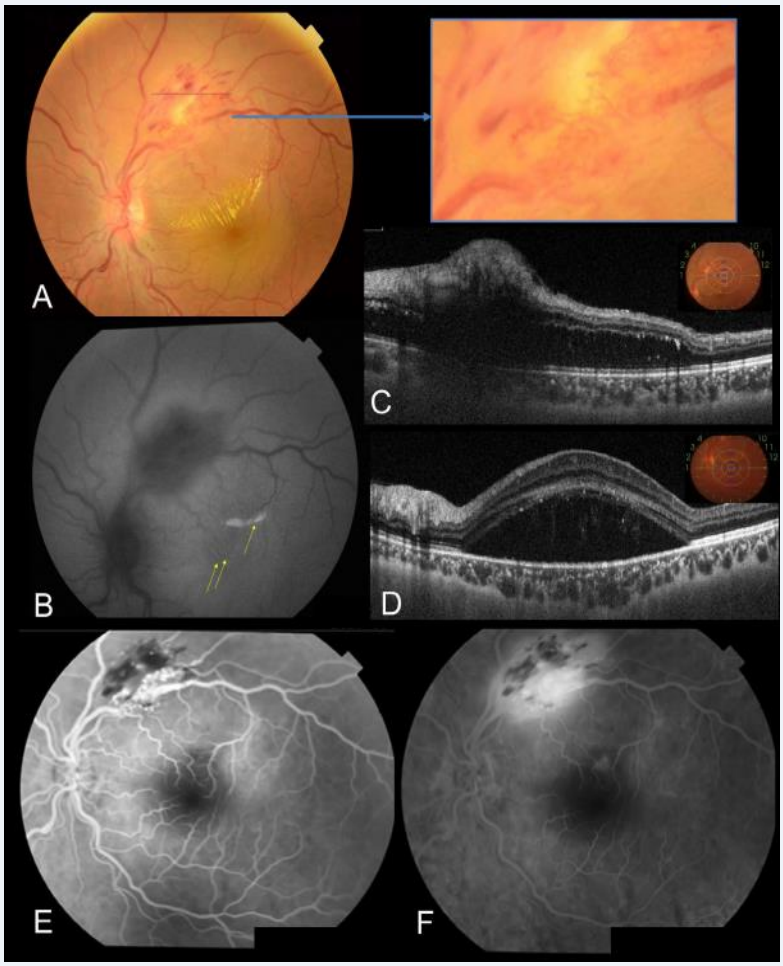


Figure 1. Multimodal imaging of the left eye at initial presentation. (A) Fundus photograph (B) Fundus autofluorescence (C) Horizontal SS-OCT scan (D) Horizontal macular SS-OCT scan (E, F) Fluorescein angiography

lesion had regressed, leaving behind residual fibrosis in the area of the former neovascularization. SS-OCT indicated incomplete posterior vitreous detachment without any clinically evident retinal breaks or vascular abnormalities. Fluorescein angiography showed no signs of active neovascularization or retinal ischemia, while OCTA demonstrated no flow signal in the area of the regressed retinal new vessels. After an additional six-month observation period, the vitreous and preretinal hemorrhages cleared spontaneously, and the retinal hard exudates were completely resolved. The fibrotic lesion at the site of the sea-fan neovascularization remained unchanged, and the final BCVA of the LE was recorded at 20/25.

DISCUSSION

Neovascularization of the retina or optic disc is an uncommon early or late complication of uveitis affecting the posterior segment, typically arising as a response to retinal ischemia, which can be observed through fluorescein angiography or OCT angiography.[3] The development of abnormal retinal vessels may be triggered by the release of pro-angiogenic factors like vascular endothelial growth factor (VEGF) from ischemic retinal tissue. However, neovascularization can also occur without clear evidence of retinal ischemia, likely due to inflammatory processes. The findings of the present study support this latter possibility. Rickettsial infections of the vascular endothelium activate signaling pathways that lead to the release of various cytokines, chemokines, and other molecules. Some of these inflammatory mediators play roles in endothelial proliferation and pathological angiogenesis, which may account for the occurrence of preretinal neovascularization in this patient.[4]

CONCLUSION

Patients experiencing rickettsial retinitis can develop sea-fan retinal neovascularization, which may lead to vitreous hemorrhage, potentially due to inflammatory processes. Utilizing multimodal imaging techniques such as optical coherence tomography (OCT), fluorescein angiography, and OCT angiography were essential for precise diagnosis and effective monitoring of retinitis, retinal neovascularization, and other retinal alterations. Combining oral doxycycline, corticosteroids, and intravitreal anti-VEGF therapy may enhance patient outcomes.

REFERENCE

1. Chawla R, Pundlik GA, Chaudhry R, Thakur C. Rickettsial retinitis: Direct bacterial infection or an immune-mediated response? Indian J Ophthalmol. 2017 Oct;65(10):1038-1041.
2. Abroug N, Ksiaa I, Ben Aoun S, Nabi W, et al. Sea-fan retinal neovascularization associated with rickettsial retinitis: a case report. BMC Ophthalmol. 2024 Sep 2;24(1):385.
3. Patel AK, Newcomb CW, Liesegang TL, Pujari SS, et al.; Systemic Immunosuppressive Therapy for Eye Diseases Research Group. Risk of Retinal Neovascularization in Cases of Uveitis. Ophthalmology. 2016 Mar;123(3):646-54.
4. Helminiak L, Mishra S, Kim HK. Pathogenicity and virulence of Rickettsia. Virulence. 2022 Dec;13(1):1752-1771.