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par

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Stéréopsie et qualité de vie liée à la vision après la vitrectomie pour décollement de rétine rhégmatoïde : influence de l'atteinte maculaire et de la diplopie post-opératoire

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Stéréopsie et qualité de vie liée à la vision après la vitrectomie pour décollement de rétine rhégmato-gène : influence de l'atteinte maculaire et de la diplopie post-opératoire

Résumé

Objectif :

Déterminer si l'atteinte maculaire au moment du décollement de rétine rhégmato-gène (DRR) influence la stéréopsie postopératoire, et explorer les facteurs cliniques et paracliniques associés à la qualité de vie liée à la vision (QVLV).

Méthodes :

Dans cette étude de cohorte prospective monocentrique menée au Centre Hospitalier Universitaire de Tours, les patients opérés avec succès d'un DRR par vitrectomie par la pars plana (VPP) ont été examinés entre 6 et 18 mois après la chirurgie, entre juin 2024 et mars 2025. Les paramètres suivants ont été recueillis : l'atteinte maculaire per-opératoire, la diplopie (examen orthoptique oculo-moteur et test optotype cadre), l'acuité visuelle stéréoscopique (The Netherlands Organisation test), l'acuité visuelle monoculaire corrigée de loin, les métamorphopsies (M-CHARTS), anisétropie (New Aniseikonia Test), l'épaisseur rétinienne centrale et l'intégrité de la zone ellipsoïde à la tomographie par cohérence optique, la présence de vaisseaux fantômes à l'autofluorescence, et la QVLV évaluée par le questionnaire National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25). Une analyse univariée a été réalisée pour évaluer la stéréopsie. Les facteurs associés à la QVLV ont été explorés par des régressions linéaires multivariées.

Résultats :

Quarante-cinq patients ont été inclus (âge médian (étendue) : 67 ans (46–82) ; femmes : 18 (40 %)). Le délai médian entre la chirurgie et l'évaluation était de 10 mois (étendue : 6–18 mois). La stéréopsie était significativement plus altérée dans le groupe macula soulevée que dans le groupe sans atteinte maculaire ($p = 0,045$). L'analyse multivariée a révélé une corrélation négative entre la diplopie et le score composite du NEI VFQ-25 ($p = 0,004$). Aucun autre paramètre n'a montré d'association significative avec le score composite ou les sous-catégories du NEI VFQ-25 ($p > 0,05$).

Conclusions :

La stéréopsie postopératoire est significativement réduite chez les patients présentant un DRR avec atteinte maculaire, sans récupération durant les six premiers mois postopératoires, et ce malgré un rattachement rétinien réussi. Cependant, la perte de stéréopsie, ainsi que les atteintes monoculaires qualitatives ou quantitatives ne semblent pas influencer la QVLV. La diplopie binoculaire, quel que soit son mécanisme, altère particulièrement la QVLV, soulignant l'importance d'une évaluation postopératoire personnalisée chez les patients opérés d'un DRR.

Mots clés : décollement de rétine ; vitrectomie ; stéréopsie ; qualité de vie

Stereopsis and vision-related quality of life after pars plana vitrectomy for rhegmatogenous retinal detachment: influence of macular involvement and postoperative diplopia

Abstract

Purpose:

To determine whether macular involvement (on or off) at the time of rhegmatogenous retinal detachment (RRD) influences postoperative stereopsis, and to explore clinical and paraclinical factors associated with vision-related quality of life (VR-QoL).

Methods:

In this prospective single-centre cohort study conducted in the University Hospital of Tours, patients who underwent successful unilateral pars plana vitrectomy (PPV) for RRD were examined between 6 and 18 months postoperatively between June 2024 and March 2025. The following parameters were collected : intraoperative macular involvement, diplopia (orthoptic exam and optotype frame test), stereoacuity (The Netherlands Organization test), distance monocular best-corrected visual acuity, metamorphopsia (M-CHARTS), aniseikonia (New Aniseikonia Test), central retinal thickness and ellipsoid zone integrity on optical coherence tomography, retinal ghost vessels (autofluorescence), VR-QoL assessed using the National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25). Univariate analysis was performed to assess stereopsis and factors associated to VR-QoL were investigated through multivariate linear regressions.

Results:

Forty-five patients were included (median age (range): 67 years (46-82); women: 18 (40%)). Median duration from RRD repair and assessment was 10 months (range: 6-18). Stereoacuity was significantly worse in the macula-off group than in the macula-on group ($p = 0.045$). Multivariate analysis revealed that diplopia correlated negatively with the NEI VFQ-25 composite score ($p = 0.004$). No other variable showed any significant association with the NEI VFQ-25 composite score or its subscales ($p > 0.05$).

Conclusions:

Postoperative stereopsis is significantly reduced in patients with macula-off RRD and does not recover during the first six postoperative months despite successful anatomical repair. However, the loss of stereopsis as well as monocular qualitative or quantitative visual loss do not seem to influence VR-QoL. Binocular diplopia, regardless of its mechanism, particularly affects VR-QoL, highlighting the importance of tailored postoperative assessment in patients with RRD.

Keywords: retinal detachment; vitrectomy; stereopsis; qualify of life

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En présence des enseignants et enseignantes
de cette Faculté,
de mes chers condisciples
et selon la tradition d'Hippocrate,
je promets et je jure d'être fidèle aux lois de l'honneur
et de la probité dans l'exercice de la Médecine.

Je donnerai mes soins gratuits aux indigents,
et n'exigerai jamais un salaire au-dessus de mon travail.

Admis(e) dans l'intérieur des maisons, mes yeux
ne verront pas ce qui s'y passe, ma langue taira
les secrets qui me seront confiés et mon état ne servira pas
à corrompre les mœurs ni à favoriser le crime.

Respectueux(euse) et reconnaissant(e) envers mes Maîtres,
je rendrai à leurs enfants
l'instruction que j'ai reçue de leurs parents.

Que les hommes et les femmes m'accordent leur estime
si je suis fidèle à mes promesses.
Que je sois couvert(e) d'opprobre
et méprisé(e) de mes confrères et consœurs
si j'y manque.

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Introduction

Rhegmatogenous retinal detachment (RRD) is a common vision-threatening retinal disease, that is primarily treated by pars plana vitrectomy (PPV). Despite anatomically successful surgery and substantial visual acuity recovery in most cases, some patients continue to experience persistent functional impairments that may affect their quality of life.

It has been reported that stereopsis is frequently reduced following RRD surgery, particularly in cases involving macular detachment[1]. In addition, visual symptoms such as metamorphopsia and aniseikonia have been proposed to contribute to patient dissatisfaction after retinal reattachment surgery[2, 3]. While individual visual disturbances have been individually explored in previous studies, their combined impact on vision-related quality of life (VR-QoL) has not yet been assessed. Furthermore, persistent postoperative diplopia[4, 5], although clinically relevant, has received limited attention in this context.

The aim of the present study was twofold. First, to determine whether macular status (on or off) influences postoperative stereoacuity in a cohort of patients undergoing PPV for RRD. Second, to explore the relative impact of both functional parameters (stereoacuity, binocular diplopia, metamorphopsia, aniseikonia, interocular visual acuity difference) and structural factors (macular involvement, ellipsoid zone integrity, retinal displacement) on VR-QoL.

Methods

Study design and participants

This single-centre prospective cohort study was conducted at the Department of Ophthalmology at the University Hospital of Tours, France, between June 2024 and March 2025.

Patients who underwent successful unilateral pars plana vitrectomy (PPV) for rhegmatogenous retinal detachment (RRD) were included. Exclusion criteria were as follows: age under 18 years, history of amblyopia or strabismus, absence of normal retinal correspondence (Bagolini striated glasses test). For the affected eye, exclusion criteria comprised moderate or severe coexisting ocular disease (such as cataract, glaucoma, retinal or anterior segment disorder) or a distance logMAR best-corrected visual acuity worse than 0.5 at the time of the postoperative assessment. For the fellow eye, exclusion criteria comprised moderate or severe coexisting ocular disease or a distance logMAR best-corrected visual acuity worse than 0.5 at the time of the postoperative assessment.

Ethics

This study adhered to the principles of the Declaration of Helsinki, and received approval from an independent Ethics Committee at the University Hospital of Tours, France (registered under the reference 2024-058). Informed oral consent was obtained from each participant after oral and written explanations on the nature of the study.

Ophthalmological data collection

All patients were clinically examined between 6 and 18 months postoperatively by an ophthalmologist and an orthoptist. Each patient underwent a standardized functional and anatomical evaluation including the following parameters:

- **Macular status:** assessed intraoperatively by the surgeon and classified as macula-on or macula-off.
- **Orthoptic examination:** detection of manifest tropia and quantification of horizontal and/or vertical ocular deviation using the simultaneous prism cover test (SPCT) and prism alternate cover test (PACT) at distance (5 meters) and near (33 cm).
- **Binocular diplopia:** all patients were asked to complete a diplopia questionnaire developed by Holmes *et al.*[6] and to undergo a standardized optotype-frame test as described by Veverka *et al.*[7]. Based on their responses to the optotype-frame test, diplopia questionnaire and orthoptic examination, patients were considered as having binocular diplopia if they manifested central-peripheral rivalry (CPR)-type diplopia, strabismic diplopia or mixed CPR-type and strabismic diplopia. CPR-type diplopia is defined as binocular double vision due to retinal misregistration, identified through an optotype-frame test, in the absence of any other detectable cause of diplopia. Strabismic diplopia is characterized by permanent horizontal deviation exceeding 0 prism diopters, permanent vertical deviation greater than 5 prism diopters on the simultaneous prism cover test or resolution of diplopia following strabismus surgery or ground-in prism correction. Mixed CPR-type and strabismic diplopia is defined by the presence of retinal misregistration combined with partial but incomplete resolution of symptoms following prism correction or strabismus surgery[7].
- **Near stereopsis:** assessed using The Netherlands Organization for Applied Scientific Research (TNO) at 40 cm under appropriate optical correction. The results were recorded in arc seconds and then converted to log arcsec for the analysis. As reported in previous studies[8, 9], patients without measurable stereopsis were assigned the next higher value beyond 480 arcsec in the logarithmic progression (+0.3 log arcsec progression).

- **Visual acuity:** monocular distance best-corrected visual acuity (BCVA) was measured using the Monoyer decimal scale and converted to the logarithm of the minimum angle of resolution (logMAR BCVA).
- **Metamorphopsia:** the degree of metamorphopsia was quantified using M-CHARTS (Inami Co., Tokyo, Japan)[10] in both horizontal and vertical orientations at 33 cm under appropriate near optical correction.
- **Aniseikonia:** assessed with the New Aniseikonia Test (Handaya, Tokyo, Japan) at 40 cm as described by Ichikawa *et al.*[11] The perceived size difference (%) in horizontal and vertical meridian was recorded.
- Swept source optical coherence tomography (**SS-OCT**) was performed using DRI OCT Triton® (Topcon, Tokyo, Japan) with 12 radial scans of 9 mm centered on the fovea. Central macular thickness (µm) was automatically provided by the software, and the ellipsoid zone (EZ) integrity was graded as intact or disrupted by a single examiner.
- **Retinal displacement:** assessed using fundus autofluorescence imaging acquired with the Optos California® ultra-widfield ophthalmoscope (Optos PLC, Dunfermline, UK). The presence of ghost vessel tracks (vascular duplication) was considered evidence of retinal displacement[12].
- **Axial length:** measured in both eyes using optical biometry (IOLMaster 700®, Carl Zeiss Meditec, Germany). High myopia was defined as an axial length ≥ 26.0 mm. Anisometropia was defined as a difference in axial length of > 0.5 mm between the two eyes.
- **Vision-related quality of life:** evaluated with the French version of the National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25)[13]. The composite score and subscale scores were calculated according to standard scoring guidelines[14, 15].

Statistical analyses

All statistical analyses were performed using R (version 4.5.1). Descriptive statistics were calculated for all variables and were reported as median (range) or mean ($\pm$ standard deviation). The Mann–Whitney U test was used to compare stereoacuity (log-transformed TNO scores) between macula-on and macula-off groups. A multivariate linear regression analysis was conducted to identify clinical and paraclinical predictors of the NEI VFQ-25 composite score. The independent variables included: diplopia, stereoacuity, macular status (on/off), metamorphopsia, aniseikonia, ellipsoid zone integrity, retinal displacement, interocular BCVA difference. Statistical significance was defined as $p < 0.05$.

Results

A total of 45 patients were included in the analysis (median age: 67 years (range: 46–82); 18 women). All patients underwent 25-gauge pars plana vitrectomy with gas tamponade using SF6 (14 eyes, 31%) or C2F6 (31 eyes, 69%). The median duration of symptoms before the surgery was 6 days (range: 0–60 days). Proliferative vitreoretinopathy (PVR) at the moment of the RRD surgery was recorded as grade A in 21 patients (47%), grade B in 8 patients (18%), and grade C1 in 1 patient (2%). PVR grading data was unavailable for 15 patients (33%).

The median time between retinal detachment surgery and assessment was 10 months (range: 6–18 months). Twenty-two patients (49%) were pseudophakic before the RRD surgery, 4 (9%) had vitrectomy combined with phacoemulsification and 15 (33%) underwent phacoemulsification after the surgery. Four patients (9%) remained phakic at the moment of the postoperative assessment: one presented no cataract and three had mild cataract.

Seven patients (16%) were classified as highly myopic and 5 patients (11%) met the definition for axial anisometropia.

Stereoacuity and macular involvement

The stereoacuity was significantly worse in the macula-off group compared to the macula-on group ($p = 0.045$, Mann–Whitney U test). The stereoacuity values are specified in **Table 1**.

Vision-related quality of life and predictive factors

Visual function parameters and VR-QoL scores are represented in **Tables 1 and 2**, respectively.

Multiple linear regressions analysis are described in **Table 3**. Only the presence of diplopia was independently associated with the NEI VFQ-25 composite score ($p = 0.004$). No other variable, including stereoacuity, macular status, metamorphopsia, aniseikonia, retinal displacement or structural OCT findings, showed a significant association with the VR-QoL composite score or its subscales ($p > 0.05$ for all).

Diplopia

Out of eight patients (18%) classified as having diplopia, four exhibited strabismic diplopia and four presented CPR-type diplopia. Five patients responded positively to the diplopia questionnaire. Four of them were found to experience strabismic diplopia and one had CPR-type diplopia with double optotype and single frame. The remaining three patients exhibited CPR-type diplopia with single optotype and double frame and initially reported binocular discomfort but were unable to clearly articulate their symptoms until targeted testing was performed.

All of the patients presenting strabismic and CPR-type diplopia with double optotype and single frame had macula-off RRD, while all three patients presenting CPR-type diplopia with single optotype and double frame were treated for macula-on RRD.

Table 1 Postoperative baseline clinical and anatomical characteristics

Macular status	Macula-on	Macula-off	Overall
N (%)	18 (40%)	27 (60%)	45
Distance BCVA (logMAR)			
Affected eye, median (range)	0 (-0.2 to 0.5)	0.1 (-0.2 to 0.5)	0 (-0.2 to 0.5)
Fellow eye, median (range)	-0.1 (-0.2 to 0.3)	-0.1 (-0.2 to 0.2)	-0.1 (-0.2 to 0.3)
Interocular difference, median (range)	0 (-0.2 to 0.6)	0.1 (-0.2 to 0.5)	0 (-0.2 to 0.6)
Stereoacuity (seconds of arc)			
>480 (none), n (%)	6 (33%)	14 (52%)	20 (44%)
>120'' and ≤480 (poor quality), n (%)	6 (33%)	11 (41%)	17 (38%)
≥15'' and ≤120 (good quality), n (%)	6 (33%)	2 (7%)	8 (18%)
Metamorphopsia scores (M-charts)			
Horizontal (°), median (range)	0.0 (0 to 0.6)	0.5 (0 to 2)	0.2 (0 to 2)
Vertical (°), median (range)	0.2 (0 to 1.0)	0.3 (0 to 1.5)	0.3 (0 to 1.5)
Absence of metamorphopsia, n (%)	8 (44%)	5 (19%)	13 (29%)
Aniseikonia scores (NAT)			
Horizontal (%), median (range)	1 (0 to 6)	1 (0 to 13)	1 (0 to 13)
Vertical (%), median (range)	1 (0 to 6)	1 (0 to 9)	1 (0 to 9)
Absence of aniseikonia, n (%)	6 (33%)	6 (22%)	12 (27%)
Retinal displacement, n (%)	1 (6%)	10 (37%)	11 (24%)
Central foveal thickness (μm), median (range)	282 (241 to 475)	285 (197 to 411)	285 (197 to 475)
Ellipsoid zone disruption, n (%)	2 (11%)	3 (11%)	5 (11%)

Table 2 Vision related quality of life assessed with the NEI VFQ-25

NEI VFQ-25	Median (range)
General health	50 (25-75)
General vision	80 (40-100)
Ocular pain	88 (38-100)
Near activities	92 (42-100)
Distance activities	92 (38-100)
Social functioning	100 (63-100)
Mental health	81 (25-100)
Role difficulties	100 (38-100)
Dependency	100 (50-100)
Driving	88 (38-100)*
Color vision	100 (75-100)
Peripheral vision	100 (25-100)
NEI VFQ-25 composite score	89 (58-98)

Higher scores indicate better vision-related quality of life.

*Undeterminable driving skills in 3 out of 45 patients

Table 3 Multiple linear regression analyses exploring the relations between functional and structural parameters and vision-related quality of life assessed using the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25)

	Stereoacuity		Macular status		M _H		M _V		A _H		A _V		ΔBCVA		Retinal displacement		Ellipsoid zone integrity		Diplopia	
	β	p	β	p	β	p	β	p	β	p	β	p	β	p	β	p	β	p	β	p
General vision	7.7	0.2	5.5	0.3	-11	0.09	-2.2	0.8	90	0.5	-179	0.3	-0.39	>0.9	7.9	0.2	-3.3	0.7	-6.9	0.3
Near activities	12	0.10	-0.81	0.9	-0.27	>0.9	3.0	0.8	116	0.4	-293	0.11	4.8	0.8	4.5	0.5	-11	0.3	-13	0.09
Distance activities	0.32	>0.9	2.2	0.7	-8.5	0.2	-5.3	0.6	3.9	>0.9	-323	0.087	5.6	0.7	7.2	0.3	8.7	0.4	-7.8	0.3
Driving	6.0	0.5	1.9	0.8	-3.6	0.6	11	0.4	154	0.4	-94	0.7	-16	0.5	7.5	0.4	-13	0.3	-14	0.2
NEI VFQ-25 composite score	5.1	0.3	-0.01	>0.9	-1.8	0.7	3.5	0.6	-1.1	>0.9	-132	0.2	-3.1	0.8	7.7	0.10	-0.72	>0.9	-14	0.004

M_H: horizontal metamorphopsia, M_V: vertical metamorphopsia, A_H: horizontal aniseikonia, A_V: vertical aniseikonia, ΔBCVA: interocular distance best-corrected visual acuity difference

Bold value: significant p-value (below 0.05)

Discussion

The current study shows that stereoacuity is significantly impaired in patients who were successfully treated for macula-off RRD and does not improve to normal within the first six months postoperatively. However, among all examined factors, only the presence of binocular diplopia showed a significant negative association with VR-QoL.

Macular involvement is associated with non-resolving impaired stereopsis by 6-month postoperatively

As shown in **Table 4**, the findings of the current study on stereopsis are consistent with previous results reported by Watanabe *et al.*[1], and support the hypothesis that macular involvement exerts a lasting negative impact on binocular integration even after anatomically successful repair. Interestingly, stereoacuity was not independently associated with VR-QoL in our cohort. Likewise, other visual function parameters, including interocular visual acuity difference, metamorphopsia and aniseikonia, did not show significant correlations with NEI VFQ-25 scores. These results contrast with those of Ng *et al.*[16] that demonstrated an influence of BCVA, metamorphopsia and stereopsis on VR-QoL. Lina *et al.*[2] also identified a negative correlation between metamorphopsia and VR-QoL. However, both of these studies used bivariate analyses which do not allow testing for independent associations. The absence of such effects in our multivariate model suggests that these functional parameters may be interrelated or secondary to other factors, such as binocular misalignment.

Table 4 Comparative summary of key studies on postoperative stereopsis and vision related quality of life after rhegmatogenous retinal detachment

Study	Patients	Time after RD surgery	Focus point	Analyzed factors	Key findings
Watanabe <i>et al.</i>, 2014 Graefes Arch Clin Exp Ophthalmol	75	6 to 12 months	Stereopsis (TST and TNO)	- Age - Circumferential dimension of retinal tears - Area of retinal detachment - Duration of retinal detachment - Difference of postoperative spherical equivalent between both eyes - Postoperative logMAR BCVA - Difference of postoperative logMAR BCVA between both eyes - Postoperative low contrast visual acuity - Macular status (on/off) - Surgical procedures (scleral buckling/vitreectomy) - Postoperative lens status (phakia/pseudophakia) - Presence of postoperative epiretinal membrane (ERM)	Bivariate analysis: - positive correlation between stereopsis (TST) and the area of RD, difference of postoperative spherical equivalent between two eyes, postoperative logMAR BCVA, difference of postoperative logMAR BCVA between two eyes, low-contrast visual acuity and macular status - positive correlation between stereopsis and postoperative logMAR BCVA and macular status Multiple regression analysis: - significant correlation between macular status (on/off) and stereopsis in both TST and TNO
Lina <i>et al.</i>, 2016 Nature	30	12 months	VR-QoL	- Postoperative BCVA - Metamorphopsia (vertical and horizontal) - Stereopsis (Randot)	Bivariate analysis: - negative correlation between the composite VFQ-25 quality of life score and vertical and horizontal metamorphopsia
Ng <i>et al.</i>, 2020 Retina	48	12 months	VR-QoL	- Postoperative BCVA - Low contrast postoperative BCVA - Metamorphopsia (vertical and horizontal)	Bivariate analysis: - negative correlation between the VFQ-25 quality of life scores and low contrast BCVA as well as stereopsis

				- Aniseikonia (vertical and horizontal) - Color vision - Stereopsis (TST)	
Okamoto <i>et al.</i>, 2023 J Clin Med	127	6 months	Stereopsis (TST and TNO)	- Preoperative BCVA - Postoperative BCVA - Metamorphopsia - Aniseikonia - Contrast sensitivity	Multiple regression analysis: - positive correlation between stereopsis (TNO) and postoperative BCVA, metamorphopsia, and aniseikonia - negative correlation between stereopsis (TNO) and contrast sensitivity - positive correlation between stereopsis (TST) and postoperative BCVA

RD: retinal detachment, TST: Titmus stereotest, TNO: The Netherlands Organisation stereotest, VR-QoL: vision related quality of life as measured by the National Eye Institute Visual Function Questionnaire consisting of 25 items, BCVA: best-corrected visual acuity

Binocular diplopia

In this study, the presence of binocular diplopia, regardless of its mechanism, was the only variable that independently predicted poorer VR-QoL.

Binocular diplopia occurs whenever normal fusion of the two eye images is impaired due to the lack of ocular alignment or if the images differ greatly between eyes. For instance, certain retinal diseases, such as epiretinal membrane, can induce foveal displacement and create a rivalry between central and peripheral fusional mechanisms, yielding a central diplopia, also known as the dragged-fovea diplopia [7, 17]. Metamorphopsia and/or aniseikonia caused by macular distortion can also contribute to binocular misregistration of the retinal mosaics and lead to double vision[18–20].

Among the eight patients presenting vertical binocular diplopia, five had a history of macula-off RRD, suggesting that the central retinal photoreceptor mosaic may have been altered. In three of these cases macular displacement was present, leading to foveal misregistration and disruption of central fusion. In the remaining two macula-off cases, disruption of sensory fusion appeared more likely related to interocular differences in image quality: one patient exhibited marked vertical (10%) and horizontal (9%) aniseikonia, while the other showed pronounced vertical (1.5°) and horizontal (0.7°) metamorphopsia. By contrast, the three patients treated for macula-on RRD were all found to exhibit exclusively peripheral diplopia in the presence of central fusion on the optotype-frame test. In these cases, the peripheral retina appeared to have been translocated without foveal involvement, producing peripheral retinal misregistration.

Eight patients presented ocular deviations on the simultaneous prism cover test. All had small-angle vertical deviations, with or without an additional horizontal component. Four of them reported diplopia and were fitted with prismatic correction for the vertical component, which drastically improved their symptoms.

Thus, binocular diplopia is the result of various underlying binocular vision disturbances, which may explain its emergence as the dominant factor affecting VR-QoL in the present cohort of patients treated for unilateral RRD. The identification of binocular diplopia as the independent predictor of VR-QoL encourages a more widespread use of binocular function testing in the postoperative follow-up of RRD patients and supports the integration of patient-centered tools such as the diplopia questionnaire, the optotype-frame test and orthoptic evaluation into routine clinical practice, especially for individuals reporting visual discomfort without clear anatomical explanation.

Strengths and limitations

Our study presents several strengths. It is one of the few prospective investigations to assess the independent contribution of both anatomical and functional parameters to patient-reported visual quality of life in a cohort of patients who underwent successful PPV for RRD. In addition, binocular vision was assessed by both subjective reporting (optotype-frame test and diplopia questionnaire) and objective orthoptic examination, allowing the detection of subtle forms of diplopia that may otherwise be overlooked.

Nonetheless, several limitations should be acknowledged. First, the sample size was relatively small, which may limit the statistical power to detect associations between the examined factors and VR-QoL. Second, the postoperative follow-up was relatively short, with evaluations conducted between 6 and 18 months following surgery. Previous studies have demonstrated that visual acuity in patients with retinal detachment may continue to improve over time, with better outcomes observed at 5 years postoperatively compared to six months[21].

Further research with larger cohorts and extended follow-up periods is needed to better understand the trajectory of the visual function recovery after successful RRD surgery.

Conclusion

The present study confirms that macular involvement at the time of RRD surgery has a lasting negative effect on stereoacuity by 6-months postoperatively. However, only binocular diplopia was independently associated with poorer vision-related quality of life. These findings underscore the importance of binocular function assessment in postoperative follow-up and suggest that diplopia may be a key determinant of long-term visual satisfaction after anatomically successful retinal reattachment.

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Tables and legends

Table 1 Postoperative baseline clinical and anatomical characteristics

Table 2 Vision related quality of life assessed with the NEI VFQ-25

Table 3 Multiple linear regression analyses exploring the relations between functional and structural parameters and vision-related quality of life assessed using the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25)

Table 4 Comparative summary of key studies on postoperative stereopsis and vision related quality of life after rhegmatogenous retinal detachment

Vu, les Directeurs de Thèse

A handwritten signature in black ink, appearing to read 'Sophie Arsene', with a large, stylized loop at the beginning.A handwritten signature in blue ink, appearing to read 'Kanav KHANNA', with a stylized 'Z' or 'K' shape at the beginning.

**Vu, le Doyen
De la Faculté de Médecine de Tours
Tours, le**

GAZIZOV Kamil

30 pages – 4 tableaux

Résumé :

Objectif : Déterminer si l'atteinte maculaire au moment du décollement de rétine rhégmatoïde (DRR) influence la stéréopsie postopératoire, et explorer les facteurs cliniques et paracliniques associés à la qualité de vie liée à la vision (QVLV).

Méthodes : Dans cette étude de cohorte prospective monocentrique menée au Centre Hospitalier Universitaire de Tours, les patients opérés avec succès d'un DRR par vitrectomie par la pars plana (VPP) ont été examinés entre 6 et 18 mois après la chirurgie, entre juin 2024 et mars 2025. Les paramètres suivants ont été recueillis : l'atteinte maculaire per-opératoire, la diplopie (examen orthoptique oculo-moteur et test optotype cadre), l'acuité visuelle stéréoscopique (The Netherlands Organisation test), l'acuité visuelle monoculaire corrigée de loin, les métamorphopsies (M-CHARTS), aniséiconie (New Aniseikonia Test), l'épaisseur rétinienne centrale et l'intégrité de la zone ellipsoïde à la tomographie par cohérence optique, la présence de vaisseaux fantômes à l'autofluorescence, et la QVLV évaluée par le questionnaire National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25). Une analyse univariée a été réalisée pour évaluer la stéréopsie. Les facteurs associés à la QVLV ont été explorés par des régressions linéaires multivariées.

Résultats : Quarante-cinq patients ont été inclus (âge médian (étendue) : 67 ans (46–82) ; femmes : 18 (40 %)). Le délai médian entre la chirurgie et l'évaluation était de 10 mois (étendue : 6–18 mois). La stéréopsie était significativement plus altérée dans le groupe macula soulevée que dans le groupe sans atteinte maculaire ($p = 0,045$). L'analyse multivariée a révélé une corrélation négative entre la diplopie et le score composite du NEI VFQ-25 ($p = 0,004$). Aucun autre paramètre n'a montré d'association significative avec le score composite ou les sous-catégories du NEI VFQ-25 ($p > 0,05$).

Conclusion : La stéréopsie postopératoire est significativement réduite chez les patients présentant un DRR avec atteinte maculaire, sans récupération durant les six premiers mois postopératoires, et ce malgré un rattachement rétinien réussi. Cependant, la perte de stéréopsie, ainsi que les atteintes monoculaires qualitatives ou quantitatives ne semblent pas influencer la QVLV. La diplopie binoculaire, quel que soit son mécanisme, altère particulièrement la QVLV, soulignant l'importance d'une évaluation postopératoire personnalisée chez les patients opérés d'un DRR.

Mots clés : décollement de rétine ; vitrectomie ; stéréopsie ; qualité de vie

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