Original Article

Exudative Retinal Detachment in Nigerians: Demographics and Causes

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Abstract

Background: Exudative retinal detachment (ERD) is a rare type of retinal detachment (RD), and information on its causes and presentation in Nigerians and Black Africans is scarce. **Aim:** To report the prevalence, vision at presentation, and causes of ERD in a cohort of RD patients. **Materials and Methods:** A prospective, multicentre, hospital-based study. We examined consecutive eyes diagnosed with ERD in ophthalmic patients seen within 1 year in four ophthalmic hospitals in Nigeria. The patients had a complete eye examination, including visual acuity, intraocular pressure measurement, slit lamp examination of the anterior segment, dilated fundus examination, and other ancillary investigations. Statistical analysis was done using SPSS version 22.0. **Results:** Nine out of 237 patients were diagnosed with ERD, giving a hospital-based prevalence of 3.8% of RDs. The mean age of patients was 45.8 ± 21.6 years (6 months–80 years), male:female = 2:1. ERD was bilateral in one patient and unilateral in eight patients. There was no gender association (P = 0.84), but systemic disease was associated with a risk of ERD (P = 0.001). Five out of 9 (55.6%) patients had an associated systemic disease. The systemic diseases include two patients (40%) who had chronic renal failure, two patients (40%) who had systemic hypertension, and one patient (10%) who had lung cancer. Other ocular causes of ERD include post endophthalmitis, coats disease, and age-related macular degeneration in one eye each. 80 % of eyes were blind at presentation. **Conclusion:** ERD is a rare form of RD in Nigerians and is associated with systemic diseases. There are inflammatory, neoplastic, vascular, and degenerative causes of ERD. At presentation, most eyes are blind. Early presentation will be beneficial in salvaging vision. Also, awareness of the occurrence and causes of ERD should be created amongst eye care practitioners.

Keywords: *Exudative retinal detachment, malignancy, Nigeria, serous retinal detachment, systemic hypertension*

Introduction

Retinal detachment (RD) is an important cause of sudden, painless loss of vision. RD is defined as the separation of the neurosensory retina (NSR) from the underlying retinal pigment epithelium (RPE), leading to fluid accumulation within the subretinal space (SRS). Both mechanical and metabolic factors maintain the adhesion between the NSR and RPE. The mechanical forces include fluid pressures, the vitreous, matrix material between the NSR and RPE, and the interdigitations between the RPE microvilli and the photoreceptors.

Oxygenation forms a significant part of the metabolic factors which affect retinal adhesion.[1] Fluid would usually not accumulate in the SRS when the RPE functions optimally, pumping the fluid into the choroidal circulation. However, fluid accumulates when the regular RPE pump activity becomes overwhelmed, or the pigment epithelium's activity reduces due to loss, damage, or reduced oxygenation, resulting in exudative retinal detachment (ERD).[2,3] There are three types of RD based on the causative pathogenetic mechanism: Rhegmatogenous, Exudative, and Tractional.[4,5] A fourth type of RD occurs due to a combination of tractional and rhegmatogenous components.[6]

ERD, also known as transudative or serous retinal detachment, results from either damage to the RPE or leaky retinal blood vessels, with fluid passage into the SRS in the absence of tractional forces or retinal breaks.[1,7,8] ERD accounts for a minority of RD.[4] Whereas there are reports on the rates of rhegmatogenous retinal detachment (RRD) in Nigerians, ERD has not been researched amongst a large sampling of Nigerians. Therefore, we conducted a

How to cite this article: Adenuga OO, Udoh M-ME, Okonkwo ON, Ovienria W, Nkanga DG, Oyekunle I, *et al.* Exudative retinal detachment in Nigerians: Demographics and causes. J West Afr Coll Surg 2023;13:63-6.

Received: 10-Feb-2023
Accepted: 22-Mar-2023
Published: 16-Sep-2023

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Access this article online

Website: www.jwacs-jcoac.com

DOI: 10.4103/jwas.jwas_41_23

Quick Response Code:

prospective study to determine the rate of occurrence and presentation of ERD among Nigerians diagnosed to have different types of RD.

Materials and Methods

We conducted a prospective, cross-sectional, descriptive, multicentre, hospital-based study. Data were obtained from consecutive patients who attended the general ophthalmic and retinal clinics of four Nigeria hospitals and were diagnosed with an RD. The patients were diagnosed from April 2019 to March 2020. This study adhered to the tenets of the Helsinki declaration and informed consent was obtained from the participants. Ethical approval was obtained from the Health Research Ethics Committee of the participating hospitals. All patients had a detailed ophthalmic examination, including a visual acuity test using a Snellen acuity chart and refraction when vision was sufficient. Visual acuity was categorised using the ICD 10 code for visual impairment: near normal/mild visual impairment ≥ 6/18, moderate visual impairment 6/24 to 6/60, severe visual impairment < 6/60 to 3/60, blindness < 3/60 to no perception of light (NPL). Eyes with no view of the posterior segment were excluded from the study.

Also, each participant had intraocular pressure measurement, anterior segment examination using a slit lamp biomicroscope, dilated fundus examination using a +90D or +78D lens, and 20D binocular indirect ophthalmoscopy to examine the retina periphery. In some patients, investigations performed (depending on equipment availability and access to the treating physician and patient) include ocular B scan—ultrasonography, optical coherence tomography, fundus photography, and fundus fluorescein angiography. A diagnosis of ERD was made in the clinical setting of a convex RD, without a retinal break and devoid of tractional elements in the vitreous or retina. There had to be an absence of retinal corrugations, suggestive of rhegmatogenous retinal detachment. In some eyes, intraocular inflammation was present, and there was evidence of anterior or posterior chamber inflammation. However, eyes with ocular inflammation, including vitritis in which ERD was visible, were not excluded.

This study on ERD was a part of a more extensive study that investigated the presentation of RD in Nigerians. Participants diagnosed with ERD from the total number of RD eyes were analysed. Data from each of the four collaborating hospitals were entered into an MS-Excel spreadsheet and transmitted to a central data collection centre at the end of each month. Analysis was done using IBM SPSS Statistics Version 22.0 (IBM Corp., Armonk, New York). Categorical variables were expressed as frequency and percentage. Frequencies, means, and standard deviations (SD) were determined, and tests of association between categorical variables were computed using Pearson's Chi-square test. Regression analysis was done to determine the likelihood of ERD being associated with systemic diseases. *P*-value < 0.05 was considered statistically significant.

Results

Demographics and risk factors for exudative retinal detachment among the study participants

Nine patients and ten eyes had ERD out of 237 patients/264 eyes diagnosed with various types of RD within the study period. We report the prevalence of ERD as 3.8% of all RDs. The mean age of patients with ERD was 45.8 ± 21.6 years (6 months–80 years). Details of age distribution are presented in Table 1. There were six male patients (66.7%) and three female patients (33.3%). Gender was not associated with the development of ERD ($P = 0.840$). The median duration of symptoms was 6 months (1 week–5 years). One patient had bilateral ERD, whereas eight had unilateral disease (four right and left eyes each).

One eye (10%) had a previous history of intraocular surgery. One eye had previous ocular trauma. There was no family history of ERD. Five out of 9 (55.6%) patients had an associated systemic disease. Details of the systemic diseases include two patients (40%) who had chronic renal failure (CRF), another two patients (40%) who had systemic hypertension, and one patient (10%) who had lung cancer. There was a statistically significant association between systemic disease and the occurrence of ERD ($P < 0.001$). Also, simple regression analysis examining the likelihood of systemic disease in predicting the type of RD revealed that eyes with ERD had an increased likelihood of being associated with systemic diseases ($\beta = 1.3$, OR = 3.6, $P = 0.054$).

Visual status of exudative retinal detachment eyes

Eight eyes (80%) were blind at presentation, that is, Snellen acuity < 3/60. Table 2 gives a summary of the uncorrected visual acuity and best corrected visual acuity of ERD eyes.

Aetiology of exudative retinal detachment

The aetiology of the secondary exudative process is represented in Table 3. This includes inflammatory, vascular, degenerative and neoplastic causes.

Table 1: Age group categorisation of patients diagnosed with exudative retinal detachment

	Age	No of patients	Percentage (%)
ERD	<25 years	1	11.1
	26–45 years	3	33.3
	46–65 years	4	44.4
	>66 years	1	11.1
	Total	9	100.0

ERD: exudative retinal detachment

Table 2: Visual acuity of ERD eyes

Categorisation of vision	UVA		BCVA	
	Frequency	%	Frequency	%
6/12 and better (normal)	–	–	–	–
<6/12 to 6/18 (mild visual impairment)	–	–	1	10
<6/18 to 6/60 (moderate visual impairment)	–	–	1	10
<6/60 to 3/60 (severe visual impairment)	–	–	–	–
<3/60 and worse (blind)	9	90	7	70
NPL (no light perception)	1	10	1	10
Total	10	100.0	10	100.0

UVA: uncorrected visual acuity, BCVA: best corrected visual acuity

Table 3: Aetiology of exudative retinal detachment

Aetiology	Frequency (eyes)	%
Endophthalmitis	1	10
Coats disease	1	10
AMD	1	10
Choroidal melanoma	1	10
Chronic renal failure	2	20
Secondary metastases	2	20
Unknown	2	20
Total	10	100

AMD: age related macular degeneration

Discussion

The prevalence of ERD was 3.8% in this study. This is higher than the 1.2% reported by Shah *et al*.[8] among patients with ocular inflammatory disease who presented with ERD. The difference in prevalence could be due to the difference in the study population and sample size variation. Literature on the prevalence of ERD amongst black Africans is scarce. Therefore, this study seeks to fill this gap.

Most of the study participants were between the ages of 46 and 65. This agrees with the findings of another study, where most ERD cases occurred in persons above 35 years of age. This age finding could be due to increased eye disease prevalence with age. Considering the visual status of participants, 80% were blind. Shah *et al*.[8] reported poor visual acuity initially but noted a tendency for vision improvement with the resolution of subretinal fluid. The percentages were, however, not reported. The occurrence of poor vision in most of our study eyes may be related to the delay in presentation, because our patients had a median symptom duration of 6 months. We did not perform a longitudinal follow-up of eyes in our study. That visual loss in some cases of ERD could be reversible with a return of vision has been shown.

Several ocular and systemic diseases are known to be associated with ERD; subretinal fluid could be from either the retinal or choroidal blood vessels. Causes of ERD can be inflammatory, neoplastic, or vascular diseases affecting the RPE, the retina or the choroid. Inflammatory causes of ERD include Vogt-Koyanagi-Harada syndrome, posterior scleritis, sympathetic ophthalmia, undifferentiated choroiditis, primary and secondary panuveitis, pars planitis, orbital cellulitis, Rheumatoid arthritis, and other collagen vascular diseases.[8] Vascular causes include pre-eclampsia/eclampsia,[9] coats disease,[10] retinal vein occlusion, malignant hypertension, retinal angiomatous diseases, and different forms of choroidal neovascularisation including polypoidal choroidal vasculopathy.[1] Neoplastic causes include malignant choroidal melanoma.[11]

Lymphangioma, haemangioma and metastatic tumours, acute lymphoblastic leukaemia,[12] squamous cell lung cancer are known causes of ERD.[13] Other causes of ERD include familial exudative vitreoretinopathy, Norrie disease, uveal effusion, central serous chorioretinopathy,[1] and chronic renal failure.[14]

In some situations, distinguishing between RRD and ERD could be a clinical dilemma. Clinically, ERD can be differentiated from RRD by specific characteristics, including ERD's smooth surface, absence of corrugations, absence of a retinal break, and shifting subretinal fluid, which responds to gravitational force with movement to the more dependent position. B-scan ultrasonography shows a smooth, convex surface without the corrugated appearance. Shifting fluid is also demonstrable during ultrasonography. The primary aetiology for ERD, when local such as in the clinical scenario of choroidal masses and scleritis, can be identified.

In some cases of ERD, the retina may be significantly elevated and, therefore, visible immediately posterior to the lens; this presentation is rare in RRD. Furthermore, proliferative vitreoretinopathies, which occur as fixed retinal folds, are rare in ERD, unlike in RRD. As ERD is associated with systemic disease, a good knowledge of the possible systemic associations of ERD is an advantage in making a diagnosis.

Coats disease was present in one of the patients. Coats disease has been reported as a cause of ERD by several authors.[15,16] It has been associated with total ERD.[17] There has been a previous report of coats like disease occurring in both eyes of a female Nigerian.[10] Coats disease is a vascular abnormality characterised by idiopathic retinal telangiectasia and causes intraretinal and subretinal exudation and ERD.

Chronic renal failure was a cause of ERD in 2 eyes of two patients (40%) in this study. Otuka *et al*.[14] reported on the occurrence of bilateral ERD in a CRF patient in South East Nigeria. ERD resulting from CRF could be due to

secondary hypertension induced by a renal disease which would disrupt normal vascular function, thus predisposing to leakiness of fluid into the SRS, with resultant ERD. Systemic hypertension was associated in 40% of the five ERD patients with systemic disease. Mandura reported bilateral reversible ERD following eclampsia which is a severe hypertensive disease.[9] However, hypertension was not a significant association with ERD in studies by Shah *et al*.[8]

Gibran and Kapoor[11] reported on ERD associated with six cases of malignant choroidal melanoma. They further reported that ERD is the most common source of visual loss associated with malignant melanoma of the uveal tract. In one patient in our series, choroidal melanoma was the cause of ERD.

In two eyes in our series, ERD resulted from secondary metastasis. Various malignant diseases with secondary metastasis, including lung cell cancer and breast cancer, have been reported to be associated with ERD.

Diagnosis of ERD can be clinical or by imaging, including B-scan ultrasonography, optical coherence tomography, and fundus fluorescein angiography. Treatment for ERD is primarily medical, unlike rhegmatogenous and tractional RD, which requires surgical intervention. Therefore, it is essential to differentiate ERD from other forms of RD to institute appropriate treatment. The objective of the research was primarily to determine the causes of exudative retinal detachment, that is, to make a diagnosis. Treatment and management were not considered in this research. Therefore, the use or non-use of the investigative modalities listed above, in most of the ERD eyes would not affect the outcome of the research.

Conclusion

Exudative or serous retinal detachment can cause painless loss of vision, and most of our patients are already blind at presentation. This study provides valuable information on the causes and presentation of ERD, a rarely reported condition in Nigeria. In our study, cases of ERD were associated with secondary metastasis, chronic renal failure, age-related macular degeneration, Coats disease, choroidal melanoma and endophthalmitis. Further studies recruiting a large number of patients, with longitudinal follow-up, will provide information on more causes of ERD, the severity of the disease and treatment outcomes.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ghazi NG, Green WR. Pathology and pathogenesis of retinal detachment. Eye 2002;16:411-21.
2. Spielberg LH, Heckenlively JR, Leys AM. Retinal pigment epithelial detachments and tears, and progressive retinal degeneration in light chain deposition disease. Br J Ophthalmol 2013;97:627-31.
3. Felfeli T, Mandelcorn MS, Yan P, Jeffery G, Mandelcorn ED. Failed pneumatic retinopexy for rhegmatogenous retinal detachment repair in ocular albinism: Clues to the role of melanin in retinal pigment epithelium pump function. Ophthalmic Surg Lasers Imag Retina 2017;48:1016-20.
4. Jalali S. Retinal detachment. Commun Eye Health 2003;16:25-6.
5. Fraser S, Steel D. Retinal detachment. BMJ Clin Evid 2010;2010:0710.
6. Hsu YJ, Hsieh YT, Yeh PT, Huang JY, Yang CM. Combined tractional and rhegmatogenous retinal detachment in proliferative diabetic retinopathy in the anti-VEGF era. J Ophthalmol 2014;2014:1-11.
7. Kim RY, Loewenstein JI. Systemic diseases manifesting as exudative retinal detachment. Int Ophthalmol Clin 1998;38:177-95.
8. Shah DN, Al-Moujahed A, Newcomb CW, Kaçmaz RO, Daniel E, Thorne JE, *et al*. Exudative retinal detachment in ocular inflammatory diseases: Risk and predictive factors. Am J Ophthalmol 2020;218:279-87.
9. Mandura RA. Bilateral serous retinal detachment and posterior reversible encephalopathy syndrome precipitated by eclamptic attack. Cureus 2021;13:2-5.
10. Okonkwo ON, Hassan AO, Ideh V, Gyasi ME, Oderinlo O. Bilateral leber's miliary aneurysm in a female black African. Int J Case Rep Imag 2018;9:100888Z01OO2018.
11. Gibran S, Kapoor K. Management of exudative retinal detachment in choroidal melanoma. Clin Exp Ophthalmol 2009;37:654-9.
12. Pasricha MV, Callaway NF, Nguyen QD, Do DV. American Journal of Ophthalmology case reports serous retinal detachment as a presenting sign of acute lymphoblastic leukemia: A case report and literature review. Am J Ophthalmol Case Rep 2021;23:101142.
13. Zarzecki M, Saeed E, Mariak Z, Konopińska J. Recurrent monocular exudative retinal detachment as the first manifestation of squamous cell lung cancer: A case report Medicine (Baltimore) 2021;100:e25189.
14. Otuka O, Eweputanna L, Okoronkwo N, Kalu A. Bilateral exudative retinal detachment in a young patient with chronic renal failure. Int Med Case Rep J 2021;14:139-44.
15. Ramasubramanian A, Shields CL. Bevacizumab for Coats' disease with exudative retinal detachment and risk of vitreoretinal traction. Br J Ophthalmol 2012;96:356-9.
16. Sigler EJ, Randolph JC, Calzada JI, Wilson MW, Haik BG. Current management of Coats disease. Surv Ophthalmol 2014;59:30-46.
17. Patel A, Panchal B, Pathengay A. Spontaneous reattachment of total exudative retinal detachment in Coats' disease. BMJ Case Rep 2019;12:e229913.