Case Report

Taiwan J Ophthalmol 2022;12:472-476

Access this article online

Quick Response Code:

Website:
www.e-tjo.org

DOI:
10.4103/2211-5056.362602

Subretinal fluid in a patient with systemic lupus erythematosus

Jong Beom Park, Kiyoung Kim, Min Seok Kang, Eung Suk Kim, Seung-Young Yu*

Abstract:

A 28-year-old male patient presented to the outpatient department with visual disturbance in both eyes. The patient had a history of stage IV lupus nephritis that was diagnosed at the age of 14 years and had undergone hemodialysis at the age of 23 years. After he started hemodialysis, the systemic condition was well controlled, and systemic steroids were not used. His best-corrected visual acuity (BCVA) was 20/200 in the right eye and 20/100 in the left eye. Funduscopic examination revealed shallow subretinal fluid (SRF) and serous retinal detachment in both eyes. The first impression of this patient was central serous chorioretinopathy. However, the late phase of fluorescein angiography (FA) demonstrated multiple subretinal leakages, and the late phase of indocyanine green angiography showed choroidal vascular engorgement and multiple hyperfluorescent plaques in both eyes. Systemic lupus erythematosus showed moderate activity according to the results of the systemic evaluation. Based on the clinical examination, lupus choroidopathy was suspected in both eyes. Half-fluence photodynamic therapy (PDT) was administered to both eyes rather than systemic steroids because the patient was systemically stable. Three months after PDT, no SRF was observed in either eye. In addition, multiple subretinal leakages on FA were reduced compared to those before treatment. There was no recurrence of SRF for 4 years after PDT, and the final BCVA was 20/70 in the right eye and 20/40 in the left eye. During this time, numerous hypoautofluorescence spots appeared adjacent to the major retinal vessels in fundus autofluorescence.

Keywords:

Central serous chorioretinopathy, lupus choroidopathy, systemic lupus erythematosus

Introduction

Systemic lupus erythematosus (SLE) is a chronic, systemic, immune vasculitis characterized by pathological autoantibodies and deposition of immune complexes.[1,2] SLE also affects multiple organ systems with varying degrees of severity depending on activation and remission.[3] Ocular manifestations, such as keratoconjunctivitis sicca, anterior uveitis, and lupus retinopathy, can be observed in more than one-third of patients with SLE.[4,5] Lupus choroidopathy is a rare complication of SLE that is not fully understood. It can be observed with aggravation of lupus nephritis or central nervous system involvement.[6] In addition, lupus choroidopathy should be differentiated from central serous chorioretinopathy (CSC), which is exacerbated by steroid treatment. Other differential diagnoses for lupus choroidopathy are Vogt–Koyanagi–Harada syndrome and hypertensive choroidopathy.

CSC is a multifactorial disease that is strongly associated with choroidal dysfunction or vascular engorgement, characterized by serous retinal detachment (SRD) with subretinal fluid (SRF) accumulation in young- and middle-aged adults.[7,8] It shows one or multiple leakages on fluorescein angiography (FA) that originate from the choroid through a retinal pigment epithelium (RPE) defect.[9] The delay in the initial filling of arteries dilated large choroidal veins, and choroidal hyperpermeability can be confirmed using

Department of Ophthalmology, Kyung Hee University Hospital, Kyung Hee University, Seoul, Korea

***Address for correspondence:**
Prof. Seung-Young Yu, Department of Ophthalmology, Kyung Hee University Hospital, 23, Kyungheedae-ro, Dongdaemun-gu, Seoul 02447, Korea.
E-mail: syyu@khu.ac.kr

Submission: 30-09-2022
Accepted: 01-11-2022
Published: 05-12-2022

How to cite this article: Park JB, Kim K, Kang MS, Kim ES, Yu SY. Subretinal fluid in a patient with systemic lupus erythematosus. Taiwan J Ophthalmol 2022;12:472-6.

indocyanine green angiography (ICGA) in patients with CSC.[10,11] Choroidal hyperpermeability and RPE dysfunction are associated with the presence of SRF.[12] The pathogenesis of CSC is not yet fully understood. There are a variety of known risk factors for CSC. Corticosteroids are the most common risk factors, and oral and intravenous steroid intake can affect the occurrence, persistence, and recurrence of CSC.[8]

Herein, we describe a patient with lupus nephritis with choroidal involvement who was treated with photodynamic therapy (PDT) and present multimodal images including hypoautofluorescence spots in fundus autofluorescence during the course of the disease.

Case Report

A 28-year-old male patient presented to the outpatient department with visual disturbance in both eyes. Visual disturbance in the right eye started 2 months prior and that in the left eye started 2 weeks prior. The patient had a history of stage IV lupus nephritis and hypertension and was on medication. He was diagnosed with lupus nephritis at the age of 14 years and was undergoing hemodialysis due to subsequent renal failure at the age of 23 years. After starting hemodialysis, the systemic condition was well controlled, and systemic steroids were not used. At presentation, his best-corrected visual acuity (BCVA) was 20/200 in the right eye and 20/100 in the left eye. Intraocular pressure and examination of the anterior segments of both eyes were normal. Posterior segment examination revealed shallow SRF and SRD in both eyes [Figure 1]. OCT showed shallow SRF, SRD, and RPE-choroidal undulation at the fovea without retinal pigment epithelial detachment, double layer sign, and diffuse atrophic RPE alterations. Other than these fundoscopic findings, no other abnormal findings were observed. Before FA and ICGA were performed, the first impression of the patient's condition was CSC due to young age, SRF, and SRD. However, the late phase of FA demonstrated multiple subretinal leakages. The late phase of ICGA also showed choroidal vascular engorgement and multiple hyperfluorescent plaques in both eyes [Figure 2a-d]. This was different from the usual FA and ICGA findings of chronic CSC. In addition, cystoid macular degeneration or intraretinal and subretinal hyperreflective dots shown in OCT of patients with chronic CSC were not found, and a systemic evaluation was performed to identify SLE activity. The results showed a decrease in C3 levels, hematuria, anemia, and thrombocytopenia. The SLE disease activity scoring system indicated that the disease activity was moderate. Although lupus choroidopathy is usually observed in severely ill SLE patients and this patient was systemically stable, lupus choroidopathy was highly suspected in both eyes. In general, lupus choroidopathy is known to improve with high-dose systemic steroid pulse therapy. However, focal treatment was used rather than systemic steroid pulse therapy or additional systemic therapy such as immunosuppressive treatment, as the patient was systemically stable. One week after the first visit, half-fluence PDT was performed in the right eye. PDT was applied to the sites of increased choroidal leakage on FA and ICGA to spare the fovea. Two days after PDT treatment, the SRF decreased in the right eye. Therefore, 3 weeks after confirming the response to PDT treatment in the right eye, PDT was performed in the left eye using the same PDT protocol. Three months after PDT, no SRF was observed in either eye. In addition, multiple subretinal leakages on FA and multiple hyperfluorescent plaques in ICGA were reduced compared to those before PDT treatment [Figure 2e-h]. BCVA improved to 20/40 in the right eye and 20/50 in the left eye 6 months after treatment. There was no recurrence of SRF associated with lupus choroidopathy, and SLE flare for 4 years after PDT, and the final BCVA was 20/70 in the right eye and 20/40 in the left eye [Figure 3]. During the long-term follow-up, numerous hypoautofluorescence spots appeared adjacent to the major retinal vessels in fundus autofluorescence [Figure 4].

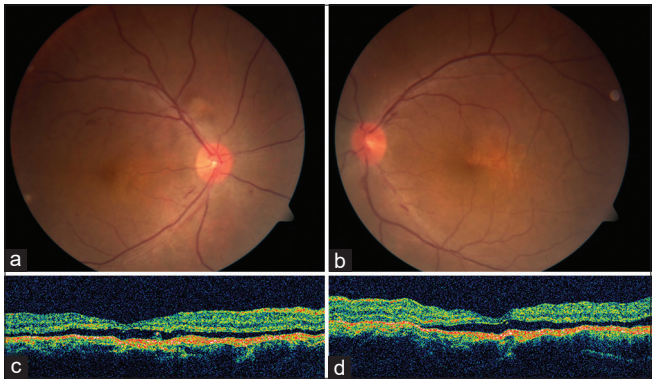

Figure 1: Fundus photography of the right (a) and left eye (b), and optical coherence tomography of the right (c) and left eye (d) at the first visit revealed serous retinal detachment with subretinal fluid

Discussion

SLE is an autoimmune disease that mainly affects women of childbearing age and is rare in men of any age. The incidence in men has been variously reported in the literature, and the approximate ratio of females to males is 9–1.2.[13] Although there are various ocular manifestations of SLE, retinal vasculitis and optic neuropathy are the most threatening complications of SLE to visual acuity.

Lupus choroidopathy is a rare ocular manifestation of SLE that has been reported in no more than 60 patients up to 2019.[14] It is observed in patients with severe active or hypertensive SLE; therefore, it is considered

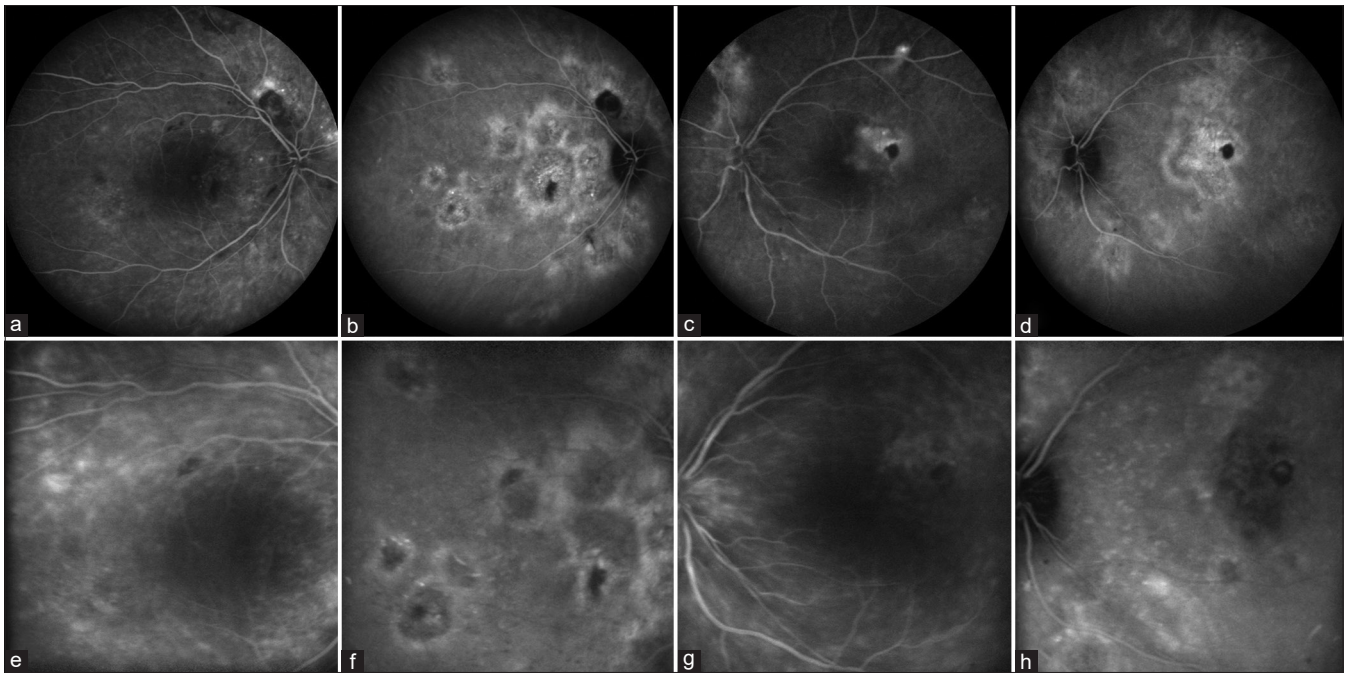

Figure 2: Late phase of fluorescein angiography of the right (a) and left eye (c) at the first visit demonstrating multiple subretinal leakages. Late phase of indocyanine green angiography of the right (b) and left eye (d) at the first visit demonstrating choroidal vascular engorgement and multiple hyperfluorescent plaques. Late phase of fluorescein angiography of the right (e) and left eye (g) at 3 months after photodynamic therapy showing reduced multiple subretinal leakages compared with before photodynamic therapy. Late phase of indocyanine green angiography of the right (f) and left eye (h) at 3 months after photodynamic therapy showing reduced multiple hyperfluorescent plaques

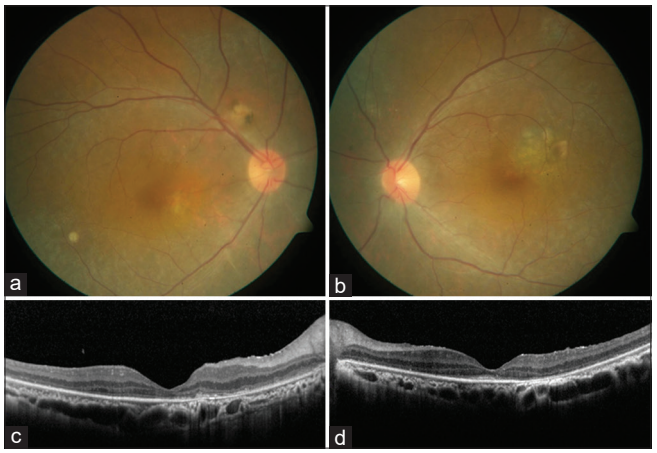

Figure 3: Fundus photography of the right (a) and left eye (b), and optical coherence tomography of the right (c) and left eye (d) at the last visit revealed that there was no recurrence of serous retinal detachment with subretinal fluid for 4 years after photodynamic therapy

an indicator of SLE activity.[4] Lupus choroidopathy is also associated with lupus nephritis because of the similar structure and pathogenesis of both the kidney and choroid.[15] Yao *et al*. reported that lupus nephritis was the most prominent comorbidity of lupus choroidopathy, occurring in approximately 78.6% of all patients.[14] In lupus nephritis, systemic hypertension is usually observed and exacerbates lupus choroidopathy because it contributes to choroidal vessel occlusion, which promotes choroidal ischemia and destruction of the blood–retinal barrier at the RPE.[16,17]

The pathogenesis of this disease is not fully understood; however, immune complex deposition in the choroid, autoantibodies against the RPE,[18] and thrombotic microangiopathy are thought to be associated with disease development.[19] Choroidal hyperpermeability occurs due to the deposition of immunoglobulins and complements in the choroidal vessels.[19] SRD is also thought to be associated with anti-RPE antibodies that cause RPE dysfunction and lead to its development.[20] Deposition of the immune complex is suggested to be important in the pathogenesis and treatment of lupus choroidopathy because plasmapheresis improves lupus choroidopathy similar to systemic high-dose steroid pulse therapy.[21] Therefore, these various causative factors lead to RPE dysfunction, and accumulation of fluid in the subretinal space in patients with lupus choroidopathy.[14]

Bilateral involvement of lupus choroidopathy has been reported in 69.6% of the cases.[14] Ocular manifestations associated with lupus choroidopathy include serous or exudative retinal detachment, serous detachment of the sensory retina, detachment of the RPE, retinal pigment epitheliopathy, clumping, and atrophy.[4,14] Fluorescein leakage, delayed choroidal perfusion, and choriocapillary nonperfusion have been observed as angiographic findings in lupus choroidopathy.[4,14]

Multimodal imaging may help to distinguish lupus choroidopathy from CSC. The ICGA findings suggestive

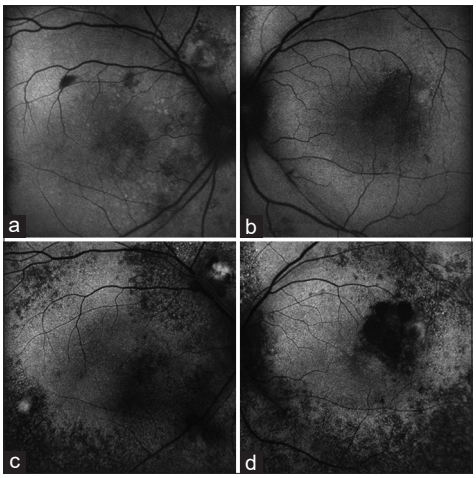

Figure 4: Fundus autofluorescence of the right (a) and left eye (b) at the first visit demonstrated few hypoautofluorescence spots. After 4 years, numerous hypoautofluorescence spots appeared adjacent to the major retinal vessels in fundus autofluorescence of the right (c) and left eye (d)

of lupus choroidopathy are choroidal hypoperfusion of wedge-like shaped wide areas and focal pinpoint spots of choroidal hyperfluorescence that are related to immune complex deposition at the choroid and Bruch's membrane.[22] In addition, multiple pinpoint leakage points on FA findings are common in lupus choroidopathy.[2] However, ultimately, a good response to systemic steroid pulse therapy fully excludes CSC and confirms the diagnosis of lupus choroidopathy.[6]

The treatment of lupus choroidopathy includes systemic corticosteroids, immunosuppressive drugs, and biological agents that control the systemic activity of SLE through immunosuppression. Because it develops in the active phase of SLE, the goal of treating lupus choroidopathy is to modulate SLE activity. As systemic corticosteroid use exacerbates CSC, accurate differentiation from lupus choroidopathy is necessary.

In the present case, the patient's SLE activity was evaluated as moderate, which differed from previous lupus choroidopathy case reports. Therefore, we investigated the efficacy of systemic high-dose steroid pulse therapy owing to its moderate SLE activity and decided on focal treatment with PDT. Shimura *et al*. reported that laser photocoagulation at the leakage point may be helpful for the prompt restoration of vision in patients with lupus choroidopathy.[23] After PDT, SRF was resolved, and the subretinal leakage on FA and multiple hyperfluorescent plaques in ICGA were reduced. In PDT treatment, free radicals released from verteporfin result in inflammation of the choroidal vascular wall.[24] PDT has been suggested to cause a decrease in choroidal hyperpermeability through short-term choriocapillaris hypoperfusion and long-term choroidal microvascular remodeling, resulting in SRF reabsorption.[25,26] Therefore, considering the pathogenesis of lupus choroidopathy and the principle of PDT and focal laser photocoagulation, we propose PDT and focal laser photocoagulation as second-line treatment options in lupus choroidopathy when SLE is not severe, although the current evidence is insufficient. After 4 years of PDT treatment, numerous hypoautofluorescence spots were observed adjacent to the major retinal vessels in the fundus autofluorescence in both eyes. In general, hypoautofluorescence patterns in fundus autofluorescence indicate damage to the RPE and elongation of the photoreceptor outer segments. In the present case, anti-RPE autoantibodies affected and damaged the RPE according to the pathogenesis of lupus choroidopathy. Therefore, hypoautofluorescence spots were observed along the major vessels in fundus autofluorescence because of damaged RPE, which was affected by autoantibodies against the RPE.

Conclusion

Multimodal imaging, bilateral involvement, SLE activity, and vision loss are helpful for diagnosing lupus choroidopathy. Lupus choroidopathy should be differentiated from CSC due to the different treatment modalities associated with systemic steroid pulse therapy. As in this case report, in addition to systemic steroid pulse therapy, half-fluence PDT was also able to achieve a sufficient treatment response in patients with lupus choroidopathy. In addition, hypoautofluorescence spots in fundus autofluorescence showed potential for autoantibody-induced damage to the RPE.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interests of this paper.

References

1. Ozturk B, Bozkurt B, Karademir Z, Kerimoglu H. Follow-up of lupus choroidopathy with optical coherence tomography. Lupus 2011;20:1076-8.
2. Read RW. Clinical mini-review: Systemic lupus erythematosus and the eye. Ocul Immunol Inflamm 2004;12:87-99.
3. Edouard S, Douat J, Sailler L, Arlet P, Astudillo L. Bilateral

choroidopathy in systemic lupus erythematosus. Lupus 2011;20:1209-10.
4. Nguyen QD, Uy HS, Akpek EK, Harper SL, Zacks DN, Foster CS. Choroidopathy of systemic lupus erythematosus. Lupus 2000;9:288-98.
5. Silpa-archa S, Lee JJ, Foster CS. Ocular manifestations in systemic lupus erythematosus. Br J Ophthalmol 2016;100:135-41.
6. Hasanreisoglu M, Gulpinar Ikiz GD, Kucuk H, Varan O, Ozdek S. Acute lupus choroidopathy: Multimodal imaging and differential diagnosis from central serous chorioretinopathy. Int Ophthalmol 2018;38:369-74.
7. Gass JD. Pathogenesis of disciform detachment of the neuroepithelium. Am J Ophthalmol 1967;63:l1-139.
8. Nicholson B, Noble J, Forooghian F, Meyerle C. Central serous chorioretinopathy: Update on pathophysiology and treatment. Surv Ophthalmol 2013;58:103-26.
9. Wang M, Munch IC, Hasler PW, Prünte C, Larsen M. Central serous chorioretinopathy. Acta Ophthalmol 2008;86:126-45.
10. Piccolino FC, Borgia L. Central serous chorioretinopathy and indocyanine green angiography. Retina 1994;14:231-42.
11. Spaide RF, Hall L, Haas A, Campeas L, Yannuzzi LA, Fisher YL, *et al.* Indocyanine green videoangiography of older patients with central serous chorioretinopathy. Retina 1996;16:203-13.
12. Battaglia Parodi M, Arrigo A, Iacono P, Falcomatà B, Bandello F. Central serous chorioretinopathy: Treatment with laser. Pharmaceuticals (Basel) 2020;13:359.
13. Romaní F, Atencia F, Cuadra J, Canelo C. Systemic lupus erythematosus in a male patient: Presentation of a case. An Fac Med 2008;69:37-41.
14. Yao Y, Wang HX, Liu LW, Ding YL, Sheng JE, Deng XH, *et al.* Acute choroidal involvement in lupus nephritis: A case report and review of literature. World J Clin Cases 2022;10:6520-8.
15. Han YS, min Yang C, Lee SH, Shin JH, Moon SW, Kang JH. Secondary angle closure glaucoma by lupus choroidopathy as an initial presentation of systemic lupus erythematosus: A case report. BMC Ophthalmol 2015;15:148.
16. Hannouche D, Korobelnik JF, Cochereau I, Hayem G, Beaudreuil J, Meyer O, *et al.* Systemic lupus erythematosus with choroidopathy and serous retinal detachment. Int Ophthalmol 1995;19:125-7.
17. Rezkallah A, Kodjikian L, Abukhashabah A, Denis P, Mathis T. Hypertensive choroidopathy: Multimodal imaging and the contribution of wide-field swept-source oct-angiography. Am J Ophthalmol Case Rep 2019;13:131-5.
18. Shoughy SS, Tabbara KF. Ocular findings in systemic lupus erythematosus. Saudi J Ophthalmol 2016;30:117-21.
19. Dammacco R. Systemic lupus erythematosus and ocular involvement: An overview. Clin Exp Med 2018;18:135-49.
20. Matsuo T, Nakayama T, Koyama T, Matsuo N. Multifocal pigment epithelial damages with serous retinal detachment in systemic lupus erythematosus. Ophthalmologica 1987;195:97-102.
21. Polito MS, Machetta F, Fea AM, Eandi CM. Hypertensive choroidopathy in atypical hemolytic-uremic syndrome. Eur J Ophthalmol 2021;31:NP63-6.
22. Gharbiya M, Bozzoni-Pantaleoni F, Augello F, Balacco-Gabrieli C. Indocyanine green angiographic findings in systemic lupus erythematosus choroidopathy. Am J Ophthalmol 2002;134:286-90.
23. Shimura M, Tatehana Y, Yasuda K, Saito Si, Sasaki T, Tamai M. Choroiditis in systemic lupus erythematosus: Systemic steroid therapy and focal laser treatment. Jpn J Ophthalmol 2003;47:312-5.
24. Schmidt-Erfurth U, Laqua H, Schlötzer-Schrehard U, Viestenz A, Naumann GO. Histopathological changes following photodynamic therapy in human eyes. Arch Ophthalmol 2002;120:835-44.
25. Schlötzer-Schrehardt U, Viestenz A, Naumann GO, Laqua H, Michels S, Schmidt-Erfurth U. Dose-related structural effects of photodynamic therapy on choroidal and retinal structures of human eyes. Graefes Arch Clin Exp Ophthalmol 2002;240:748-57.
26. Chan WM, Lai TY, Lai RY, Liu DT, Lam DS. Half-dose verteporfin photodynamic therapy for acute central serous chorioretinopathy: One-year results of a randomized controlled trial. Ophthalmology 2008;115:1756-65.