BMC Ophthalmology

CASE REPORT Open Access

Different clinical presentations of persistent placoid maculopathy: a case series

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Abstract

Background Persistent placoid maculopathy is a rare clinical entity defined as idiopathic bilateral chorioretinopathy. We report four different clinical presentations of this pathology.

Case presentation Case 1: A 63-year-old man presented with a persistent bilateral central scotoma. Persistent placoid maculopathy was diagnosed based on ophthalmological manifestations and multimodal imaging. A history of scalp tenderness and jaw claudication a week before visual symptoms was reported associated with increased C-reactive protein. A temporal artery biopsy confirmed the diagnosis of giant cell arteritis. Despite corticosteroid treatment, complete macular chorioretinal atrophy followed. Case 2: A 65-year-old woman was referred for bilateral blurred vision for one month. Visual acuity was 20/20 in both eyes and multimodal imaging confirmed the diagnosis of persistent placoid maculopathy. The patient was lost to follow-up due to the COVID-19 pandemic and presented one year later with decreased vision in the left eye of 20/200. Type 2 choroidal neovascularization was observed and treated with sub-tenon triamcinolone injection followed by intravitreal injection of Aflibercept allowing an improvement in visual acuity. Case 3: A 61-year-old man presented with sudden loss of vision in his right eye. A large submacular hemorrhage was observed on the right eye and hypopigmented white/yellowish plaque-like macular lesions on the other eye. Surgery with pneumatic displacement and intravitreal injection of Aflibercept was performed. No improvement in visual acuity was observed. Five months later, the contralateral eye was complicated by choroidal neovascularization and required intravitreal injections. Case 4: A 49-year-old man receiving immunosuppressive therapy after liver transplant was referred for bilateral decreased vision. The diagnosis of persistent placoid maculopathy was made, and corticosteroid treatment was initiated. After three months, chorioretinal lesions decreased and vision recovered.

Conclusions We report the first case series of clinical presentations of persistent placoid maculopathy, which expand upon the reported ocular manifestations of this condition.

Keywords Persistent placoid maculopathy, Giant cell arteritis, Retinal diseases, Middle aged, Choroidal neovascularization

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Background

Persistent placoid maculopathy (PPM) was described for the first time by Golchet et al. in 2006 and is defined as idiopathic bilateral chorioretinopathy [1]. This rare clinical entity, with less than 50 reported cases, mostly affects Caucasian men between the ages of 60 and 70. Patients complain of a severe and rapidly progressive bilateral decrease in visual acuity, photopsia, or scotoma with a possible history of flu-like symptoms [2]. Diagnosis is based on clinical examination associated with multimodal imaging revealing outer retinal and retinal pigment epithelium (RPE) alterations [3]. The pathophysiology of PPM is not clear. Still, choroidal hypoperfusion demonstrated by fluorescein angiography (FA) and indocyanine green angiography (ICGA) could be secondary to an inflammatory process [4]. Macular lesions may persist after several months or years but slowly heal spontaneously. Macular atrophy and choroidal neovascularization are frequent complications limiting visual acuity recovery [5]. In the present series, we report four different clinical presentations of PPM.

Case presentation

Case 1

A 63-year-old Caucasian man with no medical history was referred to the ophthalmic emergency department because of persistent bilateral central scotoma over 1 month. At the onset of ocular symptoms, the patient presented to an eye clinic and was diagnosed with acute posterior multifocal placoid pigment epitheliopathy after a negative general work-up (including tuberculosis and syphilis test). He also complained of scalp tenderness and jaw claudication a week before visual symptoms. On examination, best corrected visual acuity (BCVA) was 20/250 in the right eye and 20/200 in the left eye. Slit-lamp examination and intraocular pressure were normal. Dilated fundus examination revealed hypopigmented white/yellowish plaque-like macular lesions in both eyes with a mottled hyperautofluorescence appearance (Fig. 1, E, N). Spectral-domain optical coherence tomography (SD-OCT) showed disruption of the ellipsoid line associated with hyperreflective dots in the outer retinal layer and RPE alterations (Fig. 1, F, O). FA showed a hypofluorescence on the early phase, and a progressive staining (Fig. 1, A, B, H, I). On ICGA, hypofluorescence was observed throughout the entire sequence (Fig. 1, C, D, L, M). Some lesions were seen outside the vascular arcades on FA. Given general symptoms and the increase of C-reactive protein (10 mg/L, normal < 5 mg/dL), a temporal artery biopsy was performed and found to be positive. Diagnosis of PPM associated with giant cell arteritis (GCA) was made. A neuroimaging investigation was also carried out which showed no abnormalities. The patient was treated with daily 500 mg IV methylprednisolone for 3 days followed by 1 mg/kg/day of oral prednisone. In one week, the patient gained 1 line in the right eye and 2 lines in the left eye with no change on SD-OCT. At the last follow-up, eighteen months after the initial presentation and a gradual reduction of prednisone over 1 year, SD-OCT showed a complete macular chorioretinal atrophy (Fig. 1, G, P). Visual acuity was 20/63 and 20/40 in the right and the left eye respectively.

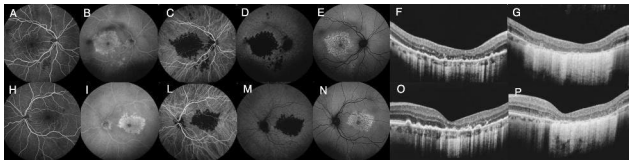

Fig. 1 Multimodal imaging of case 1: Fluorescein angiography showed an area of hypofluorescence in the early phase (**A**, **H**) and progressive staining (**B**, **I**). Indocyanine green angiography showed an area of hypofluorescence throughout the entire sequence (**C**, **D**, **L**, **M**). Fundus autofluorescence showed plaque-like macular lesions in both eyes with a mottled appearance (**E**, **N**). SD-OCT at baseline showed a disruption of the ellipsoid line associated with hyperreflective dots in the outer retinal layer and retinal pigment epithelium alterations (**F**, **O**). At eighteen months a complete macular chorioretinal atrophy was present (**G**, **P**)

Case 2

A 65-year-old Caucasian woman presented with painless bilateral blurred vision for one month. She had a history of depressive syndrome treated with tricyclic antidepressants. At presentation, BCVA was 20/20 in both eyes. The anterior segment and vitreous were normal. Fundus examination showed hypopigmented white/yellowish plaque-like macular lesions in both eyes (Fig. 2, E, F). Fundus autofluorescence revealed hyper and hypoautofluorescence spots corresponding to focal disruption of ellipsoid line and RPE alteration on SD-OCT (Fig. 2, A, B, I, L). On FA, lesions appeared hypofluorescent in the early phase and stained progressively. On ICGA, hypofluorescence was observed throughout the entire sequence (Fig. 2, C, D, G, H). Infectious etiologies were ruled out by extensive blood tests (Human Immunodeficiency Virus, Hepatitis B, Hepatitis C, syphilis, tuberculosis, rickettsia, leptospirosis, brucellosis, Lyme disease, dengue, chikungunya, coxsackie). Neuroimaging investigations were carried out and revealed no abnormality. Due to the COVID-19 pandemic, the patient's follow-up was interrupted, and no treatment was carried out. One year later, she presented to the ophthalmic emergency department with severe vision loss in the left eye which was 20/200. SD-OCT revealed intraretinal cysts with subretinal fluid and irregular pigment epithelium detachment (Fig. 2, N). Optical coherence tomography angiography (OCTA) detected choroidal neovascularization, which was treated with sub-Tenon's triamcinolone injection followed by three intravitreal injections of Aflibercept

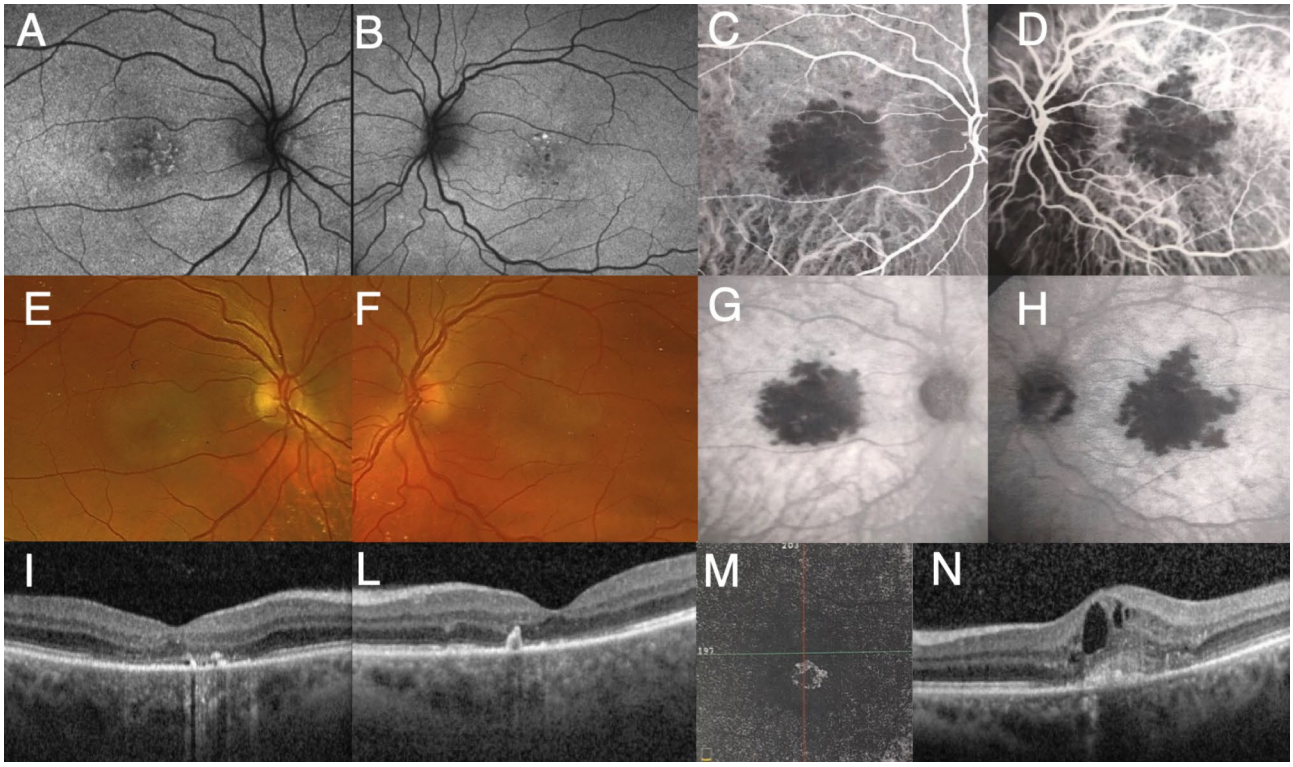

Fig. 2 Multimodal imaging of case 2: Fundus retinography showed hypopigmented white/yellowish plaque-like macular lesions in both eyes (**E**, **F**). Fundus autofluorescence showed hyper and hypoautofluorescent spots corresponding to focal disruption of ellipsoid line and retinal pigment epithelium alteration on OCT scan (**A**, **B**, **I**, **L**). Fluorescein angiography revealed a hypofluorescent lesion in the early phase that progressively stained. Indocyanine green angiography showed a hypofluorescent lesion throughout the entire sequence (**C**, **D**, **G**, **H**). At one year follow-up, SD-OCT revealed intraretinal cysts with subretinal fluid and irregular pigment epithelium detachment in the right eye (**N**). Optical coherence tomography angiography showed the presence of choroidal neovascularization (**M**)

(Fig. 2, M). After one year of regular intravitreal treatment, visual acuity in the left eye was 20/25.

Case 3

A 61-year-old Caucasian man presented to the eye emergency department reporting a sudden vision loss in his right eye for three days. He had a history of diabetes with insulin treatment and treated hypothyroidism. The first examination revealed a BCVA at counting fingers in the right eye and 20/20 in the left eye. Dilated fundus examination showed a large submacular hemorrhage in the right eye and hypopigmented white/yellowish plaque-like macular lesions in the left eye (Fig. 3, A, B, E, C). A subretinal pneumatic displacement was performed with pars plana vitrectomy, subretinal tissue plasminogen activator, and gas tamponade. An intravitreal injection of Aflibercept was performed at the end of the surgery. General work-up (including tuberculosis and syphilis test) was negative. The visual acuity remained unchanged. Five months later, the patient presented with vision loss in his left eye. SD-OCT showed subretinal fluid and pigmentary epithelium detachment (Fig. 3, D). FA showed a dye leakage in the area of subretinal fluid. ICGA showed an irregular hypofluorescent macular lesion with a localized hyperfluorescence (Fig. 3, F, G). Choroidal neovascularization was diagnosed and monthly intravitreal injections of Aflibercept were initiated and subsequently switched with Ranibizumab. A regression of exudative signs with subretinal fluid and pigmentary epithelium detachment reduction was observed on SD-OCT scans (Fig. 3, H). At 2 years, the BCVA was at light perception in the right eye and 20/20 in the left eye.

Case 4

A 49-year-old Caucasian man was referred for bilateral decreased vision for 2 months. His medical history included Factor V Leyden mutation, arterial hypertension, and liver transplantation 3 years before and he was under immunosuppressive therapy with Tacrolimus and Everolimus. At the time of presentation, BCVAs were 20/63 in the right eye and 20/25 in the left eye. Fundus examination revealed yellowish plaque-like lesions involving the macula in both eyes (Fig. 4, A, D). On FA, lesions were hypofluorescent and partially filled in in the late phase. ICGA showed hypofluorescence of the lesions, which persisted in the late phases in both eyes (Fig. 4, B, C, E, F). SD-OCT showed a disrupted ellipsoid line (Fig. 4, G, I). OCTA revealed a reduction in the

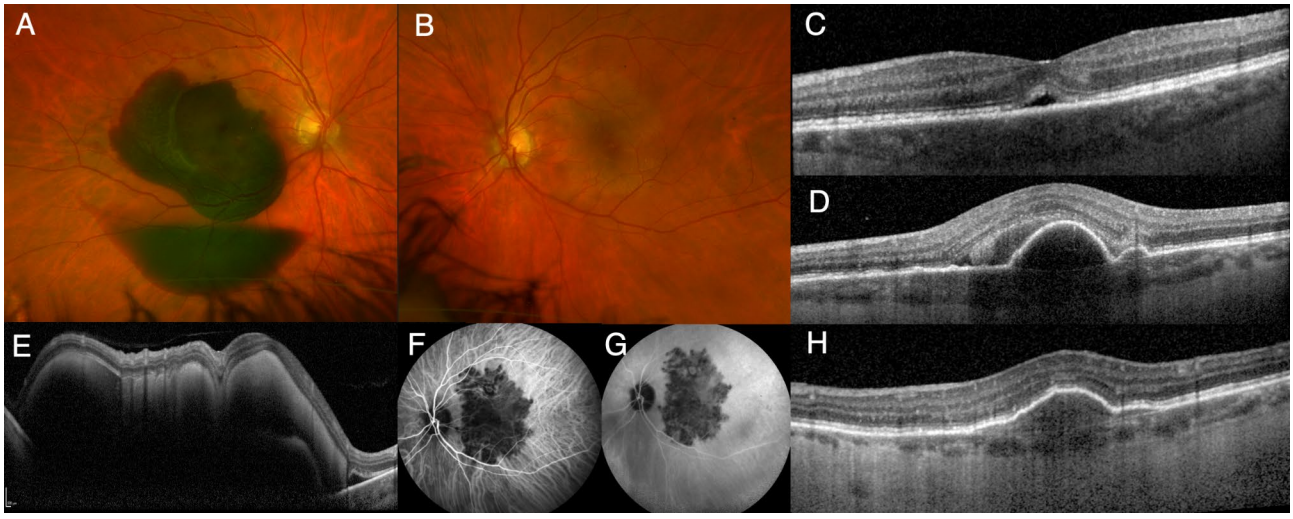

Fig. 3 Multimodal imaging of case 3: Fundus photography showed a large submacular hemorrhage in the right eye and hypopigmented white/yellowish plaque-like macular lesions in the left eye (**A**, **B**). SD-OCT showed a submacular hemorrhage in the right eye and a small subretinal fluid in the left eye (**E**, **C**). At five months follow-up, SD-OCT showed subretinal fluid and pigmentary epithelium detachment in the left eye (**D**). Indocyanine green angiography revealed an irregular hypofluorescent macular lesion with a localized hyperfluorescence (**F**, **G**). After three monthly intravitreal injections of Aflibercept and two of Ranibizumab, a regression of exudative signs with subretinal fluid and pigmentary epithelium detachment reduction was observed on SD-OCT scans (**H**)

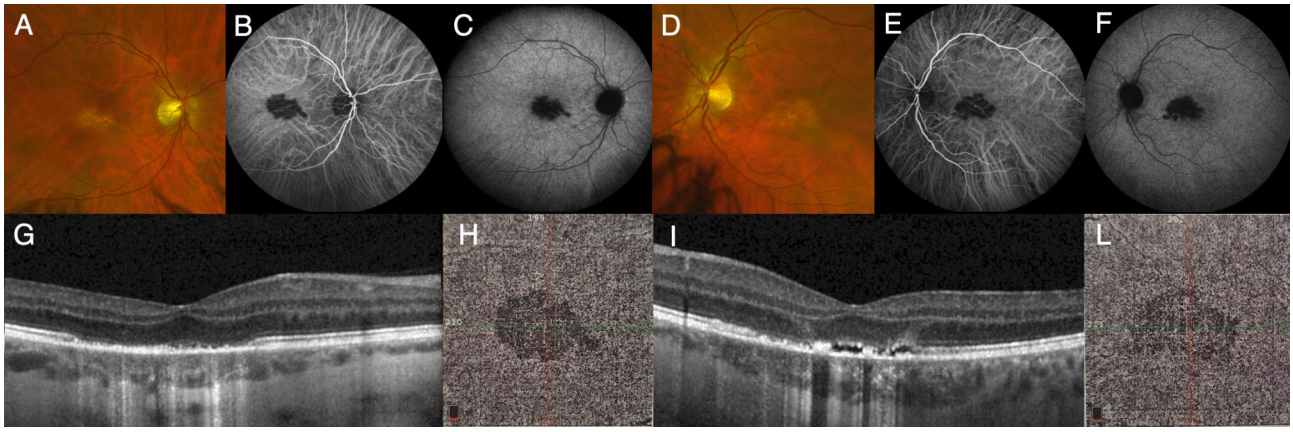

Fig. 4 Multimodal imaging of case 4: Fundus photography revealed yellowish plaque-like lesions involving the macula in both eyes (**A**, **D**). Indocyanine green angiography showed hypofluorescent lesions, in the early and late phases in both eyes (**B**, **C**, **E**, **F**). SD-OCT showed a disrupted ellipsoid line in both eyes (**G**, **I**). Optical coherence tomography angiography revealed a reduction in choriocapillaris flow signal corresponding to hypofluorescent areas on indocyanine green angiography (**H**, **L**)

choriocapillaris flow signal corresponding to hypofluorescent areas on FA and ICG. Superficial retinal vasculature and deep retinal vasculature were normal (Fig. 4, H, L). Infectious etiologies (Hepatitis B, Hepatitis C, syphilis, tuberculosis, Lyme disease) were ruled out by extensive blood tests and the patient was treated with a sub-tenon's triamcinolone injection in both eyes. Because of the progression of macular lesions after one month, 500 mg IV methylprednisolone was introduced for 3 days followed by 1 mg/kg/day of oral prednisone. At 4 months, BCVAs were 20/25 on both eyes and macular lesions were reduced in size. SD-OCT showed ellipsoid line recovery (Fig. 5, C, F). On ICGA, hypofluorescence of the lesions in the late phases disappeared in both eyes (Fig. 5, A, B, D, E). Gradual reduction of corticosteroid was made over 6 months with no recurrence.

Discussion and conclusions

PPM is a recently described rare disease mainly affecting middle-aged Caucasian men [1]. Fundus examination shows typical hypopigmented white/yellowish plaque-like macular lesions in both eyes and multimodal imaging reveals outer retinal and RPE alteration [3, 4]. Despite the slow and spontaneous healing of lesions, the prognosis of PPM remains unfavorable due to frequent complications, including macular atrophy and choroidal

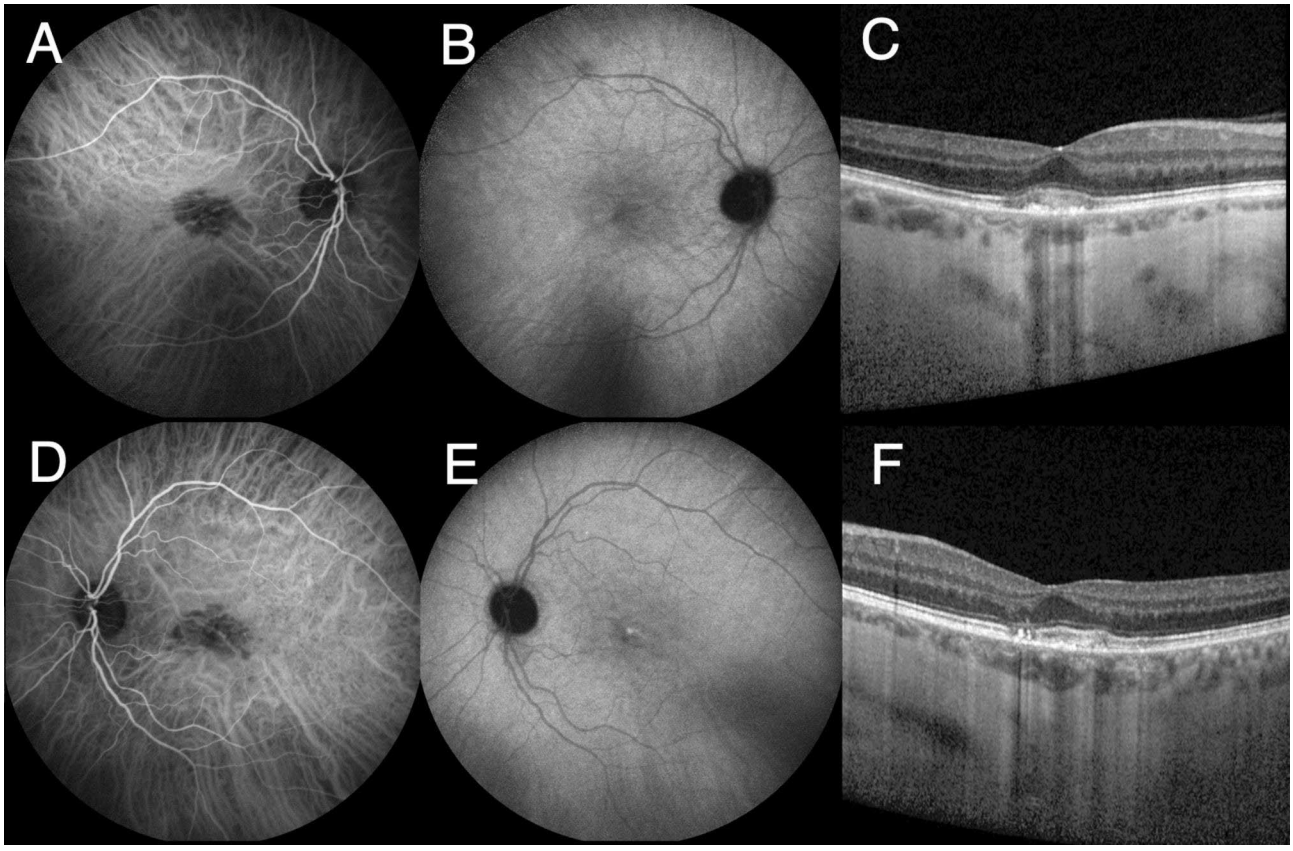

Fig. 5 Multimodal imaging of case 4 at 4 months follow-up: SD-OCT showed ellipsoid line recovery (**C**, **F**). Indocyanine green angiography showed the disappearance of the hypofluorescence of the lesions in the late phases in both eyes (**A**, **B**, **D**, **E**)

neovascularization, which significantly impair visual acuity recovery [5].

Suspected to be secondary to an inflammatory process, PPM could be due to vasculitis. A distinct hypo signal on OCTA, combined with early hypofluorescence on ICGA, was interpreted as focal hypoperfusion of the choriocapillaris [6, 7]. This would cause RPE and outer retinal ischemia leading to photoreceptor dysfunction and atrophy. Persistent hypofluorescent lesions observed on ICGA in our four cases could be explained by two mechanisms: choroidal hypoperfusion and masking effect due to inflammatory lesions [3]. Li et al. recently suggested a blocking mechanism based on symptomatology and the existence of lesions in sub-RPE [8]. Our cases 2 and 4 seem to contradict this hypothesis. Few lesions in sub-RPE were seen on OCT despite the extensive hypofluorescent macular lesions visible on ICGA (Figs. 2 and 4). Additionally, the exact overlap of choroidal flow alterations on OCTA argues in favor of the choroidal hypoperfusion mechanism. The absence of marked visual loss and severe RPE and outer retinal atrophy in the early stage of the disease would be explained by good RPE tolerance to ischemia [9]. Finally, the individual spots, when resolvable, are similar in size to macular choriocapillaris lobules, which also fit well with an ischemic mechanism. PPM may therefore be, like acute macular neuroretinopathy and acute multifocal placoid pigmented epitheliopathy, another disorder initially attributed exclusively to inflammation and later found to have clear associations with extraocular vascular disease [10].

This disease may manifest with various ocular symptoms and clinical presentations. Kolomeyer et al. reported that 79% of patients had ocular symptoms at presentation such as blurred or decreased vision, and 24% of patients presented with a prodrome such as a flu-like illness [2]. These ocular symptoms may appear suddenly or gradually but are rarely described as a sudden loss of vision. In the third case of the present series, PPM presented with sudden and total vision loss related to the presence of submacular hemorrhage. This is the second case report in the literature associating submacular hemorrhage and PPM. Golchet et al. previously mentioned one case of submacular surgery to remove a choroidal neovascular membrane and pneumatic subretinal displacement of hemorrhage [1]. Unlike submacular hemorrhage, which was exceptionally described, choroidal neovascularization (CNV) is frequently associated with PPM. Gaston et al. reported that more than one-third of cases presented

CNV and Kolomeyer et al. reported more than half [2, 5]. Two of our four cases (cases 2 and 3) developed CNV. In case 3, the presence of sub-macular hemorrhage in the right eye and a large eccentric fibrovascular pigment epithelial detachment in the left eye may represent the sequelae of a polypoidal vasculopathy which therefore cannot be ruled out. Case 1 presented the second most frequent complication of PPM which is progressive macular atrophy (reported in 25 to 50% of patients with PPM) [2, 5]. The extent of involvement varied between cases, as illustrated by case 4, which exhibited a smaller affected area compared to most reported cases. Only one of our four cases, treated with corticosteroid, showed improvement in lesions and visual acuity recovery (case 4).

Several systemic vascular comorbidities and proinflammatory auto-immune diseases were described in association with PPM [2]. The patient of case 1 presenting with GCA raises the question of the idiopathic nature of PPM. Olali et al. and Ness et al. first reported PPM-like lesions revealing biopsy-proven GCA in a 65-year-old woman and a 64-year-old man [11, 12]. Recently, Starr et al. described two cases of PPM associated with GCA. In particular a 74-year-old man and a 85-year-old woman presenting typical lesions, respectively, 6 and 8 years after biopsy-proven GCA diagnosis [12]. Our case was the fifth described case of PPM confirmed on multimodal imaging revealing GCA. Despite the use of corticosteroids, long-term follow-up (more than a year after the onset of symptoms) of the three cases in the context of GCA, showed a progressive macular atrophy with a decrease in BCVA [11, 12]. The two other cases associated with GCA showed an improvement in BCVA after the initiation of corticosteroids, but no information was mentioned on the long-term evolution [13]. These cases of PPM associated with GCA could call into question the idiopathic nature of the pathology as it was initially defined [1]. GCA is known to cause various ocular manifestations, such as anterior ischemic optic neuropathy or central retinal artery occlusion [14]. Typical angiographic findings in GCA-related ocular involvement include generalized or sectorial choroidal ischemia [15]. In these five cases of PPM associated with GCA, ICGA reveals partial preservation of large choroidal vessels. In 1990, Hayreh described "watershed zones" in the choroidal circulation—regions at the perfusion borders of posterior ciliary arteries, making them prone to ischemia [16]. The submacular region lies within the watershed zone of the temporal short posterior ciliary arteries. Partial occlusion of the posterior ciliary arteries and their branches may cause hypoperfusion of the subfoveal choriocapillaris, leading to ischemic lesions, choroidal infarction, and subsequent chorioretinal degenerative changes [17]. Pellegrini et al. reported a macular and peripapillary choroidal vascularity index reduction in patients with arteritic anterior ischemic optic neuropathy [18]. It can be assumed that these macular choroidal vascular dysfunctions in GCA could induce PPM lesions.

There are several limitations in our study, such as the absence of ICGA at presentation for case 3, in which the large macular hematoma would have limited the interpretation of angiography. Moreover, the rarity of the disease did not allow us to gather more cases with satisfactory multimodal imaging.

The present case series shows the various clinical presentations of PPM and reports for the first time two significant findings that could be associated with this clinical entity. Firstly, the possible sudden loss of vision related to submacular hemorrhage resulted in emergency surgery with pneumatic displacement. Furthermore, the possibility of association with GCA must be excluded in any case of PPM as it can lead to irreversible vision loss and systemic vascular sequelae. Multimodal imaging provides valuable insights into the pathophysiology of PPM, highlighting the complex interplay between inflammatory and vascular processes within the retina and choroid.

Abbreviations

BCVA	Best corrected visual acuity
CNV	Choroidal neovascularization
FA	Fluorescein angiography
GCA	Giant cell arteritis
ICGA	Indocyanine green angiography
OCTA	Optical coherence tomography angiography
PPM	Persistent placoid maculopathy
RPE	Retinal pigment epithelium
SD-OCT	Spectral domain optical coherence tomography

Acknowledgements
Not applicable.

Author contributions
MA was the major contributor in data collection and writing of the manuscript. FB, JV, SM and AB were major contributors in the conception of the work, data collection, interpretation and critical review. EB, PRR, DM, ACD and LC were major contributors in data collection and reviewing the article. All authors read and approved the final manuscript.

Funding
The authors declare that they have received no funding.

Data availability
Not applicable.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Written informed consent was obtained from every patient for publication of the clinical details and related images.

Competing interests
The authors declare no competing interests.

Received: 12 May 2023 / Accepted: 25 March 2025
Published online: 06 May 2025

References

1. Golchet PR, Jampol LM, Wilson D, Yannuzzi LA, Ober M, Stroh E. Persistent placoid maculopathy. Ophthalmology. 2007;114(8):1530–40.
2. Kolomeyer AM, Brucker AJ. Persistent placoid maculopathy: A systematic review. Retina. 2018;38(10):1881–95.
3. Gendy MG, Fawzi AA, Wendel RT, Pieramici DJ, Miller JA, Jampol LM. Multimodal imaging in persistent placoid maculopathy. JAMA Ophthalmol. 2014;132(1):38.
4. Nika M, Kalyani PS, Jayasundera KT, Comer GM. Pathogenesis of persistent placoid maculopathy: A multimodal imaging analysis. Retina. 2015;35(8):1531–9.
5. Gascon P, Matonti F, Beylerian M, et al. Persistent placoid maculopathy: prognosis factors and functional outcomes. Ocul Immunol Inflamm. 2020;28(7):1136–48.
6. Puche N, Hera R, Terrada C, Souied EH. Persistent placoid maculopathy imaged by optical coherence tomography angiography. Retin Cases Brief Rep. 2016;10(4):297–301.
7. Sassalos TM, Saraf SS, Ober MD. Chorioretinal perfusion in persistent placoid maculopathy. Ophthalmic Surg Lasers Imaging Retina. 2017;48(12):1026–31.
8. Li M, Zhang X, Wen F, Ji Y, Mi L. Persistent placoid maculopathy: Lichen-like lesions growing between retinal pigment epithelium and Bruch's membrane. Ophthalmol Retina. 2024;8(3):270–8.
9. Spolaore R, Gaudric A, Coscas G, de Margerie J. Acute sectorial choroidal ischemia. Am J Ophthalmol. 1984;98(6):707–16.
10. Pichi F, Aggarwal K, Neri P, et al. Choroidal biomarkers. Indian J Ophthalmol. 2018;66(12):1716–26.
11. Olali C, Aggarwal S, Ahmed S, Gupta M. Giant cell arteritis presenting as macular choroidal ischemia. Eye. 2011;25(1):121–3.
12. Ness SD, Butler NJ, Poulaki V. Bilateral macular choroidal infarction as a manifestation of giant cell arteritis. Ophthalmic Surg Lasers Imaging Retina. 2018;49(7):540–3.
13. Starr MR, Fairbanks AM, Geraets R, Chen J, Pulido JS. Persistent placoid maculopathy-like findings in patients with giant cell arteritis. Retin Cases Brief Rep. 2021;15(6):682–7.
14. Hayreh SS, Podhajsky PA, Zimmerman B. Ocular manifestations of giant cell arteritis. Am J Ophthalmol. 1998;125(4):509–20.
15. Siatkowski RM, Gass JD, Glaser JS, Smith JL, Schatz NJ, Schiffman J. Fluorescein angiography in the diagnosis of giant cell arteritis. Am J Ophthalmol. 1993;115(1):57–63.
16. Hayreh SS. In vivo choroidal circulation and its watershed zones. Eye. 1990;4(2):273–89.
17. De Smit E, O'Sullivan E, Mackey DA, Hewitt AW. Giant cell arteritis: ophthalmic manifestations of a systemic disease. Graefes Arch Clin Exp Ophthalmol. 2016;254(12):2291–306.
18. Pellegrini M, Giannaccare G, Bernabei F, Moscardelli F, Schiavi C, Campos EC. Choroidal vascular changes in arteritic and nonarteritic anterior ischemic optic neuropathy. Am J Ophthalmol. 2019;205:43–9.

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