

CASE REPORT

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Unilateral Purtscher-like retinopathy in a soldier patient with prolonged military exertion: A case report

Aseel AlKandari, Jumana AlRabiah, Lulwa AlMatooq, Alaa AlAli

ABSTRACT

Introduction: Purtscher-like retinopathy is a rare occlusive microvasculopathy that resembles Purtscher retinopathy but occurs without direct trauma. Although it is classically associated with systemic conditions such as pancreatitis, renal failure, and autoimmune disease, exertional and compressive triggers may also be implicated.

Case Report: We report a case of unilateral Purtscher-like retinopathy in a healthy soldier in his early 20s who developed sudden, painless decreased vision in the left eye following prolonged military exertion while carrying a heavy weapon over the left chest. Examination revealed optic disc hyperemia, Purtscher flecken, cotton wool spots, and a pseudo-cherry-red spot. Optical coherence tomography demonstrated inner retinal thickening and hyperreflectivity suggestive of inner retinal ischemic involvement. Systemic evaluation was unremarkable, and fluorescein angiography was not performed. The patient was managed conservatively, with near-complete anatomical resolution and improvement of visual acuity from 20/60 to 20/25 at two months.

Conclusion: Purtscher-like retinopathy should be considered in young patients presenting with acute visual symptoms after strenuous exertion or sustained thoracic compression. Conservative management with close follow-up may be appropriate in selected cases without systemic disease or severe macular involvement.

Keywords: Military exertion, Purtscher-like retinopathy, Thoracic compression

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INTRODUCTION

Purtscher retinopathy is a rare disease entity defined as an occlusive microvasculopathy associated with trauma [1]. First described in 1910 by Othmar Purtscher, the incidence of Purtscher and Purtscher-like retinopathy is estimated to be 0.24 cases per million per year [1, 2]. Purtscher retinopathy generally occurs after trauma, specifically cranial trauma and trauma associated with thoracic compression [1–3]. Purtscher-like retinopathy is a term used to describe a heterogeneous group of diseases that present similarly to Purtscher retinopathy but are not linked to trauma [1, 3]. Some common associated factors include pancreatitis, renal failure, and autoimmune diseases [1, 4].

Purtscher and Purtscher-like retinopathies usually occur hours to days after the associated factor, with the diagnosis being primarily based on clinical findings [1, 4]. Sudden vision loss of variable severity, cotton wool spots, and intraretinal hemorrhages are among the most common clinical manifestations [1]. The pathognomonic clinical finding is the presence of Purtscher flecken, which are reported in approximately 53% of cases [4]. Purtscher flecken are described as areas of retinal whitening surrounded by a clear, unaffected zone of approximately 50 microns adjacent to the retinal vessels [1, 2]. To date, the exact pathogenesis of Purtscher retinopathy is not

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fully understood. Among the most acceptable theories is microangiopathy secondary to precapillary occlusion, or fat emboli [1]. In addition, another postulated theory involves complement activation and leukocyte aggregation, leading to leukoembolization of capillaries and arterioles with resultant ischemia [1, 4].

Here, we report a case of unilateral Purtscher-like retinopathy in a previously healthy young soldier following prolonged military exertion and sustained weapon-related pressure over the left side of the chest. This case draws attention to strenuous exertion as a potential precipitating factor for Purtscher-like retinopathy in the absence of other identified systemic associations.

CASE REPORT

A previously healthy soldier in his early 20s presented with sudden-onset, painless decreased vision in his left eye several hours after a strenuous military exercise that required standing for 10 hours while carrying a heavy weapon over the left side of his chest. He denied flashes, floaters, trauma, previous similar episodes, and prior ocular history. Upon examination, best-corrected visual acuity was 20/20 in the right eye and 20/60 in the left eye. Adnexal examination was normal, and anterior segment examination was unremarkable, with no relative afferent pupillary defect and normal intraocular pressure measurements.

Fundus examination of the left eye showed mild optic disc hyperemia with multiple peripapillary and perimacular large, white, indistinct polygonal lesions resembling Purtscher flecken, along with multiple cotton wool spots and a pseudo-cherry-red spot in the foveal region. The right eye fundus examination was unremarkable (Figure 1). Optical coherence tomography (OCT) of the left eye showed thickening and increased reflectivity of the inner retina, which were suggestive of ischemia in the inner retina (Figure 2). Systemic blood and imaging workup was unremarkable, and fluorescein angiography was not performed. Overall, the findings were most consistent with unilateral Purtscher-like retinopathy following prolonged exertion and left-sided thoracic compression.

A conservative approach was undertaken, with the patient kept under close observation and advised to strictly avoid lifting heavy weapons. Two months later at follow-up, visual acuity improved from 20/60 to 20/25 in the affected eye. Complete resolution of the peripapillary and perimacular white lesions, the cotton wool spots, and the pseudo-cherry-red spot was noted on fundus examination. Additionally, the previously observed optic disc hyperemia had resolved, leaving a few residual post-ischemic retinal scars in the regions that were involved during the acute phase (Figure 3). A repeat OCT of the left eye at follow-up displayed clear improvement, with mild residual temporal retinal thinning consistent with post-ischemic change (Figure 4).

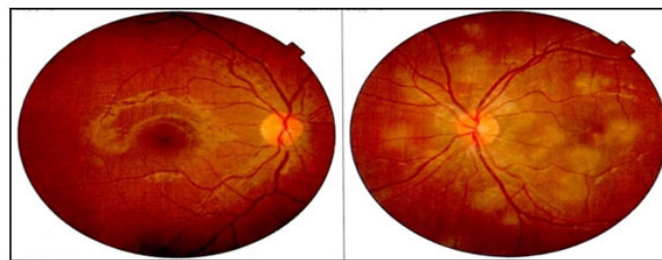


Figure 1: Initial fundus examination of the left eye showing mild optic disc hyperemia, multiple peripapillary and perimacular large white indistinct polygonal lesions resembling Purtscher flecken, multiple cotton wool spots, and a pseudo-cherry-red spot in the foveal region. The right eye fundus examination was unremarkable.

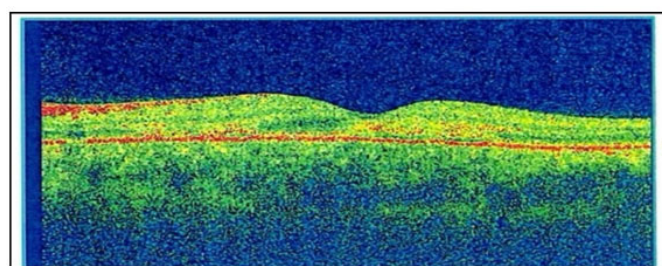


Figure 2: Initial optical coherence tomography of the left eye demonstrating inner retinal thickening and hyperreflectivity, findings suggestive of inner retinal ischemic involvement.

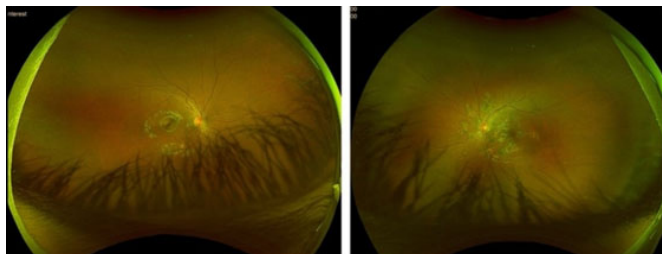


Figure 3: After two months of follow-up, Optos wide-field fundus photograph demonstrating complete resolution of the previously noted peripapillary and perimacular white lesions, cotton-wool spots, and pseudo-cherry-red spot. Optic disc hyperemia had also settled, with a few residual post-ischemic retinal scars marking the areas affected during the acute phase. The right eye fundus examination was unremarkable.

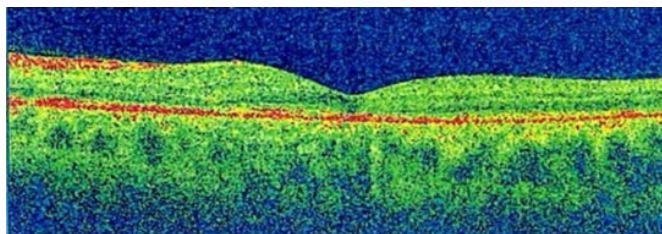


Figure 4: After two months of follow-up, optical coherence tomography of the left eye showing mild residual temporal retinal thinning consistent with post-ischemic change.

DISCUSSION

Purtscher and Purtscher-like retinopathies are rare clinical entities, with limited data available in the literature. According to a comprehensive systematic review by Miguel et al., the most clinically evident signs seen in the acute phase include the presence of cotton wool spots (93%), retinal hemorrhages (65%), and Purtscher flecken (63%) [1]. Less frequently reported signs include macular edema, optic disc swelling, and a pseudo-cherry-red spot. Clinical findings after two months of follow-up include optic atrophy (64%), retinal normalization (40%), mottling of retinal pigment epithelium (RPE) (23%), retinal thinning (14%), and narrowing of retinal arteries (4%) [1]. In our case, we observed the most common clinical signs in the acute phase including cotton wool spots and Purtscher flecken, followed by residual post-ischemic retinal changes in the late phase, consistent with the patterns described in the literature [1]. Regarding laterality, the 2024 systematic review by Serhan et al. found bilateral involvement to be more frequently reported than unilateral disease [4]. The isolated involvement of the left eye in our patient therefore represents a less commonly reported presentation. Optical coherence tomography findings in Purtscher-like retinopathy typically show inner retinal edema or hyperreflectivity at presentation, with gradual normalization and possible macular thinning over subsequent months [1, 2]. Our patient demonstrated this characteristic pattern, with initial retinal thickening and hyperreflectivity that resolved over time, leaving mild retinal atrophy at follow-up.

Purtscher-like retinopathy has been reported in association with a wide range of systemic conditions. Cases occurring in systemic sclerosis, pre-eclampsia, and acute pancreatitis illustrate the heterogeneity of the clinical settings in which this retinal microangiopathy may develop [5–7]. Exertional and Valsalva-related mechanisms have also been mentioned in literature, including cases associated with heavy weightlifting [8]. One similar study is by Kocak et al., who described unilateral Purtscher-like retinopathy after vigorous weightlifting, attributed to sudden Valsalva-induced increase in intrathoracic pressure [8]. Regarding our case, the symptoms occurred several hours after completing a 10-hour period of continuous military exertion while carrying a heavy weapon with sustained pressure over the left hemithorax. This proposes a temporal association between sustained exertion, increase in intrathoracic pressure, and the development of Purtscher-like retinal findings. The pathophysiological mechanism is still unclear. However, complement activation, leukocyte aggregation, endothelial injury, microembolization, and precapillary arteriolar occlusion are among the proposed mechanisms [1, 4]. Histopathological evidence supporting these proposed mechanisms remains limited. In our patient, fluorescein angiography was not performed; therefore, additional information regarding

retinal vascular involvement, such as areas of capillary non-perfusion or vascular leakage, was unavailable.

The differential diagnosis in this patient included retinal artery occlusion, Valsalva retinopathy, and serpiginous-like choroiditis. Retinal artery occlusion was considered less likely given the presence of Purtscher flecken and cotton-wool spots, together with the absence of embolic risk factors. Serpiginous-like choroiditis was also considered, but the OCT changes predominantly involved the inner retina. Valsalva retinopathy was particularly relevant given the history of strenuous exertion. However, Valsalva retinopathy typically presents with pre-retinal, subhyaloid, or sub-internal limiting membrane hemorrhage [9], none of which were present in our patient. In contrast, the presence of Purtscher flecken, cotton-wool spots, and OCT evidence of inner retinal ischemic involvement favored Purtscher-like retinopathy. Systemic assessment did not identify pancreatitis, renal disease, or autoimmune disease.

Visual prognosis in Purtscher-like retinopathy remains variable and incompletely understood. Although individual reports have described differing degrees of visual impairment across associated conditions, such observations are insufficient to establish a direct relationship between the underlying systemic condition and visual prognosis. In the 2024 systematic review by Serhan et al., visual outcome was significantly associated with clinical features at presentation, whereas no significant association was identified with the underlying systemic comorbidity [4]. Male sex has also been suggested as a possible favorable prognostic factor in earlier literature, although the evidence remains limited [1]. In our patient, the improvement in visual acuity from 20/60 to 20/25 over two months reflects a favorable clinical course, which may be better understood in the context of his overall clinical presentation rather than the associated trigger alone.

Purtscher-like retinopathy currently has no established evidence-based treatment, and conservative management remains common [4, 10]. Corticosteroids, whether systemic or intravitreal, have been used in some cases; however, available evidence has not demonstrated a clear benefit over observation [10, 11]. Potential retinal complications include macular edema, retinal vascular occlusion, and vitreous hemorrhage, while longer-term sequelae may include optic atrophy, retinal pigment epithelial changes, and retinal thinning [1, 4]. In our patient, systemic evaluation was unremarkable and no treatable underlying condition was identified. Given the lack of established benefit from active treatment and the potential for spontaneous visual recovery, close observation was chosen. The patient subsequently demonstrated both anatomical and functional improvement.

The main limitations of this report were the absence of fluorescein angiography and the limited ability of the available OCT images to provide detailed layer-specific assessment of the retinal ischemic changes.

Nevertheless, the diagnosis was supported by the acute clinical presentation, characteristic fundus findings, OCT evidence of inner retinal involvement, unremarkable systemic evaluation, and spontaneous anatomical and functional improvement on follow-up.

CONCLUSION

Purtscher-like retinopathy is an uncommon cause of acute visual loss. This case illustrates an unusual unilateral presentation of Purtscher-like retinopathy occurring after prolonged military exertion and weapon-related thoracic compression. Although a temporal association was present, the underlying pathophysiological mechanism remains uncertain. In patients presenting with sudden visual loss after strenuous physical exertion, Purtscher-like retinopathy should be considered when characteristic fundus and OCT findings are present. The favorable anatomical and functional recovery observed in this patient suggests that favorable outcomes may occur in selected cases without significant associated complications, and that close observation may be appropriate when no treatable systemic cause is identified.

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Claude (web application, Claude Fable 5 model; Anthropic) was used for limited language editing and grammar correction in selected parts of the Case Report and Discussion sections. It was not used to generate clinical data, images, diagnoses, or conclusions. All content was reviewed and verified by the authors.

Author Contributions

Aseel AlKandari – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Jumana AlRabiah – Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Lulwa AlMatooq – Acquisition of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Alaa AlAli – Conception of the work, Design of the work, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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The corresponding author is the guarantor of submission.

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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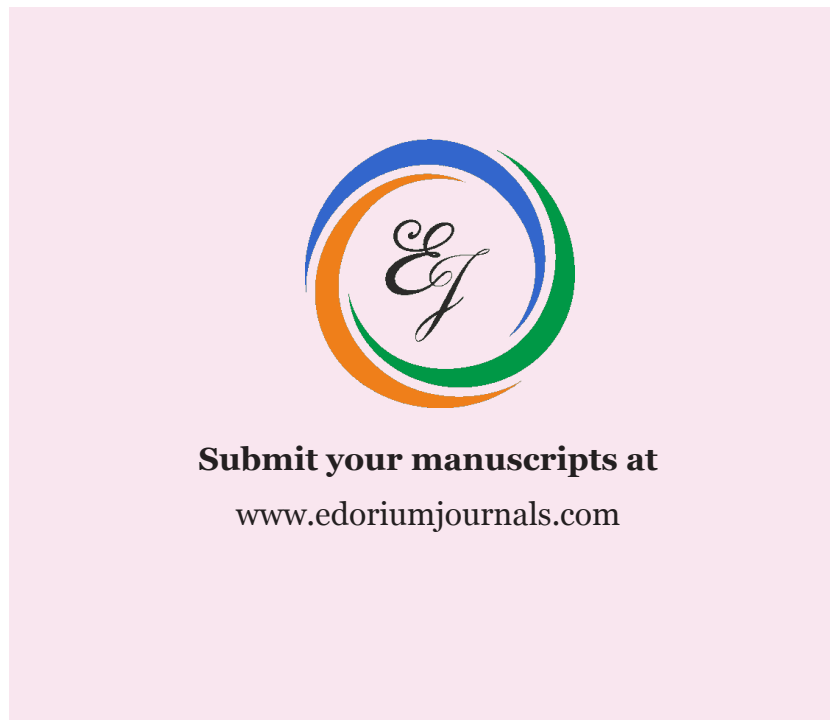
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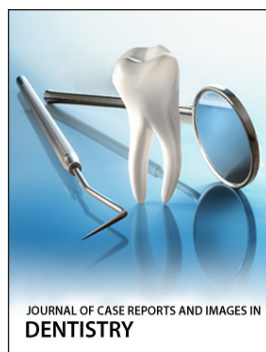
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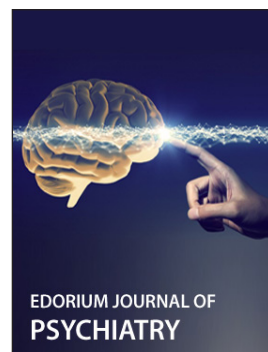
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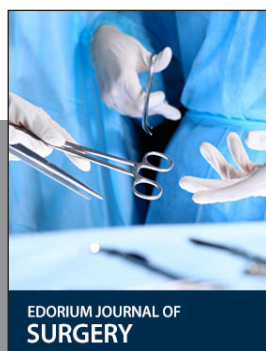
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