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Trauma-Induced Purtscher Retinopathy in a 12-Year-Old Child: A Rare Pediatric Case Following Severe Thoracic Injury

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Abstract

Background

Purtscher retinopathy is a rare retinal disorder characterized by sudden vision loss due to microvascular occlusion. It is exceptionally uncommon in the pediatric population.

Case presentation

We report the case of a 12-year-old boy presenting with severe vision loss in the right eye following polytrauma. Ophthalmologic examination revealed visual acuity limited to counting fingers at 1 meter. Fundus examination showed areas of ischemic retinal whitening in the posterior pole, associated with retinal hemorrhages and cotton-wool spots. Optical coherence tomography demonstrated inner retinal hyperreflectivity.

Conclusion

This case highlights the importance of recognizing this rare entity in children and emphasizes the need for thorough investigation of the underlying cause, as it may be associated with severe systemic conditions or, in some cases, child abuse, both of which may be life-threatening.

INTRODUCTION

Purtscher retinopathy is a rare retinal microangiopathy classically associated with severe trauma, particularly involving the head or thorax (1, 2). It is characterized by sudden visual loss accompanied by distinctive fundus findings, including cotton-wool spots, retinal hemorrhages, and Purtscher flecken (1, 2).

The underlying pathophysiology is thought to involve microvascular occlusion due to complement activation, leukocyte aggregation, or embolic phenomena (1, 2).

While this condition has been mainly described in adults, its occurrence in the pediatric population remains exceptional, with only a limited number of cases reported in the literature (3, 4).

We report a rare case of Purtscher retinopathy in a child following severe thoracic trauma.

CASE PRESENTATION

Upon presentation, the patient reported sudden, painless visual loss in the right eye. Best-corrected visual acuity was limited to counting fingers at 1 meter in the right eye, while the left eye was strictly normal with an acuity of 12/10 and no fundus abnormalities. Ophthalmologic examination revealed periorbital ecchymosis with a characteristic “raccoon eye” appearance and subconjunctival hemorrhage, consistent with blunt trauma (Fig. 1). Areas of ischemic retinal whitening were observed in the posterior pole, associated with retinal hemorrhages and cotton-wool spots (Fig. 2). Optical coherence tomography

(OCT) demonstrated inner retinal hyperreflectivity, consistent with ischemic involvement of the inner retinal layers (Fig. 3).

Ophthalmologic examination of the right eye revealed:

- Areas of ischemic retinal whitening in the posterior pole
- Retinal hemorrhages
- Cotton-wool spots (1, 2)

Optical coherence tomography (OCT) demonstrated inner retinal hyperreflectivity, consistent with ischemic involvement of the inner retinal layers (1, 2).

Given the severely reduced visual acuity and the extent of ischemic retinal edema, treatment with high-dose intravenous corticosteroids (methylprednisolone 10 mg/kg) was initiated.

Follow-up examination showed resolution of the ischemic retinal edema and hemorrhages; however, there was no recovery of visual acuity in the affected eye (3, 4).

Written informed consent for publication was obtained from the patient's parent/legal guardian.

DISCUSSION

Purtscher retinopathy is a rare retinal microangiopathy first described in adults following severe trauma (5). It is characterized by sudden visual loss, cotton-wool spots, retinal hemorrhages, and Purtscher flecken on fundus examination (1, 2). The pathophysiology is thought to involve microvascular occlusion secondary to emboli, complement activation, or leukocyte aggregation, leading to ischemic injury of the inner retinal layers (1, 2).

While most reported cases occur in adults, pediatric presentations are extremely uncommon. Only a limited number of pediatric cases have been reported, often associated with trauma, hemolytic uremic syndrome, or nephrotic syndrome (3, 4). Our patient represents a rare example of trauma-induced Purtscher retinopathy in a child, triggered by a high-impact thoracic and cranial injury.

The clinical features in our patient were typical: sudden unilateral visual loss, ischemic retinal whitening, retinal hemorrhages, and cotton-wool spots (1, 2). Optical coherence tomography confirmed inner retinal hyperreflectivity, consistent with ischemic damage. The contralateral eye was strictly normal, highlighting the unilateral nature often seen in pediatric trauma-related cases (3, 4).

Management remains debated, as there is no standardized therapy. High-dose corticosteroids have been used in selected cases with extensive ischemia and severe visual impairment. Some pediatric reports have demonstrated improvement in retinal edema and visual outcome with intravenous corticosteroid therapy (6). However, the evidence is inconsistent, and spontaneous recovery has also been described (6, 3, 4). In our patient, 3 days of high-dose intravenous methylprednisolone (10 mg/kg) led to complete

resolution of retinal edema and hemorrhages, but visual acuity did not recover, consistent with prior reports showing that structural damage to the inner retina may result in permanent visual loss even after anatomic resolution (3, 4, 6).

Adjunctive therapies such as hyperbaric oxygen therapy (HBOT) have been reported in select cases. A case of Purtscher retinopathy secondary to chest injury showed visual and fundus improvement after multiple sessions of HBOT (7), and a pediatric case combining Purtscher-like retinopathy with other retinal pathology responded favorably to HBOT as a rescue treatment (8). These interventions remain experimental but highlight potential options for severe or refractory cases.

This case underscores several important points for clinicians:

1. Early recognition is crucial. Children may not articulate visual symptoms clearly, and fundus examination should be considered in any pediatric patient with severe thoracic trauma (1, 3).
2. Purtscher retinopathy may signal systemic severity. Underlying injuries (such as diaphragmatic hernia in our patient) or even possible child abuse must be considered (3, 4).
3. Prognosis is variable. Retinal edema and hemorrhages can resolve spontaneously or with corticosteroid therapy, but visual recovery is unpredictable, especially when ischemic injury is extensive (1, 2, 3, 6).
4. Literature context. Pediatric cases remain rare, and each new report contributes to understanding the spectrum, mechanisms, and outcomes of the disease in children (3, 4, 6, 7, 8).

CONCLUSION

This case highlights the rare occurrence of Purtscher retinopathy in the pediatric population following severe thoracic trauma (3, 4). Clinicians should maintain a high index of suspicion for this condition in children presenting with sudden visual loss after trauma, as early recognition can guide systemic evaluation and management (1, 3). Although anatomic resolution of retinal edema and hemorrhages may occur, visual prognosis remains guarded, emphasizing the need for prompt ophthalmologic assessment and close follow-up (3, 4). Reporting such cases contributes to the understanding of pediatric Purtscher retinopathy and may help optimize diagnostic and therapeutic strategies in this vulnerable population.

Declarations

Ethics approval and consent to participate

Not applicable. According to local regulations, ethical approval is not required for case reports.

Consent for publication

Written informed consent for publication of this case report and any accompanying images was obtained from the patient’s legal guardian.

Availability of data and materials

All data generated or analyzed during this study are included in this published article. Additional details are available from the corresponding author on reasonable request.

Competing interests

The authors declare no competing interests.

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Author Contribution

Author Contributions:H.B. (H. Benmoussa) examined the patient in consultation, collected clinical data, and wrote the first draft of the manuscript.M.E.B. (M. El Barkani) performed ophthalmologic investigations, assisted in drafting the manuscript, and contributed to critical revisions.C.K. (C. Khodriss) contributed to data collection, assisted in the literature review, and participated in manuscript preparation.M.E.Bh. (M. El Bahloul) supervised the case management, performed the literature review, and revised the manuscript for important intellectual content.All authors reviewed and approved the final manuscript.

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Figures



Figure 1

Periorbital ecchymosis with subconjunctival hemorrhage in the right eye of the patient. Note the characteristic “raccoon eye” appearance, consistent with blunt trauma.

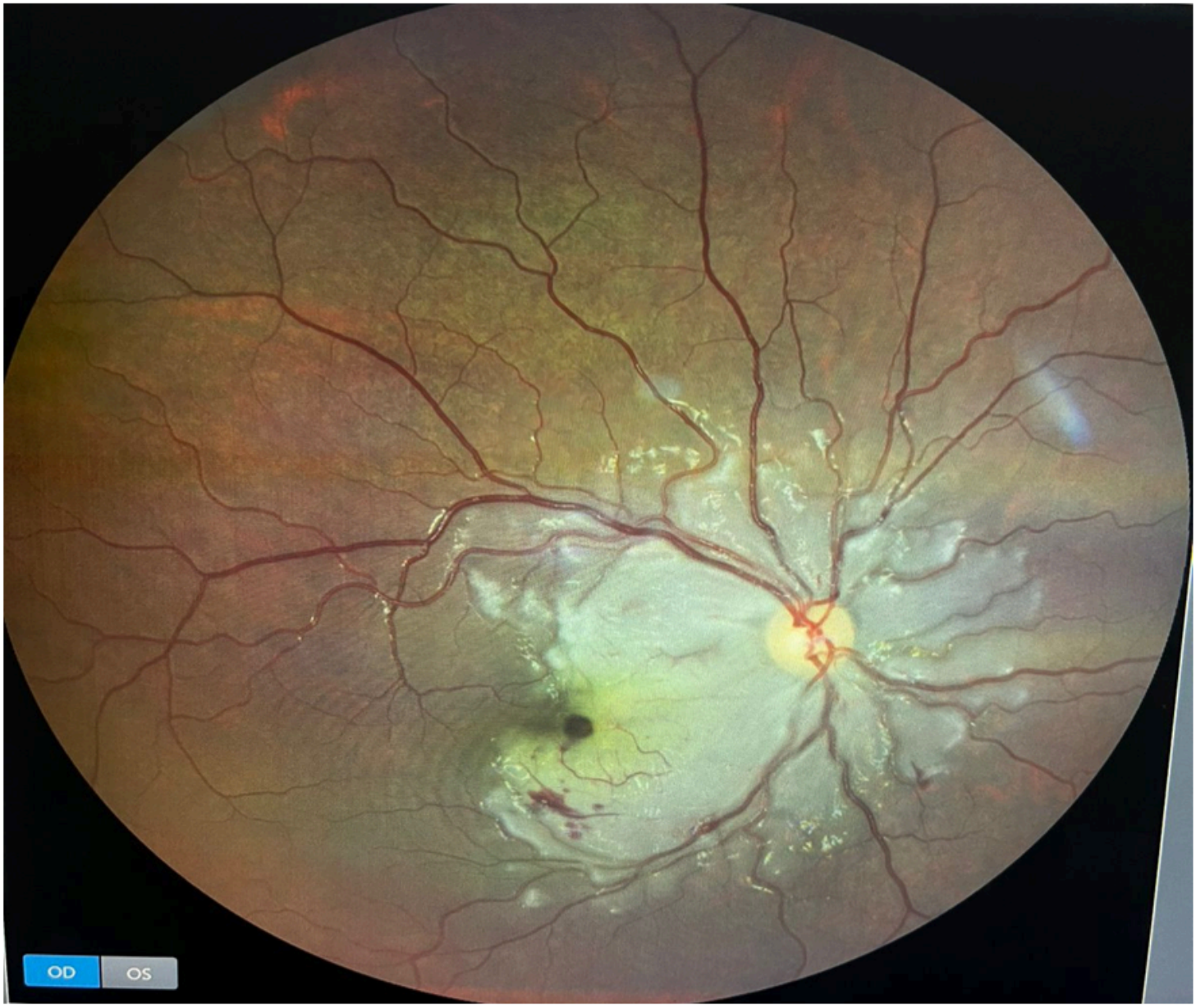


Figure 2

Color fundus photograph of the right eye showing areas of ischemic retinal whitening in the posterior pole, associated retinal hemorrhages, and cotton-wool spots. These findings are characteristic of Purtscher retinopathy.

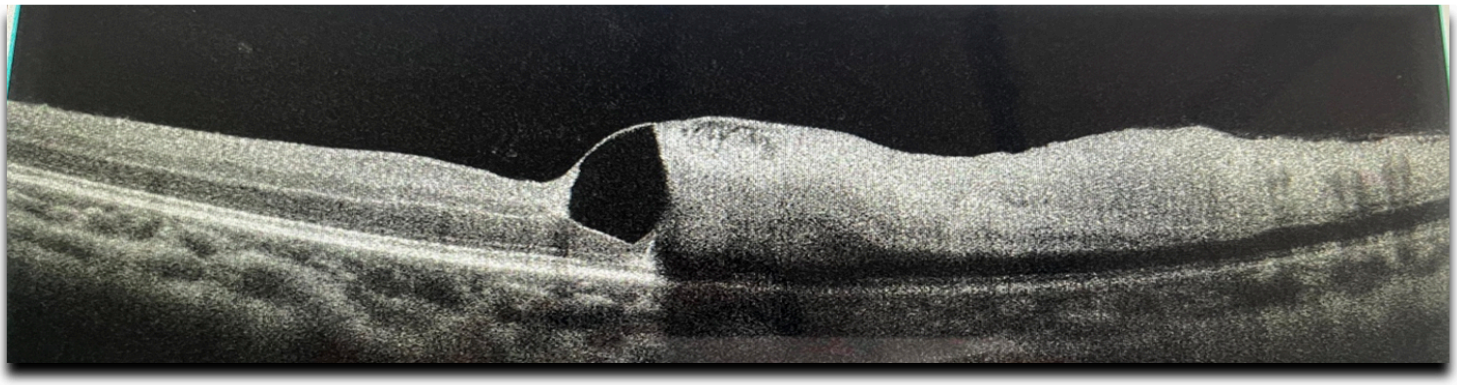


Figure 3

Optical coherence tomography (OCT) scan of the right eye demonstrating inner retinal hyperreflectivity and disruption consistent with ischemic injury. Note the localized retinal edema and structural changes of the inner retinal layers.