

Mimickers of punctate inner retinal toxoplasmosis on optical coherence tomography

Miloni Suketu Shah ¹, Atish Kumar Pradhan,¹ Ashish Khalsa,² Anup Kelgaonkar ¹

¹Vitreo-retina, LV Prasad Eye Institute Bhubaneswar Campus, Bhubaneswar, Odisha, India
²C L Gupta Eye Institute, Moradabad, India

Correspondence to
Dr Anup Kelgaonkar;
anupnk2008@gmail.com

Accepted 31 May 2022

DESCRIPTION

We herein describe two interesting cases of ocular toxoplasmosis (OT) wherein optical coherence tomography (OCT) findings mimicked the appearance of punctate inner retinal toxoplasmosis (PIRT) lesions. The first case was that of a young man who presented with a diminution of vision in his right eye (RE) for a week. His best-corrected visual acuity (BCVA) in the RE was 20/250, while in the left eye was 20/20 for distance. Intraocular pressures in both eyes were 12 mm Hg. His RE had 2+ anterior chamber reaction, vitreous haze grade 1 and two-disc diameters of retinochoroiditis supero-temporal to the fovea. He had a normal hemogram, non-reactive HIV TriDot test, non-reactive treponema pallidum hemagglutination assay and elevated serum toxoplasma IgG (143.04) IU/mL with normal IgM. We administered trimethoprim 160 mg along with sulfamethoxazole 800 mg twice a day for 6 weeks; tapering oral steroids for 4 weeks. Intravitreal clindamycin (2 mg/0.05 mL) was given at presentation and twice later with an interval of 1 week each. He had complete resolution of the lesion with visual improvement to 20/25 at the third-month visit. During the next 2 months, his vision dropped to 20/80 in the RE; an epiretinal membrane (ERM) with a yellowish lesion at the macula was noted, on OCT the hyper-reflective inner retinal lesion corresponding with the macular pucker mimicked the appearance of PIRT (figure 1A,B). We operated the RE for pars plana vitrectomy and epiretinal membrane removal with a favourable outcome. His vision at a 5-month visit after surgery was 20/20 with a pigmented scar, straightening of the fovea contour with relative temporal retinal thinning (figure 1C,D). We describe the second case of a teenage girl presenting with a drop in vision in her RE for 8 days. She had BCVA 20/80 in her RE along with focal necrotising retinochoroiditis lesion inferotemporal to disc with multiple areas of focal retinal vasculitis in all quadrants. Her left eye had BCVA 20/20 and was normal. She was diagnosed with right eye toxoplasma retinochoroiditis clinically and administered trimethoprim 160 mg along with sulfamethoxazole 800 mg twice a day for 6 weeks and tapering oral steroids for 4 weeks. Her baseline OCT passing through an inflamed vessel mimicked the appearance of a PIRT lesion (figure 2). Her vision improved to 20/20 with the healing of retinochoroiditis with pigmentation and scarring at the third-month visit.

PIRT is an atypical presentation of OT and an under-recognised entity that was first described by Friedmann *et al.* It usually presents in the second

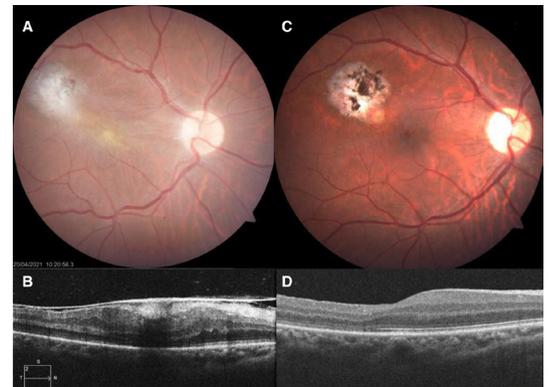


Figure 1 Right eye fundus image of case one (A), showing healed retinochoroiditis lesion with minimal pigmentation supero-temporal to fovea with a yellow lesion at the fovea, internal limiting membrane (ILM) folds and macular puckering. (B) OCT image of right eye passing through the yellow foveal lesion showing few hyper-reflective dots in the vitreous cavity along with hyper-reflective epiretinal membrane (ERM) with spherical foveal hyper-reflective lesion restricted to the inner retinal layer. (C) Shows the right eye of case one, 5 months after vitrectomy for ERM removal with healed retinochoroiditis lesion, increased pigmentation and absence of yellow lesion at fovea. Corresponding OCT image showed few ILM folds temporally along with temporal retinal thinning while straightening of earlier area of macular pucker (D). Presence of mild focal disruption of external limiting membrane and ellipsoid layer is seen.

decade and appears as a single or multifocal small active retinitis lesions with minimal vitritis.¹ These lesions are seen to be hyper-reflective lesions in the inner retina with variable depth up to the outer plexiform layer on OCT. The significance of diagnosing a PIRT lesion lies in the risk of progression to typical lesions and/or recurrences.² Initiation of anti-toxoplasma therapy whether or not will prevent these risks is debatable but recommended.³ ERM is a known complication seen during the resolution of toxoplasma retinochoroiditis.⁴ Retinal glia, especially the Muller cells, migrate due to the inflammatory response and contribute to the formation of ERM.⁵ However, purely glial ERMs are non-contractile. They act as a scaffold for the proliferation and migration of RPE cells and fibroblast-like cells giving rise to the contractile membrane.⁶ Inner retinal changes can thus be caused by the mechanical effect of ERM due to surface contraction.⁷ We encountered an inner retinal hyper-reflective lesion



© BMJ Publishing Group Limited 2022. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Shah MS, Pradhan AK, Khalsa A, *et al.* *BMJ Case Rep* 2022;**15**:e251024. doi:10.1136/bcr-2022-251024

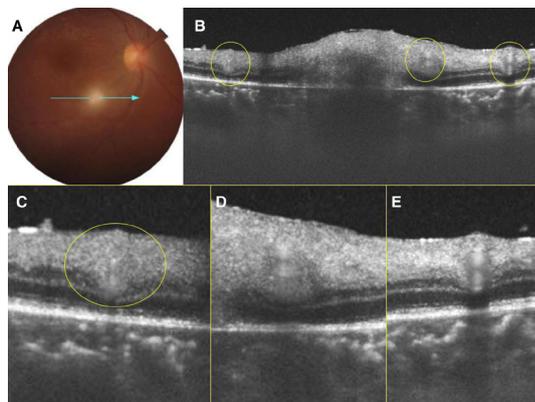


Figure 2 Right eye of case two: necrotising retinochoroiditis lesion in the inferotemporal to optic disc. (A) Optical coherence tomography image passing through the lesion (B) shows presence of full-thickness hyper-reflective lesions with choroidal shadowing corresponding to the retinochoroiditis lesion. The three yellow circles indicate the blood vessels. Enlarged image (C) shows presence of smudgy blood vessel, with minimal back shadowing mimicking like a punctate inner retinal toxoplasmosis lesion. (D) Shows a blood vessel at the edge of retinitis lesions with poor differentiation than a normal blood vessel in (E) but better than the inflamed vessel in (C).

in association with ERM in our case one after the resolution of the primary retinochoroiditis lesion.

Retinal vasculitis is associated with retinochoroiditis in OT. In our second case, the OCT scan passing through an inflamed blood vessel showed an inner retinal lesion. The presence of central two dots with a blurry and partial distorted 'figure of eight' appearance with back shadowing helped us differentiate this from a PIRT lesion. Major retinal vessels on OCT scan are known to have a 'figure of eight' appearance, which presents as central hyper-reflectivity surrounded by a configuration of two columns with back shadowing on the retina posterior to it.⁸ In a healthy vessel, the blood flow is laminar and is arranged in a

Patient's perspective

Patient one: I experienced decrease in vision after initial treatment for infection in my eye due to toxoplasma. My retina specialist informed me about development of membrane at macula with puckering. I was suggested and underwent vitreo-retina surgery. I had significant improvement in my vision over few months. I am thankful to my ophthalmologist for my initial diagnosis, treatment and subsequent surgery keeping my vision near normal.

Patient two: I had decrease in vision in my right eye with smoke like particles in front of my eye. These smoke like haze increased over the next week. I consulted with uveitis services and was diagnosed to have infection in my eye. They informed me of toxoplasma as a suspected cause of disease and started me on oral antibiotics and steroids. It took 2–3 weeks for vision recovery while the decrease in smoke like particles took couple of months.

Learning points

- ▶ Inflamed blood vessels on optical coherence tomography (OCT) can appear as an inner retinal hyper-reflective lesion with loss of 'figure of eight' due to stagnant blood flow.
- ▶ Macular pucker secondary to an epiretinal membrane, a complication of ocular toxoplasmosis, can present as an inner retinal hyper-reflective lesion on OCT.
- ▶ Inflamed blood vessels and macular pucker in a case of ocular toxoplasmosis can mimic punctate inner retinal toxoplasmosis lesions on OCT.
- ▶ Careful differentiation of punctate inner retinal toxoplasmosis lesions from their mimickers is essential to avoid misinterpretation and undue treatment.

concentric cylindrical sheet of erythrocytes, with their velocity maximum at the centre line of the vessel. The relative movement of the erythrocytes affects this hyper-reflectivity. In vasculitis, due to inflammation, the blood flow is stagnant, and this affects the movement of the erythrocytes, affecting the hyper-reflectivity and thus the loss of the 'figure of eight' appearance.

The differentiation of inner retinal lesions from PIRT is essential not only to avoid misinterpretation and undue treatment but also to help understand the nature and evolution of the disease process. The macular pucker and inflamed blood vessels were the two mimickers of PIRT on OCT in our study.

Acknowledgements Dr Soumyava Basu, Network head, Uveitis services, L.V. Prasad Eye Institute for his constant teaching, inspiration, support and guidance.

Contributors MSS and AKP were involved in data collection, manuscript writing and review of the literature. AK and AK were involved in the concept, design and manuscript review.

Funding Hyderabad Eye Research Foundation (LVPEI-2021-107-BHR-41).

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

ORCID iDs

Miloni Suketu Shah <http://orcid.org/0000-0001-8624-7845>

Anup Kelgaonkar <http://orcid.org/0000-0002-3983-4200>

REFERENCES

- 1 Friedmann CT, Knox DL. Variations in recurrent active toxoplasmic retinochoroiditis. *Arch Ophthalmol* 1969;81:481–93.
- 2 Kelgaonkar A, Khalsa A, Padhy SK, et al. Punctate inner retinal toxoplasmosis: case series and review of literature. *Ocul Immunol Inflamm* 2021;1–10.
- 3 Doft BH, Gass DM. Punctate outer retinal toxoplasmosis. *Arch Ophthalmol* 1985;103:1332–6.
- 4 Goldenberg D, Goldstein M, Loewenstein A, et al. Vitreal, retinal, and choroidal findings in active and scarred toxoplasmosis lesions: a prospective study by spectral-domain optical coherence tomography. *Graefes Arch Clin Exp Ophthalmol* 2013;251:2037–45.
- 5 McLeod D, Hiscott PS, Grierson I. Age-related proliferation at the vitreoretinal juncture. *Eye* 1987;1 (Pt 2):263–81.
- 6 Hiscott PS, Grierson I, Trombetta CJ, et al. Retinal and epiretinal glia—an immunohistochemical study. *Br J Ophthalmol* 1984;68:698–707.
- 7 Garnavou-Xirou C, Xirou T, Gkizis I, et al. The role of disorganization of retinal inner layers as predictive factor of postoperative outcome in patients with epiretinal membrane. *Ophthalmic Res* 2020;63:13–17.
- 8 Willerslev A, Li XQ, Cordtz P, et al. Retinal and choroidal intravascular spectral-domain optical coherence tomography. *Acta Ophthalmol* 2014;92:126–32.

Copyright 2022 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <https://www.bmj.com/company/products-services/rights-and-licensing/permissions/>
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

Customer Service

If you have any further queries about your subscription, please contact our customer services team on +44 (0) 207111 1105 or via email at support@bmj.com.

Visit casereports.bmj.com for more articles like this and to become a Fellow