

Case Report

Multimodal Imaging in a Case of Behcets Uveitis with Anterior Ischcmic Optic Neuropathy: A Microvascular Perspective

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Abstract

A 68-year-old fair-skinned Indian woman presented to our hospital with a primary complaint of vision loss in her right eye, accompanied by increased light sensitivity, pain, and redness that had persisted for one month. Additionally, she reported progressive visual impairment in her left eye over the past two years, along with oral and genital lesions, and multiple joint pains, for which she had been receiving ongoing treatment. She had previously been diagnosed with Behçet's uveitis, with systemic involvement, according to the criteria outlined by an international study group on Behçet's disease. On examination, the right eye showed pan-uveitis with a large optic disc cup and significant disc pallor. The left eye had corneal decompensation and was phthisical. Fundus fluorescein angiography (FFA) detected minimal disc leakage and peripheral vascular leaks. Optical coherence tomography angiography (OCT-A) revealed increased retinal nerve fibre layer loss, large cup, and severe peri-papillary capillary dropout. Macular OCT-A showed significant capillary loss, widened inter-capillary distances, and an enlarged foveal avascular zone. Laboratory tests revealed a strongly positive antinuclear antibody (ANA) with a speckled homogenous pattern. The erythrocyte sedimentation rate (ESR) was elevated at 52 mm/hr, and C-reactive protein (CRP) was 6.12 mg/dl. The differential leukocyte count showed elevated segmented neutrophils, while other blood parameters were normal. Serology for tuberculosis (TB), HLA-B27, p-ANCA, c-ANCA, and anti-CCP was negative. Based on her clinical presentation, histopathology, and investigations, she was diagnosed with Behçet's eye disease with multi-system involvement, including gastrointestinal and joint disease, and confirmed to have right-eye ischemic optic neuropathy. She was treated with topical steroids and intravenous methylprednisolone, resulting in significant visual improvement. After eight weeks, her vision improved to 6/36, with better contrast and color vision. Mycophenolate mofetil, oral steroids, and tacrolimus were restarted. Due to poor response to oral medications, intravenous adalimumab was considered but discontinued due to side effects. At three months, her right-eye vision stabilized at 6/24, with normal color perception, improved contrast sensitivity, and stable lab results.

Keywords

AION, Behcets, Uveitis, OCT-A

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1. Introduction

Adamantiades-Behçet's disease (BD) is a chronic, relapsing inflammatory condition characterised by recurrent oral and genital ulcers, ocular inflammation, and cutaneous lesions, often with simultaneous involvement of the central nervous system (CNS), joints, and gastrointestinal tract [1]. The disease is most prevalent in regions surrounding the Eastern Mediterranean and East Asia [2]. Epidemiological studies indicate a male predominance [3], particularly in the complete form of BD, while the incomplete form is more commonly observed in both sexes [4]. According to the International Study Group for Behçet's Disease, the diagnosis requires the presence of oral ulcerations in all patients, along with at least two of the following criteria: genital ulcers, specific ocular lesions, specific skin lesions, or a positive pathergy test [5].

Optical coherence tomography angiography (OCT-A) is a non-invasive, high-resolution imaging technique that allows for detailed visualisation of retinal microvasculature and choroidal vascular structures. In this case, OCT-A was utilised to provide a comprehensive assessment of retinal and choroidal changes, thereby aiding in the accurate diagnosis of Behçet's-related ocular involvement.

Case report

A 68-year-old fair-skinned Indian woman presented with a one-month history of right eye (RE) visual decline, accompanied by increased light sensitivity, pain, and redness. Additionally, she reported two years of progressive visual loss in the left eye (LE), with associated oral and genital lesions, and multiple joint pains. Despite undergoing irregular treatment for the past three years, she had discontinued both oral and topical medications four months prior to presentation.

The patient's past medical history revealed episodic flare-ups of pain and redness in the left eye, ultimately leading to total vision loss due to retinal detachment, which culminated in phthisical eye. She had been diagnosed with Behçet's uveitis with systemic involvement three years ago, based on clinical criteria set by the International Study Group for Behçet's disease.

2. Ophthalmic Examination

On examination, best-corrected visual acuity (BCVA) in the right eye was limited to hand movements, while the left eye showed no light perception. Slit-lamp biomicroscopy revealed multiple fine pigmented keratic precipitates and a modest inflammatory response in the anterior chamber of the right eye. The intraocular pressure (IOP) was 18 mmHg in the right eye and 4 mmHg in the left eye. Anterior hyaloid phase showed vitreous cells 1 plus with dense posterior vitritis with fundus imaging done one year apart showing gross disc pallor with a vertical cup disc ratio of 0.6-0.7 which had drastically increased over one year to near full cupping (Figure 1 and Figure 2). LE showed corneal decompensation with the eye being phthisical. Fundus fluorescein angiography (FFA) one

year apart detected minimal disc leak with peripheral vascular leaks on FFA (Figure 3) with recent FFA showing no leaks in late phase (Figure 4).



Figure 1. Colour fundus photo shows disc pallor with horizontal cup disc ratio at 0.7:1.



Figure 2. Colour fundus photo 1 year apart from (Figure 1) shows gross disc pallor with horizontal cup disc ratio at 0.9:1 with distinct peripapillary atrophy not seen in (Figure 1) with marked tessellation.

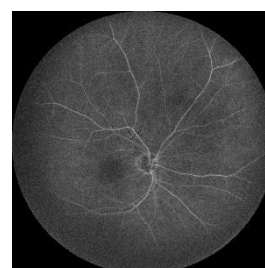


Figure 3. FFA shows minimal vascular leaks from disc and leakage seen in periphery near oral bay.



Figure 4. FFA one year apart from (Figure 3) shows staining of peripapillary atrophy with loss of macula vasculature with no leak detected in comparison to (Figure 3) suggesting quiescent phase of Behçet's uveitis.

Optical coherence tomography angiography of radial peripapillary microvasculature (OCT-Angiography) (Figure 5 and Figure 6) done one year apart detected increase in retinal nerve fibre layer (RNFL) loss in temporal quadrant, large cup and severe peripapillary capillary drop out areas. Macula OCT-A done one year apart showed gross loss of capillaries, inter-capillary distance widening and enlargement of foveal

avascular zone (Figure 7 and Figure 8). Recent oct-macula (Figure 10) showed streak subretinal fluid with cystoid spaces with older oct macula in active phase of uveitis (Figure 9) showed multiple pockets of subretinal fluid with intraretinal edema. Local tongue image showed multiple gingival eruptions with ulcers in Behcets patient (Figure 11).

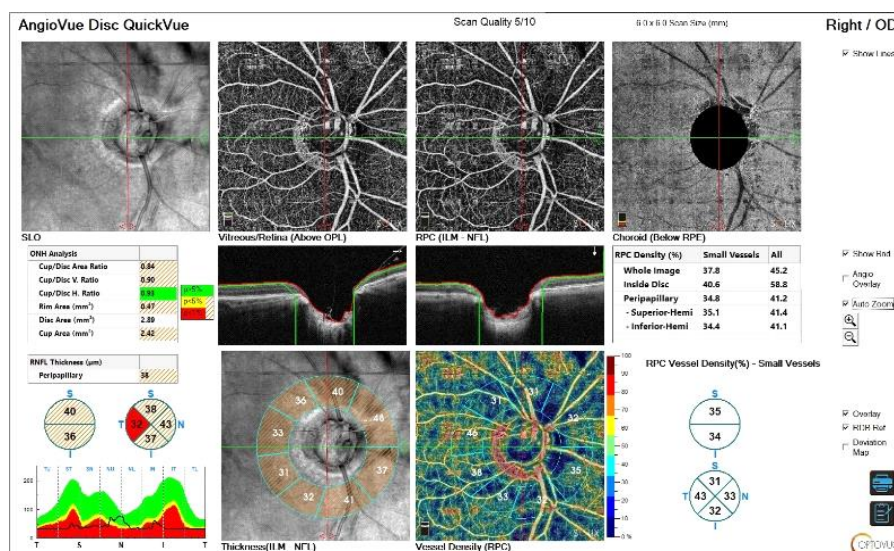


Figure 5. Angiovue Disc shows a right eye large cup with RNFL thickness loss in all quadrants most significant in temporal quadrant. Radial peripapillary capillary vessel density (%) of small vessels depicts the overall vascular loss (Depicted in blue as area of loss and maintained vessel depicted in brown) in coloured disc photo.

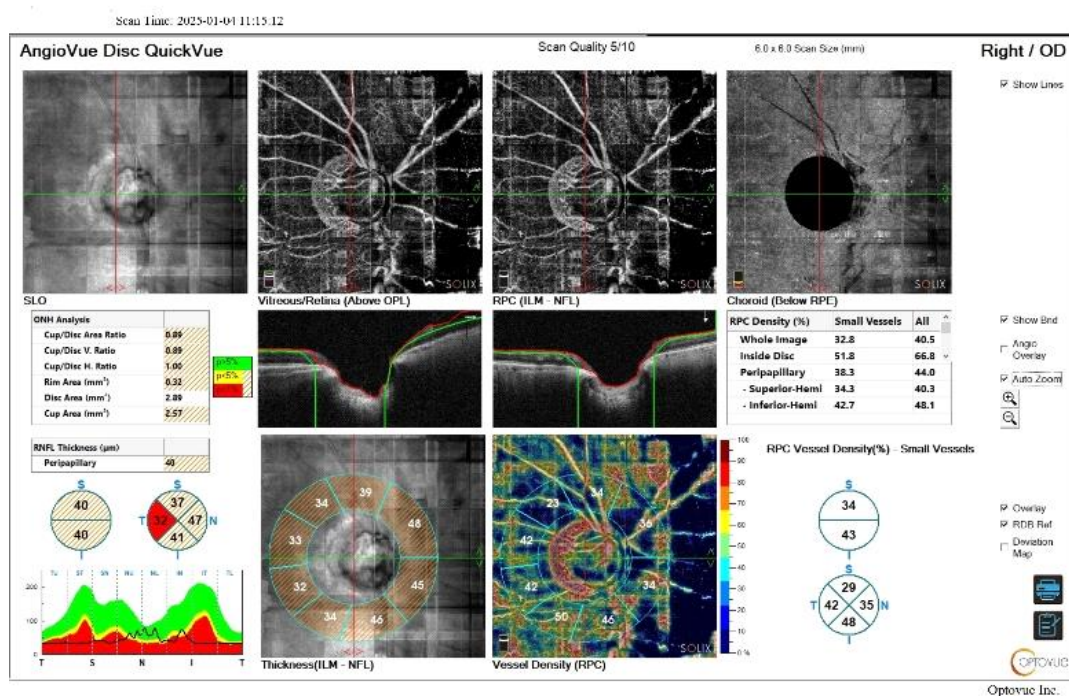


Figure 6. Angiovue Disc right eye one year apart from (Figure 5) shows a large cup with RNFL thickness loss in all quadrants most significant in temporal quadrant. Radial peripapillary capillary vessel density (%) of small vessels depicts the overall one year vascular loss compared to (Figure 5) to be much larger, suggesting the ongoing process of ischemia in Behcets uveitis (Depicted in blue as area of radial peripapillary vascular loss).

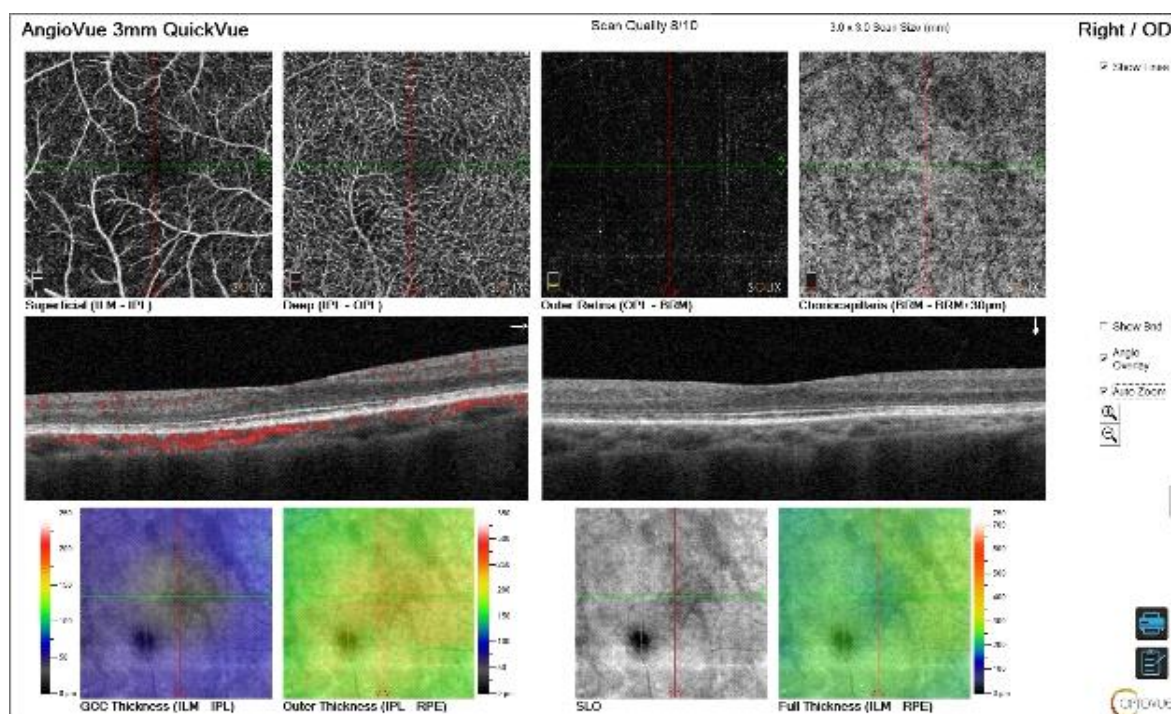


Figure 7. Angiovue 3 mm quickvue scan of right macula shows changes in microvasculature most prominent in superficial and deep capillary plexus with poor visibility of outer retina and choriocapillaries suggesting active inflammation obscuring penetration. There is distinct widening of foveal avascular zone, loss of major capillaries with widening of intercapillary distance.

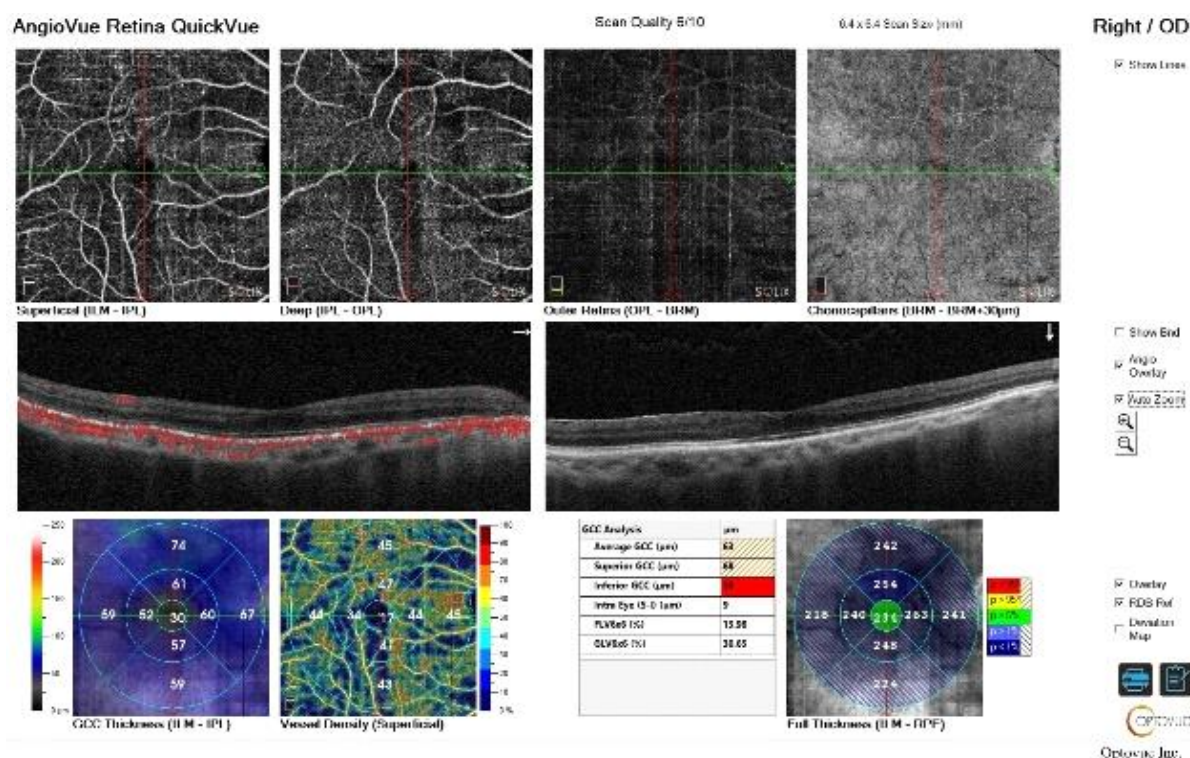


Figure 8. Angiovue retina quickvue shows a major decline in capillaries in superficial and deep plexus in to comparison to (Figure 7). There is also loss of foveal plexus margin with complete loss of intercapillary plexus. There is loss seen in outer retina and choriocapillaries primarily in inferior half suggesting major site of effect of Behcets uveitis.

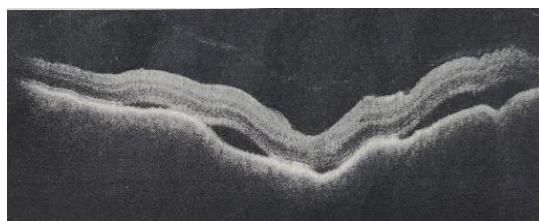


Figure 9. OCT macula radial scan shows multi pocket neurosensory detachment, inner retinal edema, subretinal fluid and increase in retinochoroidal thickness with loss of RPE and IS-OS junction details.

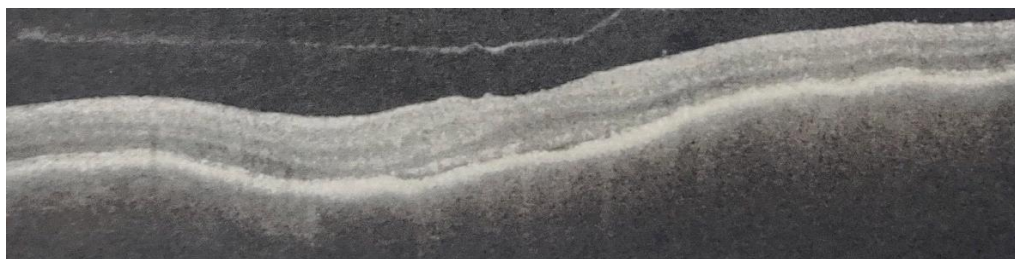


Figure 10. OCT macula radial scan 4 months apart from (Figure 9) shows streak of sub-retinal fluid with loss of inner retinal oedema with multiple hyper-reflective dots seen in inner layers suggesting a quiescent phase with undulations of retinochoroidal complex.



Figure 11. Behçets patient with eruptions and ulcers on tongue.

3. Laboratory Investigations and Serology

Laboratory tests showed a strongly positive antinuclear antibody (ANA) with a speckled homogenous pattern (1:180 endpoint). Inflammatory markers were elevated, including an erythrocyte sedimentation rate (ESR) of 52 mm/hr and C-reactive protein (CRP) of 6.12 mg/dl. Complete blood count (CBC) revealed a markedly elevated neutrophil count (95.5%), consistent with an acute inflammatory response. Serological tests for tuberculosis (TB), HLA-B27, p-ANCA, c-ANCA, and anti-CCP were all negative.

On the basis of her clinical presentation, histopathological findings, and investigative results, a diagnosis of Behçet's eye disease with systemic involvement, including gastrointestinal and joint disease, was confirmed. Additionally, the patient was diagnosed with right-eye ischemic optic neuropathy (AION) due to peripapillary capillary dropout.

4. Treatment and Follow-up

The patient was started on intensive topical steroids (prednisolone acetate 1% hourly), combined with cycloplegic-mydratic therapy (homatropine hydrobromide 2%) and artificial tears. Due to the acute presentation of panuveitis and AION, intravenous methylprednisolone (1 gm daily in 200 ml of 2% dextrose) was administered for five days, with close monitoring of both anterior and posterior segment inflammation.

Significant visual improvement was observed after ten days, with BCVA improving from hand movements to four meters, along with enhanced color perception. At eight weeks, her vision improved to 6/36, with better contrast sensitivity and color vision. The topical steroids were tapered, and oral steroids (1–1.5 mg/kg body weight) were gradually reduced to a maintenance dose. Mycophenolate mofetil was resumed and increased to 1 gm twice daily, with tacrolimus added.

Due to insufficient response to oral medications, intravenous adalimumab (a fully human IgG1 monoclonal antibody targeting TNF) was initiated subcutaneously. However, after seven doses, the patient developed systemic side effects, prompting discontinuation of the treatment. At the three-month follow-up, her right-eye visual acuity stabilised at 6/24, with normal color perception, improved contrast sensitivity, and normal liver and renal function tests.

5. Discussion

Behçet's disease is associated with significant vascular in-

flammation, leading to endothelial dysfunction, coagulation abnormalities, and impaired retrobulbar blood flow. The blood supply to the optic nerve head is derived from the short and long posterior ciliary arteries while the surface nerve fibre layer is supplied by the retinal circulation. Sectoral involvement of the optic nerve head in ischemic disorders stems from the sectoral blood circulation to the tissue with a sharp watershed zone between sectors [6].

Angiopoietin-1 has been found to be linked with endothelial survival and vasculo-protective effects. Its insufficiency contributes to loss of endothelial integrity and increased vascular permeability culminating in perivascular inflammatory infiltration [7]. Impaired vascular endothelial cells have been seen to trigger immune-mediated vasculitis, leading to vascular closure and non-perfusion finally leading to reduced vessel density (VD) on OCT-A.

Ischemic optic neuropathy (AION) is a known, but uncommon, complication of Behçet's disease, often attributed to vascular occlusion and ischemia. "Frigui et al" in their studies on Behçet's disease found optic neuropathy stasis or papilledema, which they correlated to benign intracranial hypertension or ischemic neuropathy [8]. Further retrospective case studies [9, 10] have also documented Behçet's disease to be the etiology behind AION leading to a diminished visual acuity. These reports also highlight the importance of early diagnosis and treatment to improve vision. Similarly in our patient the diminished peripapillary capillaries on OCT-A points towards an ischemic optic neuropathy as the cause of visual decline. OCT-A has proven invaluable in detecting microvascular changes in the peripapillary and macular regions, even in the absence of clinically overt ocular involvement. In large study, "Yaan et al" detected greater vascular changes on OCT-A in the peripapillary zone and it was suggested that a watch on vascular density of radial peri-papillary capillary network could serve as prognostic indicator to detect progression of Behçet's uveitis and its response to treatment [11]. There have been other studies where OCT-A has revealed structural changes in macular microvascular (MMV) architecture, radial peripapillary capillaries (RPC) and optic nerve head structure in non-ocular Behçet's disease patients. In patients without systemic vascular involvement a decrease in vessel densities has been noticed at MMV and RPC suggesting subclinical ocular involvement in absence of clinical ocular findings [12]. "Simsek et al" in their study on non-ocular Behçet's disease found choroidal vascularity index a good indicator relating to choroidal perfusion and a reduced index would suggest subclinical ocular involvement and choroidal ischemia [13].

Our case underscores the importance of OCT-A in monitoring disease progression and evaluating treatment efficacy in Behçet's-related ocular involvement.

6. Conclusion

Behçet's disease is a complex, multi-system disorder with

significant ocular manifestations, including anterior ischemic optic neuropathy. Given the chronic, relapsing nature of the disease, it is essential to utilise non-invasive, reproducible, and cost-effective diagnostic tools to monitor disease activity and progression. OCTA has emerged as a valuable tool for assessing retinal and choroidal microvasculature in both acute and quiescent phases of Behçet's uveitis, offering critical insights into the pathophysiology of the disease and guiding therapeutic decisions.

Abbreviations

AION	Anterior Ischemic Optic Neuropathy
ANA	Antinuclear Antibody
Anti-CCP	Anti-cyclic Citrullinated Peptide
BD	Adamantiades Behçet's Disease
BCVA	Best Corrected Visual Acuity
CRP	C-reactive Protein
ESR	Erythrocyte Sedimentation Rate
FFA	Fundus Fluorescein Angiography
IOP	Intraocular Pressure
HLA B27	Human Leucocyte Antigen
MMV	Macular Microvascular Architecture
OCT	Optical Coherence Tomography
OCT-A	Optical Coherence Tomography Angiography
RNFL	Retinal Nerve Fibre Layer
RPC	Radial Peripapillary Capillaries
TB	Tuberculosis
pANCA	Perinuclear Anti-Neutrophil Cytoplasmic Antibody
cANCA	Cytoplasmic Anti-Neutrophil Cytoplasmic Antibody
CNS	Central Nervous System

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Conflicts of Interest

The authors declare no conflicts of interest.

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