

Central serous chorioretinopathy secondary to subtenon triamcinolone injection: A new hypothesis for the mechanism

We report a case of central serous chorioretinopathy (CSC) induced by subtenon triamcinolone injection following routine vitrectomy and epiretinal membrane (ERM) peeling. This is surprisingly rare and raises questions regarding the pathogenesis of CSC.

The patient gave consent for their case to be reported. A 74-year-old emmetropic Asian male presented with a 6-month history of blurred vision and monocular distortion. He was otherwise well and there were no risk factors for CSC including administration of exogenous corticosteroids. Best corrected visual acuity (BCVA) was 6 of 12 OD and an idiopathic ERM was diagnosed (Figure 1A). Routine 25+ gauge pars plana vitrectomy and ERM peeling was performed concluding with an inferonasal injection of subtenon triamcinolone acetate (KENACORT-A 40, 1.0 mL, 40 mg/mL) to reduce post-operative macular oedema. Post-operative drops consisting of prednisolone acetate 1%/phenylephrine hydrochloride, ketorolac trometamol 5 mg/mL and chloramphenicol 0.5% QID were tapered off after 1 month.

One week post-operatively the BCVA was 6 of 38. Enhanced depth imaging (EDI) OCT demonstrated subfoveal fluid and gross hyporeflectivity of the outer choroid (Haller's layer) consistent with large pachyvessels (Figure 1B) and CSC. The subfoveal choroidal thickness had increased to 703 from 176 μ m pre-operatively. Neither the pachyvessels nor the subtenon triamcinolone was visible on B-scan ultrasound (Figure 1C). Ultrawide-field fundus fluorescein angiography was normal (Figure 1D), but indocyanine green angiography (ICG) suggested reduced flow through the inferonasal vortex vein (Figure 1E).

On 2-month review his BCVA was 6 of 19, the subfoveal fluid had resolved and the outer choroidal hyporeflectivity had significantly thinned back to 213 μ m (Figure 1F).

Corticosteroids are a potent risk factor for the development of CSC.¹ It is therefore surprising that CSC has

rarely been described following injection of subtenon triamcinolone. A systematic literature review was performed in March 2020 using the databases PubMed and EMBASE with the search terms “(central serous chorioretinopathy) and (corticosteroid* OR triamcinolone)”. Only one other case report of CSC developing after subtenon triamcinolone acetate (1.0 mL, 40 mg/mL) injection was identified, in a patient with HLA-B27-associated iritis.² Subretinal fluid and serous pigmented epithelial detachment occurred after 1 week and the BCVA normalized and subretinal fluid resolved by 12 weeks.

While the exact pathogenesis of CSC is uncertain, it is believed that corticosteroids modify ion channels and neurotransmitter receptors stimulating an adrenergic response, reducing nitric oxide synthesis to cause choroidal vessel spasm, damage and altered permeability and perfusion.¹ Corticosteroids may also damage retinal pigment epithelial cells (RPE) by inhibiting extracellular matrix components and decreasing fibroblastic activity.³

In our case report, the presence of dilated choroidal pachyvessels on EDI-OCT may suggest an alternative pathogenesis for CSC. Direct mechanical compression of vortex veins from the subtenon bolus of triamcinolone acetate could have obstructed venous outflow, causing venous dilation, raised choroidal vascular hydrostatic pressure and subsequent exudation. Other case reports of CSC exist in support of this hypothesis. In one case, CSC developed after a superotemporal scleral buckle with ICG hyperfluorescence localized to a compressed superotemporal vortex vein.⁴ The subretinal fluid resolved 1 month following buckle removal. In another report, CSC was thought to have developed following medial transposition of a split lateral rectus muscle compressing on a vortex vein.⁵

We present the second known case report of CSC induced by subtenon triamcinolone injection. While corticosteroid induced choroidal hyperpermeability is the

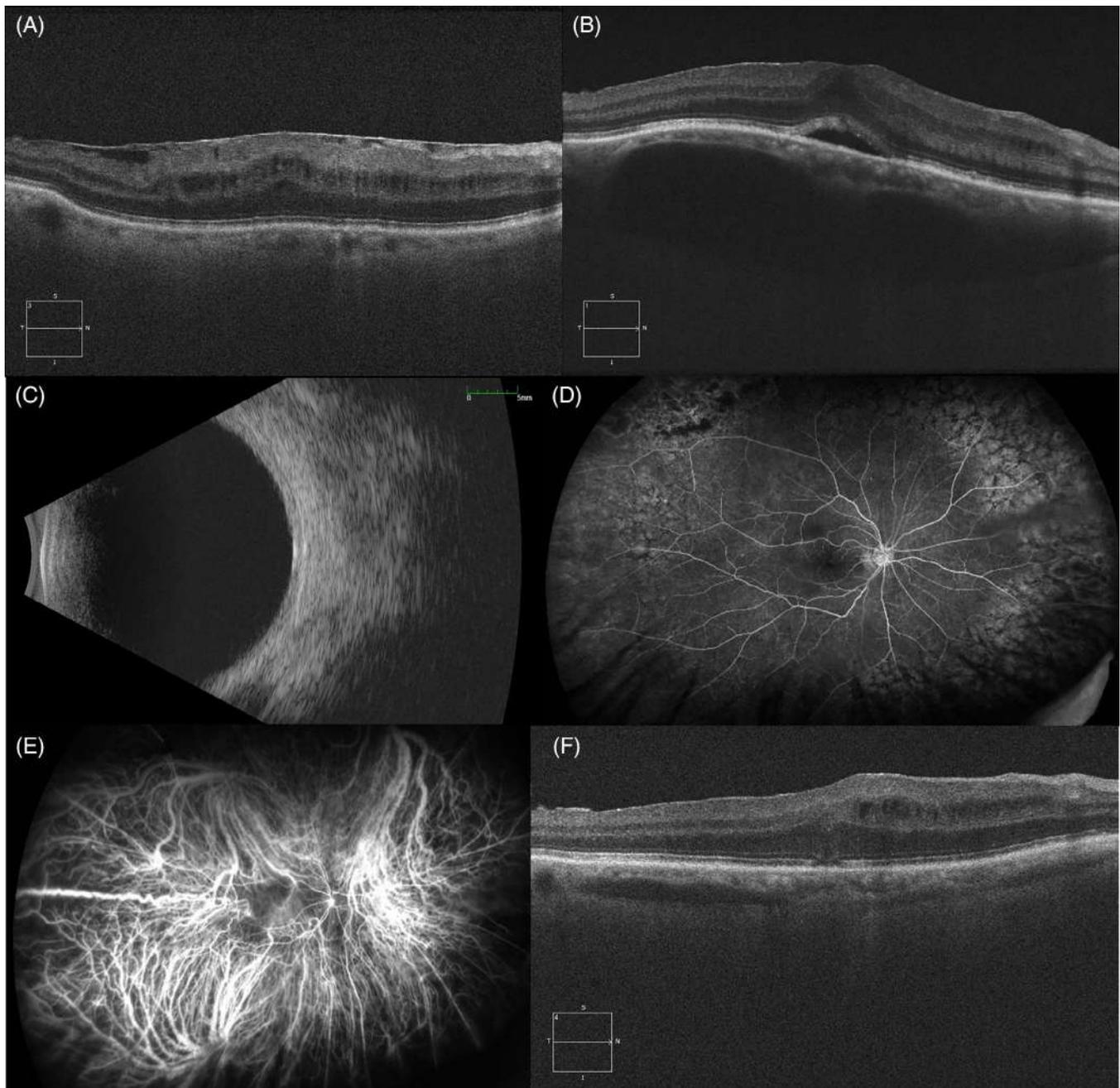


FIGURE 1 A, Optical coherence tomography (CIRRUS 5000 HD-OCT, Carl Zeiss Meditec AG, Jena, Germany) of the right macula demonstrating an ERM and mild cystoid macular oedema. Subfoveal choroidal thickness is 176 μm . B, One week after vitrectomy surgery with ERM peeling and subtenon triamcinolone acetonide injection, there is subfoveal fluid consistent with central serous chorioretinopathy. The outer choroid is massively thickened with pachyvessels in Haller's layer. The subfoveal choroidal thickness has increased to 703 μm . C, B-scan ultrasonography (Eye Cubed, Ellex, Mawson Lakes, Australia), and D, ultra wide-field fluorescein angiography (Optos PLC, Dunfermine, UK) are normal but E, indocyanine green angiography demonstrates reduced filling of the inferonasal vortex vein, in the same location as where the subtenon triamcinolone was injected. F, Two-months post-operatively the subfoveal fluid has resolved and the choroid has almost returned to normal thickness (213 μm)

most likely cause, our case raises the intriguing possibility that mechanical compression of the vortex veins may be another pathogenic mechanism.

CONFLICT OF INTEREST

None declared.

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REFERENCES

1. Ge G, Zhang Y, Zhang Y, Xu Z, Zhang M. Corticosteroids usage and central serous chorioretinopathy: a meta-analysis. *Graefes Arch Clin Exp Ophthalmol.* 2020;258(1):71-77.
2. Bauml CR, Martidis A, Truong SN. Central serous chorioretinopathy associated with periocular corticosteroid injection treatment for HLA-B27-associated iritis. *Arch Ophthalmol.* 2004;122(6):926-928.
3. Carvalho-Recchia CA, Yannuzzi LA, Negrão S, et al. Corticosteroids and central serous chorioretinopathy. *Ophthalmology.* 2002;109(10):1834-1837.
4. Giuffrè C, Carnevali A, Codenotti M, et al. Persistent subretinal fluid mimicking central serous retinopathy after scleral buckling surgery: possible vortex vein compression role. *Eur J Ophthalmol.* 2017;27(2):e54-e6.
5. Sorenson R, Soni A. Central serous chorioretinopathy following medial transposition of split lateral rectus muscle for complete oculomotor nerve palsy. *Journal of American Association for Pediatric Ophthalmology and Strabismus.* 2017;21(2):161-162.