Paracentral Acute Middle Maculopathy after infection with Covid-19

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INTRODUCTION

Paracentral Acute Middle Maculopathy (PAMM) is defined as a clinical finding which presents as a hyperreflective band spanning the inner nuclear layer (INL) observed on optical coherence tomography (OCT).[1,2] In acute settings, patients often present sudden onset of one or multiple paracentral scotomas, with slight or absent reduction in visual acuity, and on occasion, a deep grayish lesion on fundoscopy.[3] In chronic stages, the condition may progress to INL thinning and atrophy.[3,4]

Although not yet completely clarified, its pathophysiology seems to derive from hypoxic-ischemic damage to the intermediate and deep capillary plexuses of the retina.[3] Some of the identified risk factors include systemic diseases like hypertension, dyslipidemia and atherosclerosis, as well as ocular conditions like glaucoma, inflammatory chorioretinopathies, and, most importantly, ocular vessel occlusion.[3,4] Substantially, overall conditions associated with an increased risk of thrombotic events, namely sickle cell disease, vasculopathies and coagulopathies, have also been identified as major risk factors for PAMM.[4]

Several cases in literature have reported the occurrence of PAMM after viral infections, chiefly dengue fever and upper respiratory tract infections.[5,6,7] Although pathophysiology remains speculative, it most likely derives from thrombotic events in the chorioretinal microvasculature prompted by the hypercoagulable states existing in these conditions.[3,8] In this report, we introduce a case of PAMM happening two months after a Covid-19 infection, in order to discuss the propedeutics and implications of this correlation to contemporary practice in Ophthalmology.

CASE REPORT

A 68-year-old man presented to our service with the complaint of a band-shaped scotoma in the superior field of the right eye, which had started three days earlier. Past medical history included systemic hypertension, diabetes, dyslipidemia and coronary artery disease. He had undergone bilateral phacoemulsification and implantation of intraocular lenses one year earlier. The patient had been diagnosed with COVID-19 two months before, evolving with a mild course of disease and spontaneous resolution. On admission, visual acuity was 20/25 in the right eye and 20/20 in the left eye. Intraocular pressure (IOP) was 14 mmHg in both eyes. Biomicroscopy demonstrated pseudophakic eyes bilaterally. Fundoscopy in the left eye did not reveal any findings; in the right eye, however, the exam demonstrated a whitish lesion inferiorly to the fovea, suggesting inferior branch retinal artery occlusion. Optical coherence tomography (OCT) showed a hyperreflective band at the level of ganglion cell, inner nuclear and inner plexiform layers, indicating PAMM.

DISCUSSION

Paracentral Acute Middle Maculopathy (PAMM) was first described by Sarraf et al in 2013, being depicted as a possibly more superficial variant of Acute Macular Neuroretinopathy (AMN).[1] With the increased body of knowledge about the entity and the development of multimodal imaging, however, PAMM was recently reclassified as completely independent from AMN, being now defined as a particular clinical finding that may point to the presence of an underlying retinal vasculopathy or systemic disease.[2,4] It is normally associated with an acute ischemic event involving the middle and deep capillary plexuses of the retina.

As it is currently understood, Covid-19 promotes the occurrence of vascular thrombotic disorders, possibly as a result of a thrombotic milieu prompted by the systemic inflammatory response that derives from infection with the virus.[8] This may have created the necessary environment for the branch arterial occlusion seen in the patient.

Although other predisposing factors, such as systemic hypertension, diabetes and dyslipidemia, could have contributed to the outcome, it is possible to establish a strong temporal relationship between Covid-19 infection and the onset of findings. Besides, PAMM has also been reported after other viral infections, such as the common cold, influenza and dengue, as well as after the influenza vaccine.[4,5] Supposedly, the pathophysiology in these cases involves a similar mechanism, consisting of an increase in serum viscosity and formation of a prothrombotic state, which appears as a consequence of systemic inflammatory reaction and dysregulation of the coagulation cascade, leading to the formation of fibrin clots.[4,5,8,9] Hematimetric alterations, namely anemia and thrombocytopenia, which may be present in these conditions, seem to facilitate tissue hypoxia and vascular events[4,5], contributing to the arisal of PAMM. In cases of mild Covid-19 presentation, virus-induced endothelial damage has also been suggested as a contributing factor for thrombogenesis.[10]

FIGURES

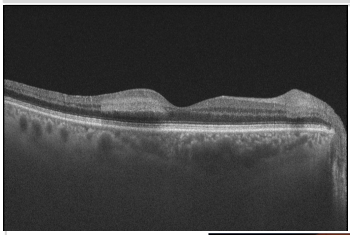

Fig. 1 - OCT of the right eye depicting a hyperreflective lesion at the level of the ganglion cell, inner nuclear and inner plexiform layers, suggestive of PAMM.

Fig. 2 - Fundus photograph of the right eye showing a whitish lesion inferior to the fovea, suggesting inferior branch retinal artery occlusion.

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