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Tubercular Serpiginous Choroiditis

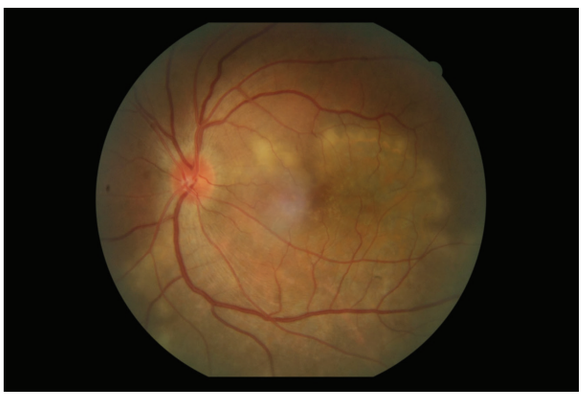
ABSTRACT

A 40-year-old Indian male presented to the emergency department three days following ocular trauma caused by an airborne insect. Initial complaints included a central scotoma and diminished visual acuity. The patient had no significant medical or surgical history. Following a thorough ocular examination, imaging tests, and laboratory investigations, the diagnosis of Serpiginous-Like Choroiditis (SLC) secondary to tuberculosis (TB) infection was established. Subsequent initiation of anti-tuberculous and immunosuppressive therapy led to a progressive amelioration of symptoms. This case highlights the significance of prompt diagnosis and comprehensive management in optimizing outcomes for individuals afflicted with SLC.

CASE PRESENTATION

A 40-year-old male of Indian origin, who resided for a long time in Dubai prior to relocating to Malta, presented to the emergency department three days after sustaining trauma to the left eye by an airborne insect while driving his motorcycle. Although the patient didn't suffer from any immediate discomfort, he subsequently reported the development of a relative central scotoma. The patient did not have any past ophthalmic history of note and denied suffering from similar symptoms in the past. The patient had no significant medical or surgical history.

Figure 1. Fundal photo of the left eye demonstrating the serpiginous-like lesion involving the macula on presentation to the ophthalmic casualty department.



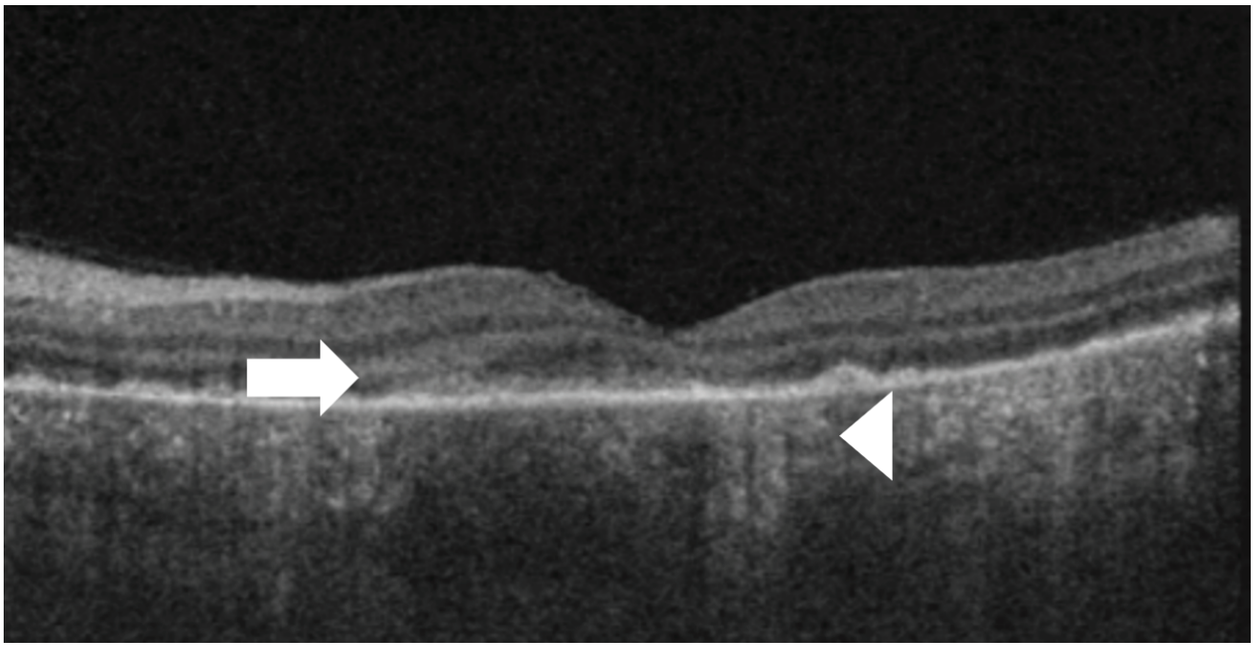
Initial examination at the ophthalmic casualty room revealed a visual acuity (VA) of 6/6-1 (Snellen) in the right eye and 6/60+1 in the left eye. Ishihara testing yielded scores of 13/13 for the right eye and 10/13 for the left eye. No relative afferent pupillary defect was observed. Anterior segment examination of both eyes was unremarkable with no evidence of cells or flare in the anterior chamber. Posterior segment evaluation revealed normal findings in the right eye, while the left eye exhibited 1+ cells (by Standardisation of Uveitis Nomenclature criteria) in the vitreous. No vitreous condensations were seen, however multifocal irregular placoid chorioretinitis (contiguous to disc) was visualised (Figure 1).

Following a comprehensive systemic inquiry, the patient indicated an absence of gastrointestinal, musculoskeletal, respiratory, dermatological, or neurological symptoms. Additionally, the patient was uncertain regarding his history of TB vaccination or contact with other individuals who suffered from the illness in the past. After the initial evaluation, the primary impression leaned towards SLC, with potential differentials including Acute Posterior Multifocal Placoid Pigment Epitheliopathy, toxoplasmosis chorioretinitis, or Syphilitic placoid chorioretinitis. Blood samples were obtained to rule out the aforementioned conditions.

These blood tests revealed a normal white cell count and CRP level. Serum Angiotensin-Converting Enzyme, used to help diagnose sarcoidosis was also normal. Additionally, the patient tested positive for TB-Quantiferon. Furthermore, serological testing for various viral entities indicated positive results for Herpes IgG and Varicella Zoster IgG. HIV, Syphilis and Toxoplasma IgG all resulted to be negative. The chest X-ray was unremarkable.

In view of the positive TB-Quantiferon test the patient was referred to the Infectious Disease Unit (IDU). Upon assessment at the IDU, the patient reported no history of cough, sputum production, fevers, chills, rigors, or weight loss. While uncertain about past exposure, the patient denied prior active treatment for tuberculosis (TB). The plan from an infectious disease standpoint included further investigations to exclude other possible infectious aetiologies, including Toxocariasis and viral infection, prior to committing to starting tuberculostatic treatment. The investigations did not show any evidence of active parasitic or viral infection.

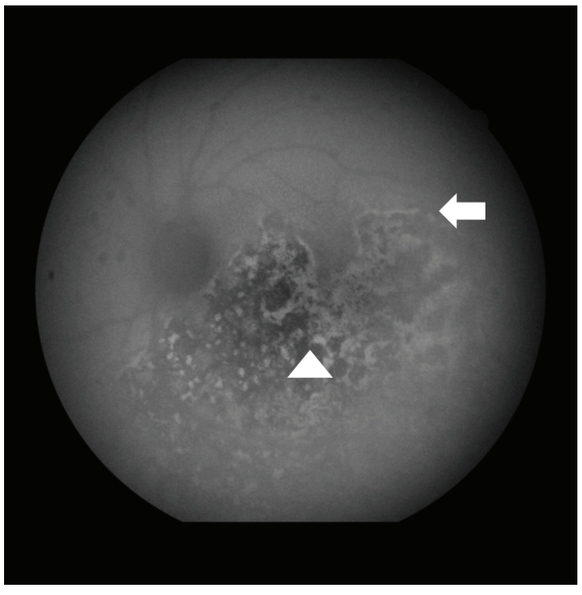
Figure 2. OCT B-Scan (foveal cut) of the left eye demonstrating hyper-reflectivity within the outer plexiform layer and outer nuclear layers (arrow) indicating active inflammation as well as hyper-transmission through the affected retinal pigment epithelium (arrowhead).



The patient was subsequently given an appointment to return to the ophthalmology outpatients in order to perform a baseline optical coherence tomography (OCT) and fundus auto-fluorescence (FAF). OCT showed loss of cone outer segment tips and an interrupted ellipsoid layer over the affected area. The fovea was also involved in the disease process. OCT also showed early choriocapillaris sclerosis (Figure 2). FAF showed hyper-autofluorescence at the lesion border suggesting advancing disease, with a mixed autofluorescence pattern within the serpiginous lesion suggestive retinal pigment epithelial loss within the affected area (Figure 3). Following the completion of the two aforementioned investigations, the diagnosis of SLC was conclusively established.

Without delay, the patient was commenced on anti-Tuberculosis therapy as instructed by IDU, specifically the standardized regimen known as RIPE therapy, comprising rifampin 300mg BD, isoniazid 150mg BD, pyrazinamide 2g daily, and ethambutol 1200mg daily. Following the initiation of RIPE therapy, the patient was promptly directed to initiate adjunctive corticosteroid therapy namely prednisolone at a dosage of 70mg daily, alongside vitamin D/Calcium supplementation BD and Omeprazole 20mg BD for gastro-protection.

Figure 3. Fundal Auto-Fluorescence Imaging of the left eye at presentation. Leading edge (arrow) demonstrates hyper-autofluorescence whereas the healing lesion core (arrowhead) demonstrates mixed pattern hyper/hypo-autofluorescence.



Subsequently, the patient underwent regular monitoring, during which significant improvements were observed. Within a span of 10 days, the visual acuity (VA) in the left eye notably improved from 6/60+1 to 6/24, while the right eye maintained a VA of 6/6. Over subsequent visits, a progressive reduction in the central scotoma was documented alongside improving results on OCT and FAF, both of which were systematically repeated. Following a month-long course of RIPE therapy, a point of remission of SLC was attained. At this juncture, the central scotoma had completely resolved, and the patient exhibited a VA of 6/6 in the right eye and 6/9 in the left eye.

Following two months of RIPE therapy, the patient underwent a thorough assessment by the infectious disease specialists, who decided to transition the treatment regimen to dual therapy, namely rifampin and isoniazid for an additional four months. Concurrently, the dosage of prednisolone was systematically tapered until reaching a maintenance dose of 10mg daily. At this juncture, the patient's treatment plan was augmented with the introduction of mycophenolate mofetil (MMF) to ensure quiescence whilst avoiding the need for higher corticosteroid doses. The initiation phase of MMF therapy commenced with a dosage of 500mg BD during the initial week, which was subsequently escalated to 1.5g BD. Throughout this period, bloods were taken on a weekly basis to monitor for potential MMF-induced toxicity. Notably, the patient's blood results remained consistently within normal ranges since the initiation of MMF therapy.

During the follow-up visits, novel extensions of the disease were identified upon fundoscopic evaluation. Consequently, the steroid dosage was escalated to 35mg daily, and a regimen for gradual tapering was reinitiated. Subsequent monitoring revealed a favourable response of the newly identified lesions to the adjustment in steroid dosage.

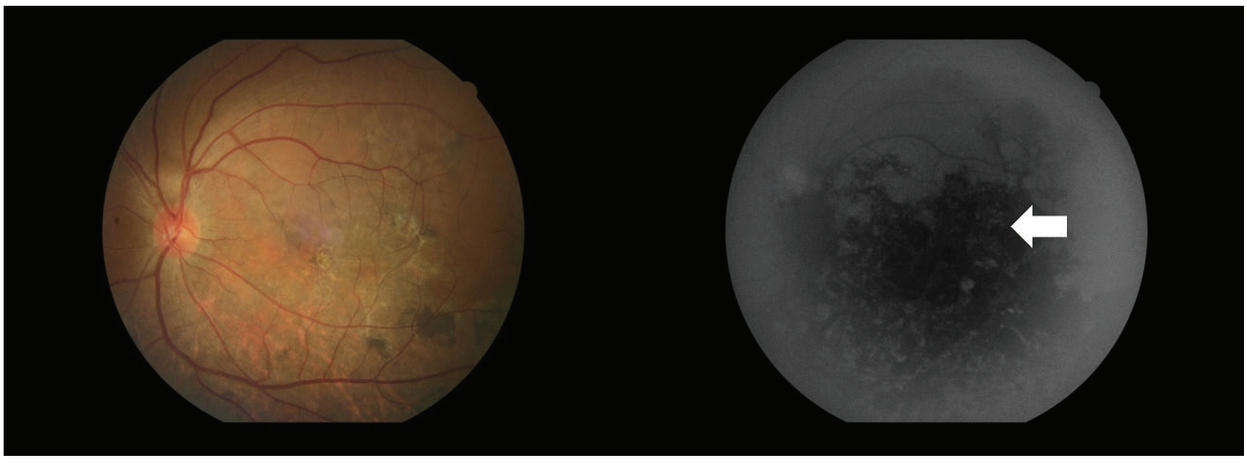
The patient managed to taper down the prednisolone dose to 5mg daily without any evidence of lesion extension noted over the last 4 months (Figure 4).

DISCUSSION

TB is a contagious bacterial infection primarily caused by *Mycobacterium tuberculosis*. It commonly affects the lungs but can also target other parts of the body including neural and ocular tissue. TB is spread via droplet transmission when an infected person coughs or sneezes, making it highly contagious. Despite being treatable and preventable, TB remains a significant global health concern, particularly in regions with limited access to healthcare resources.[1]

TB remains a significant public health challenge in developing countries like India, with much higher rates of incidence when compared to developed nations. In India, TB exhibits an incidence rate of 193 cases per 100,000 population. This high prevalence of TB in developing countries is attributed to factors such as constrained resources, deficient healthcare infrastructure, and socioeconomic inequalities, all of which present considerable obstacles to effective TB control measures.[2]

Figure 4. Fundal photo and fundal auto-fluorescence imaging of the left eye 4 months after initiating steroid-sparing treatment. Generalized hypo-autofluorescence (arrow) can be seen within the lesion core with no evidence of inflammatory activity at the border.



WHILE TB INCIDENCE RATES MAY BE RELATIVELY LOW IN DEVELOPED COUNTRIES LIKE MALTA, THE SIGNIFICANT BURDEN IN DEVELOPING COUNTRIES AS WELL AS THE INCREASING SCALE OF MIGRATION FLOWS FROM THE LATTER COUNTRIES HIGHLIGHTS THE ONGOING NEED FOR ENHANCED TB CONTROL MEASURES AND ADDRESSING ITS SOCIOECONOMIC DETERMINANTS

Between 15-20% of TB patients present with or are sequentially affected by extra-pulmonary TB.[3] Approximately 20% of patients with serological evidence of TB suffer from ocular manifestations namely TB Uveitis (TBU)[3] with reported prevalence of 2.7% in non-endemic countries.[4]

Ocular TB reaches the eye and its adnexal tissue via haematogenous spread from the lungs or extra-pulmonary tissue which explains why the uveal layer and epiretinal vasculature are more commonly affected in TBU with involvement of both the anterior and posterior segment of the globe.[5]

The main issue when dealing with TBU is primarily reaching a diagnosis owing to its multiple modes of presentation and its ability to mimic other uveitic entities. Based on the extensive research performed by the Collaborative Ocular Tuberculosis Study Group, TBU can be mainly categorized into 3 groups namely: (i) TB-associated retinal vasculitis (ii) TB Choroiditis (including SLC and Tuberculomas) and (iii) TB Panuveitis.[6] Other entities which may be stem from TB include solitary optic nerve head granulomas, neuroretinitis and panophthalmitis and these have all been described in the literature.[7]

SLC usually initiates centrally and spreads in a helicoid manner and is associated with the evolution of surrounding satellite lesions. Contrary to this presentation, the lesions are usually non-contiguous to the optic nerve head.[7,8] The presence of multifocal lesions and mild-to-moderate vitritis, lack of peripapillary involvement and evidence of TB infection distinguish SLC from Serpiginous Choroiditis which is thought to be an exclusively autoimmune choriocapillaropathy.[8] The main pathophysiological mechanism of SLC is thought to be related to Mycobacterial aggregation within the retinal pigment epithelial layer which in turn triggers inflammation in the overlying neuro-sensory retina and underlying choriocapillaris thus highlighting the importance of treating this condition with both tuberculostatic and immunosuppressive therapy.[9]

CONCLUSION

This case report emphasizes the challenges in diagnosing and managing TBU, focusing on SLC. Timely recognition of ocular manifestations, coupled with a comprehensive evaluation, facilitated the diagnosis of this rare condition. Initiation of anti-tuberculous therapy and adjunctive corticosteroids led to favorable treatment response, evidenced by progressive improvement in visual acuity and resolution of central scotoma. The successful transition to a tailored treatment regimen guided by the infectious disease specialists underscores the importance of multidisciplinary collaboration in optimizing clinical outcomes.

While TB incidence rates may be relatively low in developed countries like Malta, the significant burden in developing countries as well as the increasing scale of migration flows from the latter countries highlights the ongoing need for enhanced TB control measures and addressing its socioeconomic determinants. Let us not forget that migrants are a hard-to-reach group and this translates into a challenge for TB control in higher-income countries. This case underscores the importance of clinical vigilance and comprehensive management strategies when addressing ocular TB sequelae, with the ultimate aims being improving patient quality of life, mitigating TB resistance, and minimizing transmission.

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