

## OPTIC PERINEURITIS DUE TO TUBERCULOSIS WITH NO PULMONARY DISEASE: A REPORT OF TWO CASES AND MRI FINDINGS

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**Abstract:** Optic perineuritis (OPN) is a rare form of orbital inflammatory disorder, which occurs on the optic nerve sheath and adjacent tissue. It may be idiopathic, also known as primary, or secondary to underlying causes, such as infections or autoimmune diseases. Patients usually present with progressive visual loss and pain during eye movements which can be uni or bilateral. Clinically, optic perineuritis may be similar and difficult to distinguish from optic neuritis, resulting in delayed diagnosis and treatment. Magnetic Resonance Imaging (MRI) plays a fundamental role in the diagnosis of this condition, with perineural enhancement representing the utmost imaging biomarker. Tuberculosis (TB) is essentially a lung disease caused by *Mycobacterium tuberculosis*. Extrapulmonary disease may occur alone or in association with pulmonary TB. Ocular involvement is uncommon, occurring in less than 5% of cases (3).

Herein we report two cases of young female patients presenting progressive visual loss, with the final diagnosis of optic perineuritis due to tuberculosis with no pulmonary disease, in which the diagnosis was based on imaging findings and cerebrospinal fluid (CSF) analysis. We reinforce the importance of identifying this disorder in early stage, for appropriate management and a better prognosis.

**Keywords:** Optic Perineuritis; Tuberculosis; Visual Loss; Magnetic Resonance Imaging; Young Female;

## CASE REPORT

CASE 1: A 27 year old woman seek medical assistance with a history of chronic treatment for migraine over the last 5 years, with satisfactory pain control until one month before admission, when there was a change in pain pattern. She also presented low visual acuity early in the morning and proptosis on

the right eye. On admission she had ptosis, amaurosis and papilledema on the right eye (Figure 1).

CASE 2: A 44-year-old woman with history of unilateral headache associated with reduced visual acuity, scotomas and photophobia over the last week. Physical examination on admission revealed papilledema (Figure 2).

Patients were admitted to the emergency department and diagnostic workup was performed, including MRI of the brain and orbits, CSF analysis, in addition to inflammatory and infectious screening.

The diagnosis of optic perineuritis (OPN) was given based on MRI findings of abnormal bilateral and asymmetrical enhancement in the optic nerves, better seen in the coronal plane referred to as *donut sign* and in the axial plane as the *Traintrack sign*.

CSF analysis included GeneExpert assay which was positive for *Mycobacterium tuberculosis*, confirming the diagnosis as OPN due to tuberculosis, despite the fact that the patients had no respiratory symptoms and no evidence of lung disease.

Patients were treated with intravenous methylprednisolone therapy for 5 days. Later on, RIPE regimen (Rifampicin + Isoniazid + Pyrazinamide + Ethambutol) was started, and they were discharged to continue treatment on outpatient clinic, with gradual recovering of symptoms.

## DISCUSSION

TB is responsible for significant morbidity and mortality all over the world, especially in undeveloped countries (4). The most common site of involvement is pulmonary disease, but is very important to be aware of possible extrapulmonary manifestation, such as ocular disease. Ocular TB can result in permanent visual loss when it is not promptly recognized and treated. OPN is a commoner form of presentation in relation to optic neuritis (3).

OPN is an unusual form of orbital inflammatory disease in which the inflammation is confined to optic nerve sheath, as a result non-specific fibrosis. OPN can be classified into idiopathic (primary) or secondary. Most cases are primary, as there is no underlying causes. Secondary causes include diseases such as Tuberculosis (TB), autoimmune diseases, Myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD), Syphilis or lymphoproliferative diseases.

OPN patients usually present with acute vision loss over weeks and painful eye movement. Visual loss severity is variable. Some patients describe only blurred vision. Fundoscopic examination demonstrate disc edema. Symptoms such as ptosis, exophthalmos and ophthalmoplegia may also be present.

It might be difficult to distinguish between OPN and optic neuritis by clinical signs and symptoms. Nonetheless, it is crucial to have a confident diagnosis because treatment of those conditions differ significantly (1). In this context, MRI plays an important role because it is able to distinguish the exact location of the inflammatory process.

OPN diagnosis is based on clinical and MRI findings. In order to detect perineural inflammation surrounding optic nerve's sheath, a fat-suppressed, Gadolinium-enhanced T1 sequence should be performed. Peripheral enhancement appears as "tram track sign" in axial plane and as "doughnut sign" in coronal plane.

These findings are not specific for OPN and

may be present on other inflammatory diseases of optic nerve sheath, such as meningioma, lymphoma, orbital pseudotumor or even metastasis (1). Additional findings can be seen in OPN cases, such as subtle enhancement of the sclera, extraocular muscles and orbital fat (5).

OPN cases due to TB can be diagnosed by optic nerve biopsy, although it is not recommended routinely due to the high operatory risk. The diagnosis of ocular TB can be particularly challenging when there is no associated lung disease. Nevertheless, the majority of extrapulmonary TB cases occur in the absence of lung involvement. Accordingly, the diagnosis of ocular TB can be presumed based on MRI findings and a positive test such as GeneExpert assay, especially in countries where it is an endemic disease.

OPN usually has good prognosis if properly treated, and is directly related to the time gap between the onset of visual symptoms and the beginning of therapy.

## CONCLUSION

OPN caused by TB is rare and might be a challenging diagnosis due to nonspecific symptoms and lack of uniformity in diagnostic criteria, especially in the absence of concomitant pulmonary disease.

We reported two OPN cases caused by TB in which the diagnosis was made based on MRI findings and GeneExpert assay. In both cases treatment was initiated promptly with intravenous methylprednisolone therapy followed by antitubercular medication, resulting in a good outcome.

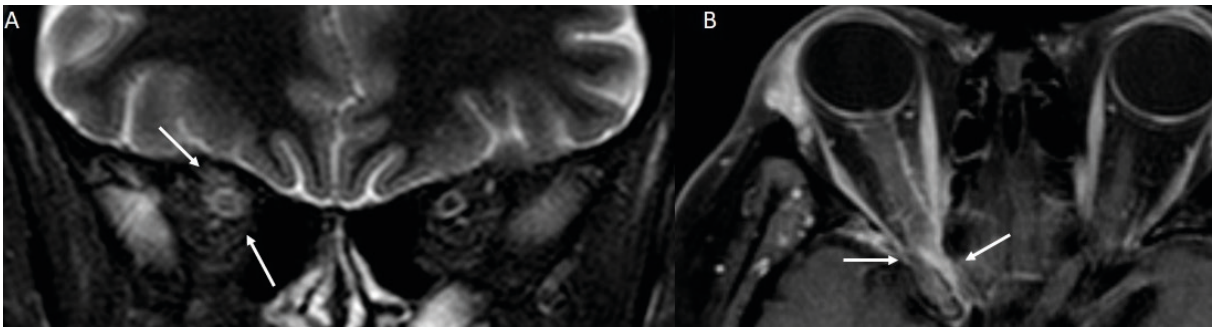


Figure 1: Patient 1. MRI. A. STIR sequence in coronal plane showing hiperintense signal in the orbital fat surrounding optic nerve sheath (arrows). B. Post contrast T1 sequence in axial plane depicting abnormal enhancement adjacent to optic nerve at the level of the optic canal (arrows).

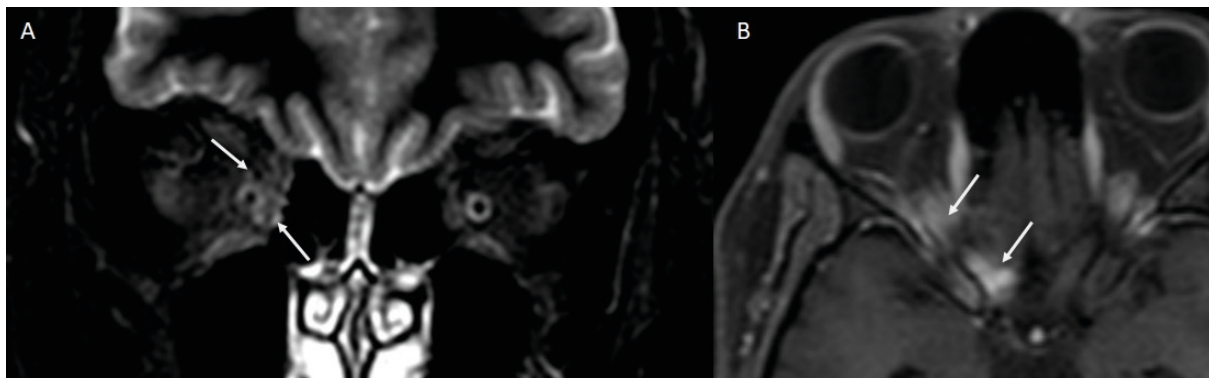


Figure 2. Patient 2. MRI. A. STIR sequence in coronal plane showing hiperintense signal in the orbital fat surrounding optic nerve sheath (arrows). B. Post contrast T1 sequence in axial plane depicting abnormal enhancement adjacent to optic nerve at the level of the orbital apex and optic canal (arrows).

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