

# Syphilitic dementia presenting with Adie's tonic pupil and mesial temporal lobes hyperintensities

## *Demência sífilítica apresentando pupila tônica de Adie e hiperintensidades temporais mesiais*

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### ABSTRACT

Syphilis became a rare cause of dementia in the present days. Screening tests for syphilis are no longer recommended according to 2001 American Academy of Neurology guidelines. On the other hand, as it may represent a potentially treatable cause in developing countries, the *Academia Brasileira de Neurologia* recommends laboratory screening for syphilis in patients with dementia. The diagnosis of neurosyphilis is established with basis on the clinical setting, along with treponemal and non-treponemal serum antibodies, and cerebrospinal fluid pattern. Magnetic resonance imaging generally reveals cortical atrophy. Focal signs in the temporal lobes are rarely seen. A case of a young man diagnosed with neurosyphilis is presented, on the basis of neuropsychiatric symptoms, uncommon pupillary changes (Adie's tonic pupil), CSF with positive FTA-abs, and increased IgG index, and additionally mesial temporal lobes hypersignal changes.

**Keywords:** syphilis, dementia, tonic pupil, Adie, magnetic resonance, temporal lobe.

### RESUMO

Considera-se neurosífilis uma causa rara de demência atualmente. Testes para investigação de sífilis não são mais recomendados de acordo com as orientações da Academia Americana de Neurologia, de 2001. Por outro lado, como pode representar uma causa potencialmente tratável, a Academia Brasileira de Neurologia recomenda a investigação de sífilis em pacientes com demência. O diagnóstico de neurosífilis é estabelecido pelo quadro clínico em associação com anticorpos treponêmicos e não treponêmicos, e exame de LCR. Ressonância magnética revela, em geral, atrofia cortical. Presenças de sinais focais em lobos temporais são consideradas raras. É apresentado caso de homem jovem com diagnóstico de neurosífilis com base nas manifestações neuropsiquiátricas, alteração incomum ao exame pupilar (pupila de tônica de Adie), LCR com FTA-abs positivo e índice de IgG elevado, e ainda hipersinal nos lobos temporais mesiais.

**Palavras-chave:** sífilis, demência, pupila tônica, Adie, ressonância magnética.

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## INTRODUCTION

Central nervous system (CNS) *Treponema pallidum* infection became a rare cause of dementia in the modern era. Screening tests are no longer recommended according to 2001 American Academy of Neurology (AAN) Guidelines on treatable dementias<sup>1</sup>. On the other hand neurosyphilis could represent a potentially treatable cause of dementia in developing countries, so the *Academia Brasileira de Neurologia* (ABN) recommends laboratory screening for syphilis in patients with dementia<sup>2</sup>.

Neurosyphilis diagnosis remains a challenge even for experienced physicians due its wide range of clinical and laboratory presentations. Pupil involvement is observed in almost all cases, being Argyll Robertson pupil the characteristic one<sup>3</sup>. Adie's pupil is rarely associated with neurosyphilis and few articles mention this relation<sup>4</sup>.

In order to establish a diagnosis of neurosyphilis one must consider the clinical setting along with treponemal, non-treponemal serum antibodies and cerebrospinal fluid (CSF) pattern. Brain imaging generally reveals cortical atrophy. Focal signal changes are rarely seen in the temporal lobes<sup>5</sup>.

This brief report presents a case of a young man diagnosed with neurosyphilis on neuropsychiatric symptoms basis, uncommon physical findings (Adie's tonic pupil), subtle CSF abnormalities (slight pleocytosis with elevated IgG index as CSFFTA-abs), and rare syphilitic MRI presentation (mesial temporal lobes signal changes).

## CASE REPORT

A 32-year-old right handed man was referred to a neurology outpatient facility due to an insidious onset history of social withdrawal, apathy and cognitive impairment. There was no history of primary syphilis. Physical assessment yielded widespread paratonia, brisk deep tendon reflexes with Babinski sign on the right, and stereotyped oral movements. Ocular examination revealed anisocoria, with an overall sluggish response to both light and accommodation on the left. In the dark there was slowness of mydriatic reaction (Adie's tonic pupil) (Figures 1 and 2). Mini Mental State Examination (MMSE) was 18 out of 30 (11 years of schooling).



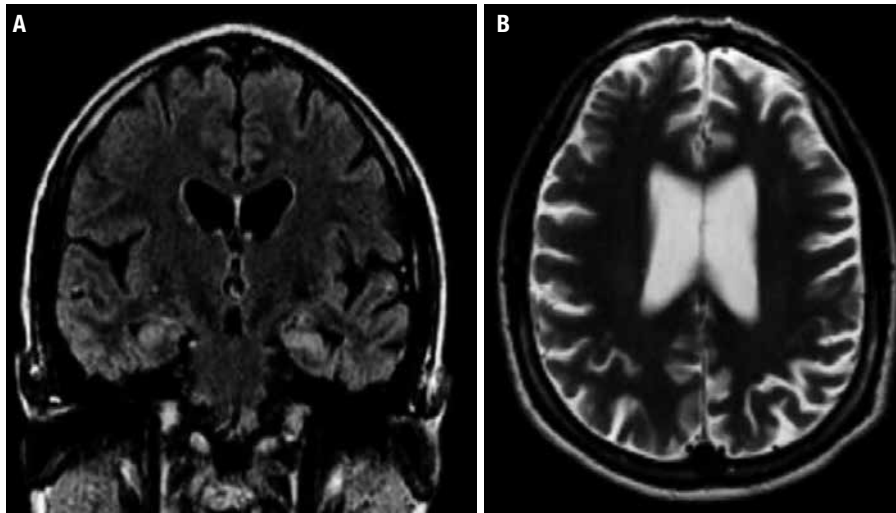
**Figure 1.** Incomplete constriction of left pupil with light.



**Figure 2.** Left pupil remains small for an abnormal long time, comparing to right side, with darkness (tonic pupil).

Serum non-treponemal exam (VDRL) was positive at a titer of 1/8 and treponemal reactions (FTA-abs) were strongly positive. Neurosyphilis was confirmed by CSF analysis: slight pleocytosis (5 cells/mm<sup>3</sup>, 90% lymphocytes), CSF-VDRL was negative, but CSF-FTA-abs was positive with high IgG index (1.44 [NR ≤ 0.6]). HIV serology was negative, serum levels of ceruloplasmin were within normal limits, as well as vitamin B12 level, and thyroid function. Magnetic resonance imaging (MRI) revealed diffuse cortical atrophy and high signal changes on T2 and FLAIR sequences in both temporal lobes (Figures 3A and 3B).

The patient underwent a 14-day course of intravenous benzyl penicillin. At follow up visit after five months no significant improvement in MMSE (19/30) was observed, but there was not further cognitive decline after one year. His relatives perceived improvement of apathy. After one year the cells and IgG index of CSF normalized.



**Figure 3.** (A) Brain MR imaging (FLAIR sequence) coronal: demonstrates high signal hyperintensities in temporal lobes, markedly in temporal pole and mesial regions. (B) Axial T2-weighted MRI of the brain demonstrates diffuse cortical atrophy.

## DISCUSSION

Pupillary abnormalities have long been related to neurosyphilis, being Argyll Robertson pupil the most prevalent presentation. In this condition the photomotor response is abolished (or almost) whereas accommodation is intact in a discoric and myotic pupil due to dorsal midbrain lesions<sup>3</sup>. Adie's tonic pupil rarely occurs in the context of an underlying systemic condition, being found generally in healthy young women with patellar and ankle areflexia. It consists of a mydriatic pupil with sluggish reaction to both light and accommodation due to ciliary ganglion (parasympathetic) idiopathic degeneration. It is postulated that the pathophysiology of Adie's pupil in neurosyphilis is caused by ischemic changes in post-ganglionic fibers<sup>3</sup>.

Diagnosing neurosyphilis based on laboratory exams is by no means straightforward, once there are no specific changes. Serum treponemal tests are useful, since they yield high negative-predictive value. Positivity of CSF VDRL sets the diagnosis, but it occurs approximately in 50% of patients only, as mentioned by some studies. When CSF-VDRL is negative, a positive CSF-FTA-abs reaction with either pleocytosis of  $\geq 5$  cells/mm<sup>3</sup>, or proteins of  $\geq 45$  mg/dl, or IgG index of  $\geq 0.6$  (considering HIV-negative patient) must be present to diagnose neurosyphilis<sup>4</sup>. This patient was

HIV-negative and the CSF analysis revealed reactive FTA-abs, with 5 cells/mm<sup>3</sup>, and elevated IgG index (1.44), suggestive of intrathecal antibody synthesis.

Brain imaging more often shows diffuse cortical-subcortical atrophy and infarcts, unspecific signs of late CNS syphilis. On rare occasions MRI demonstrates non-enhancing high signal changes on T2 and FLAIR MRI in temporal lobes, resembling limbic encephalitis<sup>5</sup>, as observed in the present patient. Polymerase-chain reaction of such areas could have shown *Treponema pallidum* DNA.

The treatment of choice in case of late neurosyphilis is intravenous benzyl penicillin 3-4 million units every 4 hours during 14 to 21 days. Repeated CSF analysis should be obtained 6-12 months after treatment in order to document normal CSF cells, proteins or IgG index<sup>4</sup>.

## CONCLUSION

Based on this case it may be concluded:

- (1) neurosyphilis is still responsible for some cases of secondary dementias and should be ruled out;
- (2) pupillary abnormalities other than Argyll Robertson pupil can be found in neurosyphilis, such as Adie's tonic pupil;

- (3) if Adie's tonic pupil is present in a dementia context, syphilitic screening tests should be promptly requested;
- (4) neurosyphilis should be included in the differential diagnosis of temporal lobes non-enhancing MRI changes, which can also mimic limbic encephalitis abnormalities.

### **CONFLICT OF INTEREST**

There is no conflict of interest to declare.

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