

## Meningovascular Neurosyphilis: Illustrative Case

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### Abstract

**Background:** Meningovascular neurosyphilis is not a common clinical presentation of *Treponema pallidum* infection. Only 20% of primary syphilis cases have central nervous system invasion, most of them asymptomatic. However, recent years have seen an increase in incidence, probably related to the reemergence of the human immunodeficiency virus (HIV) epidemic. Patients with HIV infection are more susceptible to early meningeal infection associated with meningitis, cranial nerve damage or acute ischemic stroke. Since it is a rare entity, experience is limited and neuroimaging reports are scarce.

**Case presentation:** A 45-year-old woman presented subacute headache, fever, dysarthria and right hemiparesis. Neuroimaging revealed a subacute ischemic lesion in the posterior arm of the internal capsule and a moderate stenosis of the supraclinoid portion of the left internal carotid artery, so inflammatory process or vasospasm in the origin of the left anterior choroidal artery was suspected. Lumbar puncture showed meningovascular neurosyphilis, and HIV was detected in blood. Control angiography computed tomography (CT) revealed resolution of stenosis.

**Conclusions:** In patients with HIV and syphilis co-infection, progression to meningovascular complications is accelerated, often with early strokes. Since it is a potentially treatable cause, routine serological tests in young stroke patients are essential. Leptomeningeal or extra-axial enhancement should also be suspected, as well as white matter changes in this population. The incidence of endarteritis in the neuroimaging tests is not entirely defined, probably due to the more frequent typical presentation in the form of subacute encephalitis.

**Keywords:** Neurosyphilis; syphilis; HIV; Vasculitis; Stroke

### Case Report

Meningovascular neurosyphilis is a classic entity with a low incidence nowadays. Therefore, experience is limited and neuroimaging reports are scarce. We present a case report without any relevant past medical history with acute-onset right hemiparesis. Neuroimaging laboratory management and follow updates are summarized. A 45-year-old woman suffered from progressive holocranial headache, fever and constitutional syndrome for several months prior to presentation. She went to emergency room with acute dysarthria and right hemiparesis. With the suspicion of an acute stroke, a CT scan was performed, with a subacute ischemic injury to the posterior limb of the left internal capsule being identified (**Figure 1A**). The study was complemented with a CT angiogram that revealed significant stenosis of the supraclinoid portion of the left internal carotid artery (**Figure 1D**) and unspecific CT perfusion. The infarction was confirmed by magnetic resonance imaging (MRI) (**Figure 1B-C**). The cerebrospinal fluid (CSF) analysis revealed lymphocytic meningitis with glucose consumption (37 mg/dL) and 27 predominantly mononuclear cells, 1.53 g/L of protein and positive Anti-treponema Pallidum antibodies. Serology serum tests performed were positive for HIV and *Treponema pallidum*, with RPR 1/128. Other serological tests were determined, all of them with negative results: *Toxoplasma*, Cytomegalovirus, *Borrelia burgdorferi*, *Cryptococcus neoformans*, *Mycobacterium tuberculosis* and multiple Polymerase Chain Reaction (PCR) assay at CSF; Epstein-Barr virus, Parvovirus B19, HSV 1 and 2, Varicella-Zoster virus, Leishmania, *Echinococcus*, *Borrelia burgdorferi*, Hepatitis B and C virus, *Coxiella burnetii* and *Brucella* in serum. The eye fundus was also evaluated for cytomegalovirus retinitis screening, with no remarkable findings.

In addition, apical ground-glass infiltrates were evident on CT-angiography. A thoracic CT scan was performed, which showed bilateral

interstitial pulmonary infiltrates that pointed to an opportunistic infection as the primary possibility. Bronchoalveolar lavage PCR confirmed pulmonary infection by *Pneumocystis jirovecii*. This allowed us to reach a definitive diagnosis of syphilis and neurosyphilis within an HIV co-infection, stage C, with opportunistic infection by *Pneumocystis jirovecii*.

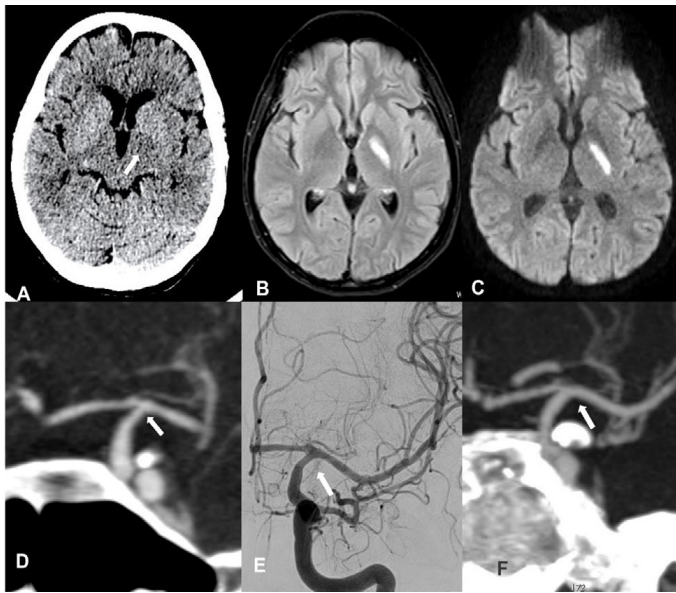
The study was completed with cerebral arteriography and treatment was started with dexamethasone, antiretroviral therapy (bictegravir/tenofovir alafenamide/emtricitabine), Benzylpenicillin for *Treponema pallidum* and Trimethoprim/Sulfamethoxazole for respiratory infection by *Pneumocystis jirovecii*. The evolution of the patient was favorable with a viral load decrease and improvement of motor deficit and headache. A follow-up CT angiogram performed at 6 weeks showed complete resolution of the intracranial stenosis (**Figure 1F**). Clinically, she maintained a minimal residual upper limb paresis. Nine months later, the serum RPR dropped to 1/64 and no HIV RNA was detected.

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**Figure 1.** **A:** Cranial CT scan showing hypodensity compatible with ischaemic lesion affecting the left internal capsule (white arrow). **B and C:** Cranial MRI in FLAIR (B) and diffusion (C) sequences confirming the presence of an ischaemic lesion affecting the left internal capsule. **D:** Cranial CT-Angiography demonstrating significant stenosis in the left internal carotid end-portion (white arrow). **E:** Left internal carotid artery selective arteriography confirming stenosis (white arrow). **F:** 6 weeks later control CT-Angiography showing complete restoration of the left terminal carotid artery (white arrow).

In patients with HIV and syphilis co-infection, progression to meningovascular complications is accelerated, often with early strokes [1,2]. Therefore, routine serological tests in young stroke patients are essential, as it is an eminently treatable cause. Leptomeningeal or extra-axial enhancement should also be cause for suspicion, as well as white matter changes in this population [3]. The incidence of endarteritis in neuroimaging is not entirely defined, probably as a result of the more frequent typical presentation in the form of subacute encephalitis [3].

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**Conflict of interest:** none.

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