

## Post Meningioma Resection Complicated by Intracranial Hemorrhage in a Neurosyphilis Patient: A Case Report

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### Case Description

A 48-year-old African American female with a medical history of hypertension, GERD, asthma, neurosyphilis and status post meningioma resection presented to the emergency department with complaint of headaches and lethargy for two days. The patient had a remarkable past surgical history of 30 days' post-operative sphenoid meningioma resection with bilateral craniotomy and on-going treatment with penicillin for active syphilis infection with positive RPR and FTA antibodies. Head CT performed secondary to altered mental status demonstrated right frontal intracranial hemorrhage and the patient underwent emergent craniotomy with hematoma evacuation, without noted complication during surgery. CT angiography of the neck and brain was negative for intracerebral aneurysm and arteriovenous malformation. Coagulopathy studies were negative.

On the seventh day post-operative from the first hematoma evacuation, the patient reported progressive bilateral vision loss. A CT was again performed and demonstrated a left frontal intracranial hemorrhage. A second emergent craniotomy and hematoma evacuation was performed without complications. The patient was noted to have had poor vision deteriorating at baseline from optic atrophy secondary to the intracranial hemorrhage. Ophthalmology was consulted and noted optic atrophy as well as Adie syndrome of the eye. Her new functional state declined with severe cognitive deficits of memory, language, and attention with periods of agitation, confusion, and hallucinations. She was admitted to our traumatic brain injury rehabilitation unit for functional deficits in mobility, transfers, ADL, and iADL.

## Discussion

World Health Organization estimated annual case reports of syphilis in the United States has increased by 5-folds “fewer than 10,000 in 1956 to more than 50,000 in 1990” [13]. In 2015, 74,702 new cases were reported by Centers for Disease Control (CDC) [16]. Majority of increased incidence are among the early age, underprivileged, heterosexuals, blacks, and urban dwellers, in New York, California, and Southwest [13]. Syphilis has various manifestations as they are time dependent and classified as primary, secondary, tertiary, or quaternary. Factors that determine the development and progression of tertiary disease are not known [15].

Tertiary syphilis comprises three types: neurosyphilis, cardiovascular syphilis, and late benign syphilis [14]. Neurosyphilis is then divided into two general categories: 1) early neurosyphilis affects mesodermal structures (ie, mainly meninges and vessels), and 2) late neurosyphilis affects the brain and spinal cord parenchyma [13]. Some degree of neurosyphilis is present in the primary stages; therefore, neurosyphilis, in a broad sense, begins early. Based on the dominant clinical manifestations, meningovascular syphilis (MVS) is one of the six dominant neurosyphilis [14].

MVS generally occurs during the early stages of syphilis. Often times, patients will initially complain of nonspecific symptoms consistent with a meningo-encephalitic process due to inflammation of leptomeningeal arteries. This encephalitic prodrome may last weeks to months, and can include: headaches, vertigo, and behavioral changes [6]. Due to the generic nature of the symptoms, neurosyphilis is often misdiagnosed as other various CNS infections such as herpes simplex encephalitis or primary CNS vasculitis.

The endoarteritis seen in MVS is similar to that caused by other infectious processes. Perivascular inflammation causes fibroblastic proliferation of the intima, thinning of the media, and fibrous and inflammatory changes to the adventitia. This leads to luminal narrowing causing multiple small areas of thrombosis, ischemia, occlusion, and infarction [2]. Therefore, meningovascular disease often results in ischemic stroke, and should be considered in young adult patients with high-risk lifestyle or history of sexually transmitted illness presenting with transient ischemic attack (TIA) or stroke.

The most common presentation of meningovascular syphilis is a stroke syndrome in a relatively young adult involving the middle cerebral artery (most common) or the branches of the basilar artery (second most common) [16]. A subacute encephalitic prodrome is present, with headaches, vertigo, insomnia, and psychological abnormalities (eg, personality change, emotional lability, insomnia, decreased memory), followed by a gradually progressive vascular syndrome [14]. Rarely, MVS may present with hemorrhage caused by ruptured aneurysmal dilatations or continuous dissection.

Although MVS presentation is less common, several cases have been noted. One such case was recorded by Zhang et. al, in which the authors noted continuous dissection formation of the M1 segment of the right MCA in the presence of syphilis as the cause of a cerebral hemorrhage. Severe stenosis of the M1 and the right MCA, M1 segment of the left middle cerebral artery, and the A1 segment of the right anterior cerebral artery was also noted [4]. Another such case

was described by Koh et. al, where in a 56-year-old male presented with an intracranial hemorrhage in the left frontal lobe and subarachnoid hemorrhage due to neurosyphilis [3].

## Conclusion

Our patient presented with active syphilis infection at the time of initial presentation, as well as multiple events of cerebral hemorrhage. Initially, the consideration was made that the bleeding may be related to the previous resection of meningioma. However, due to the distinct location of the bleeding from the resection site, the presence of active syphilitic infection on first admission, and the two separate incidences of bleeding, as well as the overall cognitive decline of the patient, meningovascular syphilis remains the most likely cause of bleed in this patient.

As care of this patient continues, focus has remained towards patient's vision loss. We will continue to coordinate follow up with ophthalmology in order to evaluate vision loss. Meanwhile, we are also assisting the patient in adapting to her new onset vision loss, and plan to continue rehabilitation with an emphasis on completing ADLs with her current disability. The patient will continue to be monitored intermittently for any new onset bleeds or meningioma recurrence with MRI imaging.

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