CASE REPORT

Eye sign points to ancient diagnosis: A case report of neurosyphilis

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SUMMARY

A 50-year-old gentleman first presented with worsening motor disturbances, psychosis, and cognitive deterioration; he was initially misdiagnosed with schizophrenia and substance-induced psychosis. Computed tomography of the brain showing widening of sylvian fissures, atrophy of the temporal lobe and cerebellum as well as atrophy of the basal ganglia. After further evaluation, neurosyphilis was identified, with Argyll Robertson pupils serving as the key diagnostic finding. This case emphasizes the importance of performing a complete eye examination in neuropsychiatric assessment and considering infectious aetiologies in atypical presentations.

INTRODUCTION

There has been a resurgence of syphilis, beginning in the 1970s, with changes in sexual practices.[1] Neurosyphilis causes a variety of neuropsychiatric signs and symptoms. Argyll Robertson pupils are characterized by small, irregular pupils that accommodate but do not react to light, and are indicative of neurosyphilis. This case study centers on the patient's initial misdiagnosis with psychiatric diagnosis, which led to the identification Argyll Robertson pupils, and the existence of tertiary neurosyphilis.

CASE PRESENTATION

We present a case of a 50-year-old Malay man without any notable medical history who arrived with a steady decline in memory, disorientation, and motor impairments over two and a half years. The patient had progressive cognitive decline, characterized by forgetfulness, misplacing personal belongings, and having trouble navigating when operating a vehicle. In addition, he displayed disorientation when driving and could not successfully carry out basic activities like cooking simple meals. Despite these cognitive difficulties, he still managed to function independently.

After failed traditional treatment for 6 months, the patient sought the advice of a psychiatrist. A urine drug test indicated the presence of morphine, leading to the diagnosis of substance-induced psychosis. As part of the treatment, he was prescribed risperidone 1 mg to be taken twice daily. The patient's condition progressively worsened, as evidenced by increased social withdrawal, preoccupation, incoherent speech, and exacerbated sleep difficulties. His ability to perform the basic tasks required for daily living was compromised, necessitating the need for monitoring.

The patient was admitted to the medical ward, citing stiffness and tremors in both upper limbs, fever, and severe gastroenteritis symptoms. His cognitive decline had advanced, limiting his ability to identify only immediate relatives. His everyday living activities become completely dependent on his family members. The neurological examination of the patient revealed increased muscle tone in both upper and lower limbs, bilaterally. In the upper limbs, muscle power was reduced to 4/5 on both sides, and reflexes were brisk bilaterally. Similarly, in the lower limbs, muscle power was also 4/5 on both the right and left sides; however, reflexes were noted to be normal. The initial investigations consisted of a computed tomography brain scan, which revealed widening of sylvian fissures (Figure 2), atrophy of the temporal lobe and cerebellum as well as atrophy of the basal ganglia (Figure 1), and a lumbar puncture, which indicated increased cerebrospinal fluid protein levels of 1.38, cerebrospinal fluid glucose 3.37, and no acid-fast bacillus seen. Encephalitis autoimmune receptor profile was conducted on the cerebrospinal fluid, testing for several antibodies; contactin-associated protein 2 antibody, leucine-rich glioma-inactivated protein 1 antibody, dipeptidyl aminopeptidase-like protein 6 antibody, gamma-aminobutyric acid receptor antibody, and N-methyl-D-aspartate receptor antibody. All results were negative. The patient underwent treatment for probable meningoencephalitis and successfully finished a two-week regimen of antibiotics. During this hospitalization, the administration of risperidone was stopped because of the occurrence of extrapyramidal side effects and hyperactive delirium. The patient's creatine kinase levels initially increased to 29,000, then decreased to 4,000.

After discharge, the patient displayed increased social isolation, a lack of organization, and a disregard for personal cleanliness. His motor function began to decline, as indicated by his broad-based gait, muffled voice, slurred speech, and positive Romberg sign. He failed to attend follow-up appointments, but he returned 15 months later with increased irritability and disorganized behaviour. The patient was diagnosed with schizophrenia and prescribed olanzapine 10mg to be taken at night. Additionally, he received a monthly intramuscular injection of Fluanxol 20mg.

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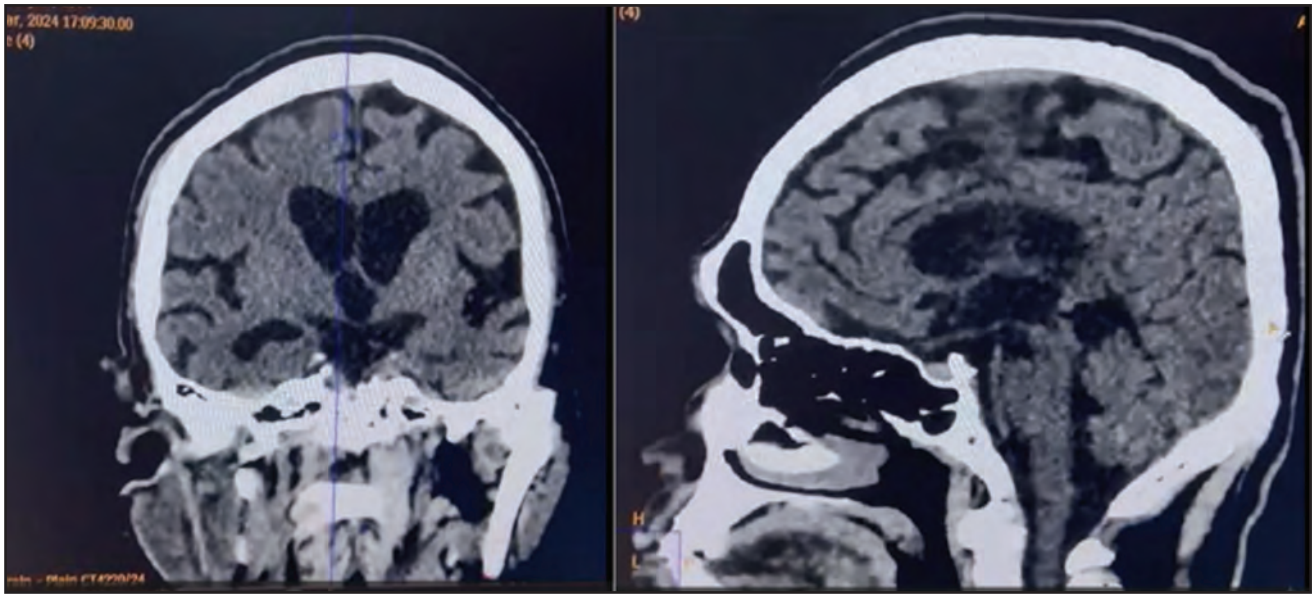

Fig. 1: Coronal view reveals atrophy involving basal ganglia. Parietal lobe relatively more affected, sagittal view, cerebellar atrophy also seen, thinning of corpus callosum seen

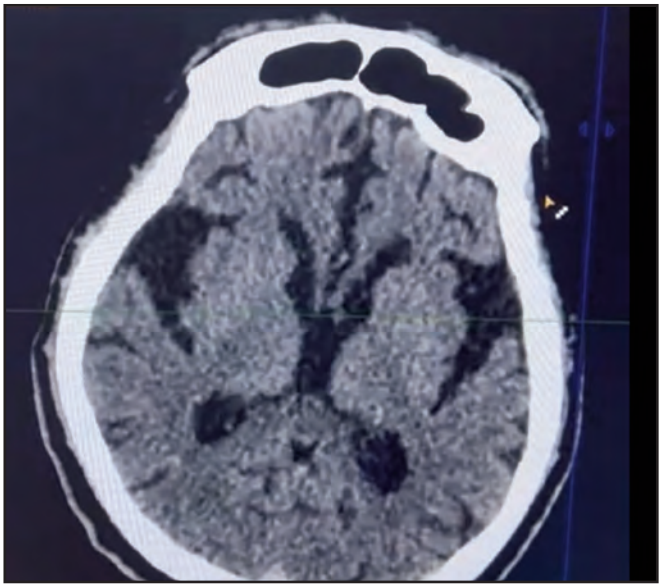

Fig. 2: The axial view shows widening of the Sylvian fissures

Five months later, the patient exhibited heightened irritability, verbal abuse, irrelevant speech, and disorganized behaviour, which included aggression toward family members. The urine drug test yielded negative results, while the basic laboratory tests (Full Blood Count, Renal Profile, Liver Function Test) showed no abnormalities. He received intramuscular Haloperidol and intravenous Valium and was subsequently transported to hospital. The psychiatric impression was relapsed schizophrenia. Nevertheless, upon admission, he experienced rigidity of bilateral upper limb, and creatine kinase levels rose to 1,542. The administration of antipsychotic medication was stopped because of the occurrence of extrapyramidal adverse effects.

His cognitive state fluctuated throughout his hospitalization. Computed tomography of the brain was repeated; it did not show any additional changes from the first scan. On the eighth day, blood testing indicated a positive Treponema pallidum particle agglutination test and reactive rapid plasma reagin test with a titre of 1:32, resulting in a diagnosis of neurosyphilis. The patient has no previous history of syphilis. Infectious disease specialists administered intravenous penicillin 4 million units every 4 hour for 14 days. Most notably, he exhibited Argyll Robertson pupils, which were small, irregular, and unresponsive to light but responsive to near accommodation.

DISCUSSION

Argyll Robertson pupils, named after Scottish ophthalmologist Dr. Douglas Argyll Robertson, are a distinct indicator of advanced tertiary neurosyphilis. Characterized by small bilateral pupils that fail to constrict in bright light but do constrict when focusing on a nearby object. This finding is highly specific to late-stage syphilis.[2]

Widespread use of penicillin had reduced the prevalence of Argyll Robertson pupils. However, this trend has reversed, particularly among men who have sex with men and individuals with human immunodeficiency virus. In 2016, the Centers for Disease Control and Prevention reported 30,676 cases of late and latent neurosyphilis in the United States, with many falling within the men who have sex with men population.[3]

The precise mechanism underlying Argyll Robertson's pupils is not well understood. Syphilis could be inducing lesions in the dorsal midbrain area. This affects the pupillary light reflex but does not affect the accommodation reflex.[2,4] The syphilitic lesion is the dorsal part of the midbrain, close to the Sylvian aqueduct. Damage to the Edinger-Westphal nucleus would impact the efferent pupillary fibers situated on its dorsal side. These fibers have a crucial function in the light reflex. The fibers associated with the accommodation reflex,

situated nearer to the ventral aspect of the Edinger-Westphal nucleus, remain unchanged.[4]

Argyll Robertson pupils were identified in this patient by small bilateral pupils that fail to constrict in bright light but do constrict when focusing on a nearby object. The symptoms typically occur bilaterally and develop slowly over months to years.[5] The patient's other neuropsychiatric symptoms, such as cognitive deterioration, motor abnormalities (e.g., broad-based gait), and behavioural alterations, were indicative of neurosyphilis.[6]

Other potential causes of light-near dissociation, such as Adie's pupil, diabetic neuropathy, and specific optic nerve lesions, should be considered as differentials. Argyll Robertson pupils are small and irregular in shape, and these correlate with other advanced syphilis symptoms such as tabes dorsalis and general paresis of insane.[6]

Tabes dorsalis is a late stage of neurosyphilis, distinguished by the degeneration of the nerves in the dorsal columns of the spinal cord. Apart from Argyll Robertson pupils, ataxia and proprioception loss are associated with the condition.[7] Patients frequently exhibit a wide-based walking pattern and a positive Romberg sign due to defective proprioception, as seen in this case.

General paresis of the insane is a condition characterized by the widespread and long-lasting inflammation of the brain caused by the invasion of Treponema pallidum. PARESIS is an abbreviation for Personality, Affect, Reflexes, Eye, Sensorium, Intellect, and Speech. These are the primary aspects of the disease, which exhibits a wide range of symptoms including cognitive impairment, behavioural changes, psychiatric features, as well as neurological signs such as dysarthria, myoclonus, intention tremors, seizures, hyperreflexia, and Argyll Robertson pupils.[8] This is corroborated by the most recent computed tomography of the brain results, which revealed brain atrophy. This is in line with the symptoms exhibited by the patient, including personality changes and delusions. Magnetic resonance imaging and computed tomography scans help identify causes of neurodegenerative dementia. Comprehensive cognitive evaluation would be necessary as well. Neurosyphilis should be considered even in human immunodeficiency virus negative heterosexual individuals when they experience rapid progressive dementia or any atypical form of dementia.[8]

Usually in neurosyphilis there are small, isodense focal nodules near the meninges which suggest the presence of syphilitic gummas. Syphilitic gummas usually appear as tiny nodules next to the meninges that have the same density as surrounding tissues on computed tomography scans. On magnetic resonance imaging scan, the objects appear dark on T1-weighted pictures, bright on T2-weighted images, and show a strong signal indicating movement on diffusion-weighted imaging. In addition, they exhibit homogeneous contrast enhancement on T1-weighted magnetic resonance imaging or contrast-enhanced computed tomography images.[9] Based on computed tomography scan findings in this case, it also suggest a differential diagnosis of frontotemporal dementia, as the bacteria has a predilection towards the frontal and temporal lobes.[10]

The existence of Argyll Robertson pupils is a diagnostic sign for neurosyphilis. In this instance, the detection of Argyll Robertson pupils redirected the diagnostic attention from other psychiatric and inflammatory diseases to an underlying infectious disease. This emphasizes the importance of comprehensive neuropsychiatric and ocular evaluations in individuals exhibiting atypical psychiatric symptoms, as ocular manifestations may offer essential diagnostic insights.

CONCLUSION

This case study emphasizes the importance of conducting thorough neuropsychiatric assessments and investigating viral causes in patients with unusual psychiatric symptoms. Argyll Robertson pupils are an important diagnostic sign for tertiary neurosyphilis, highlighting the importance for medical practitioners to be attentive in identifying these pathognomic signs which might guide the diagnostic workup and swiftly starting the necessary treatment.

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DECLARATION

The authors declare no conflicts of interest related to this publication.

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