Opercular Syndrome as a Sequelae of Herpes Simplex Virus Infection: A Case Report

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KEY CLINICAL MESSAGE:

Opercular syndrome is a rare cortical form of pseudo-bulbar palsy resulting in voluntary facio-labio-pharyngo-glosso-laryngo-brachial paralysis with well-preserved automatic and reflex movements. This report highlights herpes simplex virus as uncommon cause of the syndrome. Thus, suspicion, timely recognition and appropriate management are crucial for better outcomes in these patients.

Key words : Insular cortex infarction, herpes simplex virus, pseudobulbar palsy, focal seizure

INTRODUCTION

Opercular syndrome (OPS)-Foix-Chavany-Marie Syndrome (FCMS) is a rarely seen cortical type of pseudobulbar palsy that is characterized by paralysis of facial, lingual, pharyngeal, and masticatory voluntary muscles with preservation of autonomic, involuntary, and reflexive functions leading to automatic–voluntary dissociation.(1) It has a prevalence of $<1/1{,}000{,}000$.(2) Those muscles that are voluntarily paralysed are well preserved in autonomic, reflexive and emotional domains, which means that the corneal reflex, the threaten reflex, and emotional laughing or crying are all possible.(3)(4)

The anatomic basis for such a dissociation has been linked to the presence of alternate pathways connecting the amygdala and hypothalamus to the brainstem controlling reflexive and automatic muscle action.(5) FCMS is most commonly secondary to bilateral sequential anterior opercular or subcortical insular infarcts.(6)

Few cases have been reported of opercular syndrome with viral infection such as Herpes simplex virus.(2)(7)

Here we present a case of herpes simplex virus infection induced bilateral opercular syndrome in a male patient.

CASE HISTORY/ EXAMINATION

A 26-year-old married male presented at a community hospital with complaints of headache, slurred speech, and recurrent focal onset seizures with multiple episodes of loss of consciousness for 2 days. After the initial evaluation, he developed fever and exhibited a decline in the Glasgow Coma Scale (GCS-7, E3V1M3) necessitating intubation.

Following the initial intubation, the patient was extubated but later required reintubation due to respiratory distress caused by hospital-acquired pneumonia. Subsequently, he was airlifted to a tertiary center in the capital, where he remained in the Intensive Care Unit (ICU). He was then referred to our center for further management.

Examination at our center revealed Glasgow Coma Scale (GCS)of E4VtM6. On neurological examination, the patient was aphonic but exhibited normal reading and verbal comprehension. Communication was maintained through writing and signs. Corneal, pupillary, and extraocular movements were intact. Jaw jerk was exaggerated. Pupils were reactive to light bilaterally. He was unable to whistle and could not stick out tongue or chew. He had normal mouth opening and could swallow water. Tongue was stationary in midline with no atrophy or fasciculation. Palatal movement was absent on voluntary command. Spontaneous smiling, yawning, palatal, laryngeal and blink reflexes were present but gag reflexes was absent. His strength was 4+ out of 5 across all joints of upper and lower limbs on motor examination. Deep tendon reflexes were preserved. Plantar response was down-going. Coordination, sensory examination, and extrapyramidal signs were within normal limits.

METHODS (DIFFERENTIAL DIAGNOSIS, INVESTIGATIONS AND TREATMENT)

Diagnostic workup included imaging and CSF studies. At the first center, CSF analysis results indicated a viral etiology, characterized by total leucocyte count – 10 per high power field constituted by 98% lymphocytes with sugar level – 20 mg/dl, elevated protein - 79 mg/dl and normal ADA.

Computed Tomography scan at the second center revealed bilateral asymmetric hypodensities, predominantly on the left side, affecting the cortex, antero-inferior temporal lobe, and infero-lateral lobes. Repeat lumbar puncture report was positive for both Herpes Simplex Virus (HSV) and Epstein-Barr Virus (EBV) confirmed with polymerase chain reaction.

MR Imaging at our center revealed ill-defined T2/FLAIR lesions in the bilateral insular cortex, bilateral superior temporal gyri, and bilateral precentral gyrus involving both grey and white matter of frontoparietal lobes (left $>$ right), features that were suggestive of sequelae of Fiox-Chavany-Marie syndrome secondary to herpes simplex encephalitis.

Antiviral therapy (Acyclovir- 500 mg intravenous three times a day) was initiated at the second center where CSF-PCR showed Herpes simplex, which was continued at our center covering total duration of 28 days. A tracheostomy tube was electively inserted to facilitate respiratory support. Besides antiviral therapy, other supportive treatments were given to address complications such as hospital-acquired pneumonia and respiratory distress.

RESULTS AND CONCLUSIONS (OUTCOME AND FOLLOW-UP)

The patient's clinical course was complex, marked by neurological sequelae and respiratory compromise. Feeding was done with a nasogastric tube. Effective management necessitated the collaboration of multiple specialties, including neuro-medicine, infectious diseases, critical care, and Ear, Nose, Throat Head and Neck Surgery departments.

At the time of discharge and upon further inquiry via tele-communication and physical follow up in subsequent couple of months, the patient was able to read and write but mild dysarthria was present. Nasogastric feeding was also subsequently removed with patient being able to feed on his own.

DISCUSSION

The opercular syndrome(OS) includes bilateral corticobulbar involvement with voluntary facio-labio-pharyngo-glosso-laryngo-brachial paralysis with well-preserved automatic and reflex movements.(8) It is a sequalae of bilateral lesions of the anterior opercular area surrounding the insula formed from gyri of the frontal, temporal and parietal lobes. It is a form of cortical type of pseudobulbar palsy.(8)

The etiology encompasses vascular lesions including thrombotic or embolic multiple strokes, particularly in adults; infections of the nervous system, for example herpes simplex encephalitis, and toxoplasmosis secondary to AIDS; acute disseminated encephalomyelitis; head trauma; vasculitis; multiple sclerosis; perinatal difficulties; and perisylvian cortical dysplasias.(1)(8)

OS is commonly associated with infectious cause in childhood (72.7) including herpes simplex virus. The

virus is the most prevalent cause (37.5%). Likewise in adults OS is more commonly linked to cerebral infarction.(53.3%)(9) with viral cause being less common. We found only one previous case related to OS with EBV infection. EBV encephalitis causes damage to the deep nuclei of the basal ganglia and thalamus, which is different from our findings. Our patient's PCR results showed no amplification of EBV DNA. Only 75% of patients with a positive EBV serological test show detectable EBV DNA. The remaining 25% can have negative PCR results.(9)

The operculum includes the area covering the island of Reil, and is made up of parts of the frontal, parietal, and temporal cortex and lesions which disrupts the connections between these areas and the relevant cranial nerve nuclei in the brainstem can cause the suprabulbar palsy of the opercular syndrome. This explains the preservation of emotional and automatic bulbar reflex movements, which relies on the use other neural pathways.(10)

In contrast to pseudobulbar palsy, the opercular syndrome is characterized by lack of sphincter disturbances, the rarity of pathological laughing, the decreased tone of the affected muscles, and the abolished gag reflex and it differs from bulbar palsy in the lack of fasciculation, atrophy and denervation, and in the preservation of involuntary innervation and of reflexes except for the gag reflex.(10) The patient had mild residual dysarthria as seen in other studies. Incomplete resolution of neurologic symptoms is consistent with prior reports of HSV-induced FCMS.(15)

Weller et al classified opercular syndrome based on etiology; i.e. (a) Classical form most often related to vascular etiology; (b) Subacute form due to central nervous system infections; (c) Developmental form most often related to neuronal migration disorders; (d) Reversible form in children with epilepsy; and (e) Rare type related with neurodegenerative disorders.(11)

Patient can present with opercular syndrome in the setting of initial near normal cerebrospinal fluid (CSF) studies as seen in the early phase of our case. HSV encephalitis should be suspected and treated in febrile patients with otherwise unexplained neurologic deficits even if initial CSF analysis is unremarkable.(12)

The clinical manifestation is fairly uncommon, however radiological evidence of involvement of the operculum in HSE is commonly evident. MRI is very sensitive in showing opercular damage, depending on the etiology.(13)

The limbic system is usually affected by HSVE; the most commonly affected areas are the medial temporal lobes, but it can also impact the insular, cingulate, and fronto-basal cortex. The lesions are unilateral or bilateral. On a brain MRI, regions of T2 and FLAIR hyperintensities involving the cortex and white matter are commonly observed. Although a few cases of basal ganglia involvement have been recorded in HSVE, basal ganglia are typically avoided.(13)(14)

In terms of prognosis for HSE, it is critical to begin antiviral therapy at an effective dose and time duration timely along with supportive care. Inadequate dosing and treatment can lead to a poor prognosis. Many authors believe that 21 days would be secure. Acyclovir and valacyclovir are suggested as prophylaxis against HSE. We treated our case with intravenous acyclovir for three weeks and continued for one more week until the control CSF PCR findings came back negative. It is favorable for prognosis to continue the intravenous treatment for at least four weeks, even if the control CSF HSV-1 PCR goes negative.(2)

CONCLUSION

Viral infection can be a cause for FCMS. Increased awareness of FCMS and its associations with viral etiologies are crucial for facilitating prompt diagnosis with imaging modalities. Timely recognition and comprehensive management are required for improving the long-term outcome for FCMS.

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DATA AVAILABILITY STATEMENT Data will be provided by the corresponding author upon reasonable request.

CONSENT

Written informed consent was obtained from the patient's family for the publication of this case report in accordance with the journal's patient consent policy, including the use of de-identified imaging and clinical data.

IMAGE

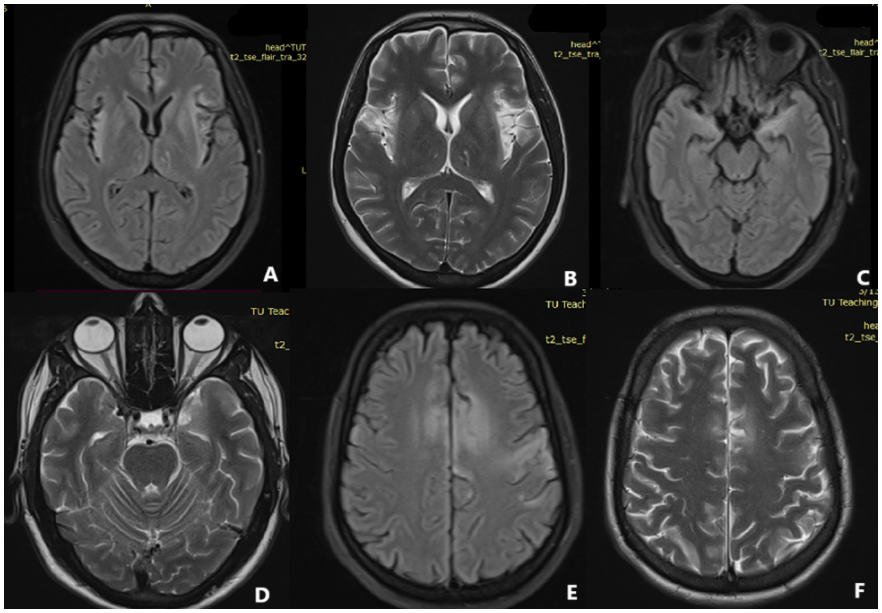

Figure 1:

A - MRI FLAIR axial view showing high signal intensity in B/L insular cortical area

B - MRI T2 axial view showing high signal intensity in B/L insular cortical area

C - MRI FLAIR axial view showing high signal intensity in bilateral superior temporal gyri

D - MRI T2 axial view showing high signal intensity in bilateral superior temporal gyri

E - MRI FLAIR axial view showing high signal intensity in bilateral precentral gyrus predominantly in left side

F - MRI T2 axial view showing high signal intensity in bilateral precentral gyrus predominantly in left side