

**CASE OF WEBER SYNDROME, WALLEMBERG SYNDROME, MILLARD GUBLER SYNDROME: A CASE SERIES ON BRAINSTEM STROKE SYNDROME**

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**Abstract**

Brainstem stroke syndrome is also known as Brainstem infarction. It is a syndrome that develops as a result of necrosis of brain tissue due to the lack of oxygen supply to the brainstem following Ischemia. Brainstem stroke syndrome is classified anatomically based on the region of the brainstem involved i.e. Midbrain, Pons, and Medulla oblongata. The brainstem controls vital functions such as respiration, circulation, swallowing, wakefulness, blood pressure control, cardiac rhythm, etc. The cranial nerve nuclei present in the brainstem controls functions like motor functions, balance, hearing, vision, taste, etc. Thus, any damage to the brain stem may lead to morbidity and mortality. Timely management of brainstem stroke syndrome is crucial and the initial management focuses on maintaining the patient airway and adequate oxygenation. This case series presents cases of brainstem stroke syndrome involving - Midbrain (Weber's Syndrome), Medulla Oblongata (Wallenberg Syndrome), and Pons (Millard Gubler Syndrome).

**INTRODUCTION**

Brainstem stroke syndrome is also known as brainstem infarction or crossed brainstem syndrome. It is a syndrome that develops as a result of necrosis of brain tissue due to the lack of oxygen supply to the brainstem following ischemia.<sup>[1]</sup> Brainstem stroke syndrome is classified anatomically based on the region of the brainstem involved.

**The classification is as follows,<sup>[1]</sup>**

1. Midbrain - Weber's syndrome, Benedikt syndrome, Claude syndrome, Nothnagel syndrome, Wernekink commissure syndrome
2. Pons - Millard Gubler syndrome, Brissaud-Sicard syndrome, Facial colliculus syndrome, Gasperini syndrome, Gelle syndrome, Grenet syndrome, Inferior medial pontine syndrome (Foville syndrome), Lateral pontine syndrome (Marie-Foix syndrome), Locked-in syndrome, Raymond syndrome, Raymond-Cestan syndrome
3. Medulla Oblongata - Lateral Medullar Syndrome (Wallenberg syndrome), Avellis syndrome, Babkinski-Nageotte syndrome, Cestan- Chenais syndrome, Hemimedullary syndrome (Reinhold syndrome), Jackson syndrome, Medial

Medullary syndrome (Dejerine syndrome), Opalski syndrome, Vernet syndrome.

The brainstem controls vital functions such as respiration, swallowing, wakefulness and circulation. Thus any damage to the brain stem may lead to morbidity and mortality.<sup>[2]</sup> Timely management of brainstem stroke syndrome is crucial and the initial management focuses on maintaining the patient airway and adequate oxygenation. This is followed by the management of comorbidities and risk factors of the patient. In addition to this anti-platelet therapy is administered and Intravenous thrombolysis therapy or thrombectomy can be considered according to the individual patient's condition.<sup>[3]</sup>

**CASE SERIES****Case 1: A case of Weber's Syndrome**

A 58-year-old male consulted the General Medicine OPD with the chief complaints of giddiness, vomiting, drooping of the left upper eyelid, and weakness of the right upper limb and lower limb, which was sudden in onset. The patient was a known case of Diabetes Mellitus and was on Insulin therapy. On admission the patient's vitals were as follows- Pulse rate was 90bpm, Blood pressure was

140/80mmHg. On Examination the following observations were made - Higher Mental Function was Normal, Cranial nerve examination - 3rd Cranial nerve showed restriction of elevation and depression, Adduction of the left eye was seen, there was drooping of the eyelid of the left eye, the pupil of the left eye was dilated and was not reacting to light. Other Cranial nerve examinations were normal, Motor system examination showed that the right upper limb has a power of 3 / 5, and the right lower limb had a power of 3 / 5, reflexes were brisk on the right side, and the sensory system was found to be normal, there were no cerebellar signs. All the blood investigations were found to be normal. MRI Brain showed DWI hyperintense left midbrain infarction.

Based on the subjective and objective findings, a diagnosis of Weber's syndrome was made and the patient was treated with Anti-platelet medications.

### **Case 2: A case of Lateral Medullary Syndrome (Wallenberg Syndrome)**

A 60-year-old male consulted the General Medicine OPD with the chief complaints of sudden onset giddiness, vertigo, difficulty in swallowing (dysphagia), slurring of speech (dysarthria), and a tendency to sway towards the right side on standing. The patient was a known case of Diabetes Mellitus and was on Tablet Metformin 500mg BD and Insulin therapy. On admission the patient's vitals were normal. On examination the following observations were made: Right eye showed mild ptosis, right pupil showed miosis, and Higher Mental Function was normal. The cranial nerve examination of the 5<sup>th</sup> nerve showed that the patient was unable to feel pain and temperature over the right half of the face. The 9<sup>th</sup> and 10<sup>th</sup> nerves showed gag reflex lost on the right side. The motor system was found to be normal. The bilateral plantar showed flexor, and the sensory system showed hemisensory loss over the left side of the body. Cerebellar signs were positive on the right side. The finger nose finger test was impaired on the right side. Dysdiadochokinesia was present on the right side, and the Heel to knee test was impaired on the right side. The blood routine examination was normal. MRI revealed a wedge-shaped area of attenuated signal intensity in the right dorsolateral medulla, which appeared hypointense in TW1 and hyperintense in T2 and flair images.

Based on the subjective and objective findings, a diagnosis of Lateral Medullary Syndrome (Wallenberg Syndrome) was made. The patient was managed with Ryles tube feeding, anti-platelets, and Mannitol. The patient's condition improved in 2 weeks.

### **Case 3: A case of Millard Gubler Syndrome**

A 56-year-old male patient arrived at the Emergency department with the chief complaints of weakness of the right upper limb and lower limb which was sudden in onset. The patient also noticed double

vision (diplopia). The patient was a known case of Diabetes Mellitus and Hypertension for 4 years. The patient was a smoker with 15 pack years. The patient was conscious and oriented. On arrival the patient's vitals were as follows - Pulse rate was 80bpm and Blood Pressure was 170/100mmHg. On Examination the following observations were made - Higher Mental Function was Normal, and cranial nerve examination showed 6th nerve left eye abduction palsy and the 7th nerve left side lower motor lesion involving the left half of the face. The other cranial nerve examinations were normal. Motor system examination showed that the power of the right upper limb was 3 / 5, and the power of the right lower limb was 3 / 5. Right side brisk tendon reflexes and rightside plantar extensor were observed. The sensory system examination was normal and the cerebellar signs were normal. The routine blood examination was Normal. MRI showed- Ischemic infarct in the Antero lateral part of the left half of Pons (Ventral portion/pons).

Based on the subjective and objective findings, a diagnosis of Millard Gubler Syndrome was made. The patient was managed with Anti-platelets and the patient's condition improved.

## **DISCUSSION**

This case series presents cases of brainstem stroke syndrome involving the Midbrain (Weber's Syndrome), Medulla Oblongata (Wallenberg Syndrome), and the Pons (Millard Gubler Syndrome)

Weber's Syndrome is the partial or complete paralysis of the oculomotor nerve along with contralateral hemiplegia.<sup>[4]</sup> Wallenberg syndrome is also known as Lateral Medullary Syndrome as it involves infarction in the lateral segment of the medulla oblongata. The clinical presentation includes dysphagia, slurred speech, vertigo.<sup>[5]</sup> Millard Gubler Syndrome causes paralysis of abducent nerve and facial nerve and contralateral hemiplegia. In all three cases, the patients were older males in the age group between 55- 60 years. All of them were Diabetic patients and had comorbidities, yet the outcome of the patients was good. This may be attributed to the timely management of brainstem stroke syndrome in all three cases.<sup>[6]</sup>

## **CONCLUSION**

The brainstem is responsible for vital functions like breathing and circulation. Brainstem stroke syndromes are a group of syndromes classified based on the anatomical position of damage to the brainstem. This damage is the necrosis of the brain tissue due to Ischemia. The timely management of brainstem stroke syndrome is crucial to avoid morbidity and mortality and improve the patient's quality of life.

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