Medial and Lateral Pontine Syndrome, Superior Cerebellar Artery Syndrome, Parinaud’s Syndrome, Weber’s Syndrome

In the following article you will learn how to differentiate between medial and lateral pontine syndrome, superior cerebellar artery syndrome, Parinaud’s syndrome and Weber’s syndrome, what their main characteristics are and where the site of lesion is to be expected.

Medial Pontine Syndrome

This condition is also known as Foville’s syndrome, caused by the blockage of the paramedian and the short circumferential branches of the basilar artery. The part of the brain affected is the pons. The structures of the pons affected by the blockage are:

- The corticospinal tract which results in contralateral hemiparesis.
- The medial lemniscus which causes disruption of the posterior column-medial lemniscus pathway. This causes contralateral loss of the tactile and vibration sensations.
- Abducent nerve nucleus causing paralysis of the ipsilateral lateral rectus muscle. This causes strabismus.
- Facial nerve nucleus causing weakness of the facial muscles on the ipsilateral side. This is due to involvement of the corticobulbar tract.
Lateral Pontine Syndrome

It is also known as Marie-Foix syndrome, caused by the blockage of the long circumferential branches of the basilar artery and the anterior inferior cerebellar artery, causing lesion in the pons. The structures within the pons which are affected by this lesion are:

- The lateral spinothalamic tract causing contralateral loss of pain and temperature sensations of the trunk and the limbs.
- The corticospinal tract causing contralateral weakness of the extremities.
- The spinal trigeminal tract and nucleus resulting in ipsilateral loss of pain and temperature sensations of the face.
- The vestibular nuclei causing vertigo, nausea and vomiting.
- The cochlear nuclei resulting in the loss of hearing sensation.
- The cerebellar tracts causing ipsilateral ataxic gait.
- The descending sympathetic tract causing ipsilateral ptosis, miosis and anhydrosis (ipsilateral Horner's syndrome).

Superior Cerebellar Artery Syndrome

This rare disorder is caused by the blockage of the superior cerebellar artery.

Clinically, it is difficult to differentiate this syndrome from the posterior inferior cerebellar artery syndrome and the anterior inferior cerebellar artery syndrome. The diagnosis is confirmed with MRI. This disease results in:

- Contralateral loss of touch and pain sensation from the body
- Nausea and vomiting
- Slurred speech
- Cerebellar ataxias.

Parinaud’s Syndrome

It is also known as dorsal midbrain syndrome, mainly caused by the tumor of the
pineal gland which suppresses the rostral interstitial nucleus of medial longitudinal fasciculus. It is also associated with multiple sclerosis in the young females, AV malformation, obstructive hydrocephalus and stroke in older patients. This syndrome is characterized by:

- Paralysis of the upward gaze while downward gaze is preserved
- Retraction of eyelid, also known as Collier’s sign
- ‘Setting-sun sign’ which is the conjugate downward gaze
- Pseudo-Argyll Robertson pupils, i.e., pupils do not react to light but may accommodate
- ‘See-saw nystagmus’
- The condition is often associated with bilateral papilledema.

A thorough work up of the causes of this syndrome through neuro-imaging such as MRI brain is essential before proceeding to any management plan.

It needs to be differentiated from other clinical conditions such as pineal cyst, Niemann-Pick disease, Wilson’s disease and hydrocephalus.

Weber’s Syndrome
It is usually caused by a unilateral lesion in the midbrain due to occlusion of the paramedian branches of the basilar artery. The structures of the midbrain affected with their presenting symptoms are as follows:

- **Substantia nigra** causing contralateral movement disorders (*Parkinsonism*) as the dopaminergic fibers innervate the contralateral hemisphere motor area
- **Corticospinal fibers** causing contralateral hemiparesis and upper motor neuron signs
- **Corticobulbar tract** resulting in contralateral facial muscles weakness and hypoglossal nerve dysfunction
- **Occulomotor nerve fibers** causing ipsilateral occulomotor nerve palsy. 
  There’s *diplopia* due to fixed wide pupil pointing down and out along with *drooping of eyelid*.

The infants born with the Weber’s syndrome may develop *convulsive disorders* during the first year of their lives. They have *lower intellect* and become resistant to the treatment.

They have a *large port-wine stain on the forehead and on one upper eyelid* due to abundance of capillaries over the ophthalmic branch of the trigeminal nerve.

Other symptoms include *developmental delays* and *increased intra-ocular pressure* causing *glaucoma*.

**Treatment options for Weber’s syndrome**

- **Laser treatment** to remove port-wine birth mark
- **Anticonvulsant drugs** to treat the seizure disorders
- Monitoring of glaucoma and surgical intervention if required
- **Physical therapy for muscle weakness** and educational therapy for the patients with mental delays
- **Brain surgery** for the removal of affected parts.
References


Sherwood, I. Human physiology. 7th ed; 2010.


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