# Disorders of the Central Nervous System and Their Comparison

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Neurologic disorders can affect people of every age, gender, and culture. Because they are similar in nature, disorders of the central nervous system can often times be confused with each other. As a healthcare provider, it is important to recognize the differences between common neurologic disorders and be able to correctly identify and treat them.

## Bell's Palsy

Bell's palsy is a central nervous system disease that is most commonly caused by an infection of the facial nerve or by lesions in the brain. Infections range from herpes simplex, Epstein-Barr virus, Lyme disease--among others. However, "the underlying etiology often remains unclear despite extensive workup for investigation" (Taksande, pg. 1). Bell's palsy is characterized by one-sided facial drooping and eventual total paralysis. Symptoms may also include a loss of taste, inability to produce tears or salivate, and dry eyes. This condition may be helped with corticosteroids, antibiotics, eye drops, and physical therapy; however, bell's palsy will resolve itself within a few weeks or months. A few questions that would be useful in assessing a patient would include 'have you been able to smile or blink on the affected side?', 'have you noticed any problems with dry eyes or mouth?', and 'have you been sick with any sort of viral or bacterial infection recently?'.

## Multiple Sclerosis

Multiple sclerosis is an autoimmune disorder targeted against the myelin sheaths that surround nerves and improve transduction of nerve signals. Because this disease disrupts the transmission of signals from the periphery to the brain and back, patients with multiple sclerosis experience a steady decrease in motor function and sensation over time. Multiple sclerosis "can be categorized

in different clinical subtypes, namely active versus not active neuroinflammation" (Gravesteijn, pg. 2). This mean that the damage caused by multiple sclerosis can be actively progressing or remain dormant for a time. Although this disease has no cure, symptoms can be managed through physical and occupational therapy. A few questions that would be useful in assessing a patient would include 'have you been feeling any weakness or numbness in your extremities recently?', 'have you noticed being off-balanced while walking?', and 'do you experience dizziness, blurred vision, or slurred speech?'.

## Meningitis

Meningitis is the inflammation of the surrounding tissue of the brain and spinal cord otherwise known as the meninges. This inflammation comes from a variety of sources such as bacterial, parasitic, fungal, and viral infections as well as trauma. "The most common types of meningitis are pyogenic (bacterial) meningitis and tuberculous meningitis (TBM)" (Yerramilli, pg. 1). Meningitis can present through headaches, fever, confusion, seizures, nausea, or vomiting. If meningitis is suspected, a cerebral spinal fluid culture will be taken and analyzed in the lab to determine what kind of infection is causing the inflammation. Treatments include antibiotics, pain medications, and anti-inflammatory medication. Most treatments simply require time for the infection to heal. A few questions that would be useful in assessing a patient would include 'have you experienced a fever?', 'have you had any nausea, vomiting, or headaches?', and 'have you had a recent infection or trauma?'.

## Encephalitis

Encephalitis is caused by inflammation of the brain tissue. This disorder can be caused by bacterial or viral infections as well as a rarer form known as autoimmune encephalitis. Symptoms of "encephalitis can include cognitive regression/impairment, memory changes, seizures, sleep disturbance, autonomic instability, speech changes or mutism, and involuntary movements" (Shekunov, pg. 1). Treatments for encephalitis may include antibiotics, antipyretics, and intravenous antiviral therapy. A few questions that would be useful in assessing a patient would include 'have you been exposed to ticks or mosquitos recently?', 'have you noticed yourself feeling more irritable or confused lately?', and 'have you experienced any seizures?'.

## Cerebral Vascular Accident

Cerebral vascular accidents, otherwise known as strokes, occurs when blood flow to the brain is disrupted or blocked completely. This can be caused by clots or hemorrhages. Because of the decreased blood flow to the brain, symptoms can include hemiparalysis or the face or extremities, loss of coordination, and slurred speech. Factors that can increase the risk of suffering a cerebral vascular accident includes "smoking, hyperlipidemia, obesity, diabetes, atrial fibrillation, sedentary lifestyle, raised body mass index and hypertension" (Doogue, pg. 2). Strokes are a serious medical condition that requires immediate treatment depending on the type of stroke the victim is experiencing. A few questions that would be useful in assessing a patient would include 'can you smile or raise your eyebrows?', 'can you repeat what I just said?', and 'can you walk in a straight line?'.

## Comparing Disorders of the Central Nervous System

Because of the nature of different central nervous system disorders, there is value in understanding the similarities and differences between the most common neurological disorders. Analyzing these disorders in a comparative way can help healthcare providers identify different disorders more accurately and efficiently.

### Cerebral Vascular Accident compared to Bell's Palsy

Cerebral vascular accidents, or strokes, share a few key symptoms with Bell's palsy which can make the identifying process challenging. One of the main similarities between these two disorders is paralysis of half the face. Drooping and complete loss of function for half of a patient's face occurs when the function of the trigeminal cranial nerve is disrupted. These two disorders can also present with slurred speech—either caused by lack of blood flow or lack of trigeminal nerve response. However, these two disorders differ because strokes present with slurred speech as well as loss of balance and coordination whereas Bell's palsy only affects the face where loss of taste and an inability to produce saliva and tears manifests.

### Bell's Palsy compared to Multiple Sclerosis

Bell's palsy and multiple sclerosis both present with slurred speech and slowed facial reactions. However, Bell's palsy is often times a moderate-to-fully recoverable condition, effects the facial nerves, and is caused by an infection whereas multiple sclerosis is incurable, affects the entire nervous system, and is caused by an autoimmune response.

### Multiple Sclerosis compared to Encephalitis

Multiple sclerosis and encephalitis can both present as autoimmune disorders. Both disorders cause involuntary movement and trouble with speech. However, multiple sclerosis is a life-long disease, affects the myelination of nerves, and more directly affects the physical ability of the

patient whereas encephalitis is often times fully recoverable with treatment, affects the brain tissue, and more directly affects the cognitive ability of the patient.

**Encephalitis compared to Meningitis**

Encephalitis and meningitis are both inflammatory disorders that causes fever, confusion, and seizures. As long as both disorders are caused by a bacterial infection, both encephalitis and meningitis can be treated with antibiotics and antipyretics. However, encephalitis is the inflammation of brain tissue and meningitis is the inflammation of the tissue that surrounds the brain and spinal cord.

**Meningitis compared to Cerebral Vascular Accident**

Meningitis and cerebral vascular accidents, or strokes, are both conditions that cause confusion and headaches. However, meningitis is an infection that causes inflammation, affects the meninges, and has the ability to heal on its own whereas a cerebral vascular accident causes blood loss and tissue damage, affects the brain tissue, and must be medically treated immediately to prevent permanent damage and even death.

References

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