Analysis Of Nervous System Diseases

The nervous system, composed of the brain, spinal cord, and nerves, is considered to be the human body’s most complex system, responsible for collecting and interpreting sensory input, maintaining homeostasis, and managing the activity of muscles and glands. Because of its significance in control of bodily functions and the overall complexity of the system, the slightest complication can result in a loss of memory, difficulty learning, speaking, breathing, swallowing, or moving, muscle tension, and urinary issues. As of now, there are over 400 known neurological diseases.

One such example is multiple sclerosis (MS), a chronic autoimmune disorder in which the immune system attacks the myelin, or protective covering, of nerve fibers, causing communication issues between the brain and the rest of the body. MS mainly affects the brain, spinal cord, and optic nerves, resulting in muscle weakness, bladder issues, excessive fatigue and dizziness, decreased sexual interest, vision issues, mobility changes, and memory issues. Though multiple sclerosis is rarely fatal, in more severe cases, it can cause paralysis and complete vision loss.

The cause of MS is unknown, but scientists have identified some risk factors to be genetics, smoking, infections, vitamin D deficiency, and vitamin B12 deficiency. Age and sex also plays a factor in one’s likelihood of getting MS; most people are dignosed between ages 20-40, and women are twice as likely to be affected than men. As there are no specific tests for MS, diagnosis involves blood tests, MRI scans of the brain and spinal cord, spinal fluid analysis, and an evoked potential test. The patient’s medical history is also considered in the process of diagnosing MS.

Though there is currently no cure for multiple sclerosis, treatment is available to lessen the effects of attacks and slow the development of the disease. Corticosteroids and plasma exchanges are used to counter MS attacks, and disease altering medications such as Ocrelizumab and Natalizumab are used to lower the rate of progression. Physical therapy and muscle relaxants are also used to help with hindered mobility. As of now, nearly 1 million people living in the United States have MS, with about 2.3 million cases worldwide.

Another example of a neurological disease is cerebral palsy, the most common movement and motor disability in children. CP refers to a group of disorders that affect movement and a person’s ability to maintain balance and posture. Found most commonly in infants, cerebral palsy is caused by abnormal brain development (usually during pregnancy). Though the cause of the damage isn't always known, some factors that tend to lead to CP are gene mutations, maternal infections, fetal stroke, infant infections, traumatic head injury, and a lack of oxygen to the brain. Risk factors associated with an increased chance of CP are poor maternal health, ingestion of alcohol or drugs during pregnancy, infant illness, low birth weight and premature birth, malnutrition, heart and lung disease, and osteoarthritis.

Those with CP struggle with movement, posture, and reflexes (ex. swallowing), and commonly have an eye muscle imbalance. Many also have related intellectual disabilities, causing difficulty in speech and learning. Some symptoms of cerebral palsy include delays in reaching motor skill

milestones, variations in muscle tone, lack of muscle coordination, tremors, and excessive drooling.

Diagnosis of cerebral palsy may not be made until several months after birth as the symptoms grow to be more apparent. When a child is suspected of having CP, their growth and development is closely monitored and a physical test typically ensues. Occasionally, doctors conduct a series of tests including MRIs, cranial ultrasounds, blood, urine, and skin tests, and electroencephalograms to eliminate other possibilities.

Despite that there is no cure for CP, treatment can significantly better the lives of people affected. Muscle and nerve injections can help to lessen muscle tightness, and physical therapy assists greatly in strength, flexibility, balance, motor development and mobility. Occupational therapy, speech/language therapy, and recreational therapy are also available to improve day to day life. Surgical procedures may also be performed to lessen pain and improve mobility. A patient with cerebral palsy can have surgery to adjust their arms, hips, or legs into the correct positions to make it easier to use physical aids.

The fourth most common neurological disorder, epilepsy is a disease in which nerve activity in the brain is disturbed, causing seizures. Symptoms of epilepsy are confusion, paranoia, periods of empty staring, convulsions, loss of consciousness, alterations to the senses, dizziness, unresponsiveness, and performing repetitive movements. Epilepsy is caused by birth defects, lack of oxygen to the brain, severe head trauma, strokes, and brain infections, and can affect all ages. Risk factors include age (though epilepsy can occur at any age, it is most common in children and elderly), family history, strokes and vascular diseases, previous head injuries, dementia, and seizures in childhood.

Epilepsy is diagnosed with a medical history check and physical exam, as well as tests such as an electroencephalogram, a CT or MRI, and a blood test. Some children with epilepsy may outgrow the condition, and the majority of seizures can be controlled with medication. Treatment includes anti-epileptic (anticonvulsant, antiseizure) drugs, vagus nerve stimulators, a ketogenic diet, and brain surgery. Overall, epilepsy is a highly prevalent disorder, with 1 in 26 people developing it at some point during their lifetime.