Neurological Diseases

Abstract:

The nervous system is made up of the brain, spinal cord, and all the nerves throughout the body. All of these nerves together control the processes and work within the body. The brain is the command center and when something goes wrong within this system of nerves, issues with movement, physical sensation, speaking, breathing, swallowing, and even learning can be affected. If a condition begins within the brain, problems with senses, mood, or memory of the brain can be affected.

There are more than 600 neurological diseases, some that begin at birth like spina bifida and cerebral palsy, and others caused by trauma to the spinal cord and/or brain. Infections such as meningitis can have lifelong effects and cancers that invade nerve pathways or the brain can leave nerves damaged or interrupted. Parkinson's and Alzheimer's disease are degenerative diseases of the nervous system and develop when nerve cells are damaged or completely die. This leaves the nervous system not fully functional.

Learning Objectives:

1. Define the term neurological disease
2. Describe the causes and risk factors associated with neurological diseases
3. Identify signs and symptoms of neurological diseases
4. Explain how to care for those with neurological diseases

Introduction

Neurological diseases don't just impact people physically, they can also have noticeable effects on the person's emotional well-being. Clients with a neurological disorder may be prone to mood swings or sudden emotional outbursts. There is also an increased likelihood of depression and delusions. Treating clients holistically and ruling out other possible causes prior to making a definitive diagnosis is imperative. When caring for a client with a neurological disease, having the understanding that their emotional state is as important as caring for their physical symptoms will create a well-rounded approach. Having a heightened emotional state can lead to increased physical symptoms and make it more difficult for the client to handle daily routines. Approach each client with the understanding that no matter the diagnosis, the emotional component can play a large role in their ability to handle day-to-day regimens and compliance with treatments or therapies.

Types of Neurological Diseases

There are four types of neurological diseases.

Sudden Onset Conditions:

These types of disorders occur as the result of an injury, usually to the brain and/or the spinal cord.

Intermittent and/or Unpredictable Conditions:

This term covers conditions such as epilepsy and the early stages of multiple sclerosis (MS).

Progressive Conditions:

This is used to describe conditions that worsen over time, such as motor neuron disease and Parkinson's disease.

Stable Neurological Conditions:

Cerebral palsy is the most common stable neurological condition.

Common Types of Neurological Diseases

As mentioned earlier there are more than 600 neurological diseases. Causes of these can vary greatly, from birth defects to infections within the body. Some of the more common neurological diseases will be discussed below.

Alzheimer's Disease

Alzheimer's disease is a progressive neurologic disorder that causes the brain to atrophy or shrink and this leads to the death of brain cells. A continuous decline in thinking, behavioral and social skills eventually affects a client's ability to function safely and independently. Dementia is the most common form of Alzheimer's disease.

Bell's Palsy

This condition is the result of damage to the 7th cranial nerve, the facial nerve. Damage to this nerve, which normally has an unexplained onset, causes pain, facial muscle weakness, or paralysis, and usually occurs on only one side of the head and face. Onset is sudden and worsens over 48 hours. Bell's Palsy can affect anyone at any age and equally affects men and women. It occurs most often in pregnant women or those who are affected by upper respiratory ailments such as influenza, covid, or a common cold. Recovery can vary widely, as quickly as 2 weeks of onset or up to 6 months after the first symptoms.

Cerebral Palsy

Cerebral palsy can affect movement and muscle tone or posture. Most often damage to the nervous system and brain occurs prior to birth while the brain is still in the developmental stage. Symptoms normally begin to appear in infancy, causing impaired movements such as hyper-reflexes and the inability to control movement. This will lead to unusual posture, spasticity of limbs and the trunk, and an unsteady gait as the infant develops. The effects of Cerebral Palsy can vary greatly both physically and intellectually. Cerebral palsy is a lifelong disorder. There is no cure, but treatments can help improve function.

Epilepsy

Epilepsy is a disorder of the brain characterized by repeated seizures. A seizure can be defined as a sudden alteration of behavior due to a temporary change in the electrical activity within the brain. During a seizure, the electrical activity in the brain becomes erratic or imbalanced. Epilepsy is usually diagnosed after a client has had at least two seizures without a definite cause.

Seizures normally belong to one of two basic categories:

1. Primary generalized seizures begin with a widespread electrical discharge that involves both sides of the brain at the same time.
2. Partial seizures begin with an electrical discharge in a limited area of the brain.

Motor Neuron Disease

Motor neurons are a type of nerve cell that is responsible for communication between cells throughout the body that enable the body to move. You have two main kinds:

1. Upper motor neurons are in the brain and send messages via the spinal cord.
2. Lower motor neurons are in the spinal cord and transmit the messages sent from the upper motor neurons within the brain to the muscles.

Motor neuron diseases occur when nerve cells die and electrical messages are interrupted between the brain and the muscles. Loss of control over movement can cause issues with walking, swallowing, and even the ability to breathe. Below are some of these motor neuron diseases:

Amyotrophic Lateral Sclerosis (ALS)

ALS affects both the upper and lower motor neurons. With ALS, there is a gradual loss of muscle control, and this affects walking, talking, chewing, swallowing, and breathing. Muscles deteriorate and no longer support the client's vital body responses.

ALS usually begins between the ages of 40 and 60. Most clients with ALS only live for 3 to 5 years after their symptoms start, yet others can live

for 10 years or longer. Only about 5% to 10% of cases in the United States run in families.

Primary Lateral Sclerosis (PLS)

PLS is similar to ALS, but it affects only upper motor neurons. This slowly causes progressive weakness in voluntary muscle movement. PLS often affects the legs first, followed by the trunk, arms, and hands. It will gradually affect the bulbar muscles (muscles that control speech, swallowing, and chewing). Symptoms include weakness, muscle stiffness and spasticity, clumsiness, slowing of movement, and problems with balance and speech. PLS is more common in men than in women and it usually starts in people 40 to 60 years old. The muscles get stiffer and weaker over time.

Progressive Bulbar Palsy (PBP)

PBP is a form of ALS and clients with this condition will eventually develop ALS. PBP damages motor neurons in the brain stem, an area that controls vital functions within the body. The brain stem has motor neurons that help with chewing, swallowing, and speech, and these actions are likely to be affected if the client has PBP. PBP can affect a client's emotions and they may have emotional responses like crying or laughing at inappropriate times and have little control over this.

Pseudobulbar Palsy

Pseudobulbar Palsy is similar to progressive bulbar palsy. It affects motor neurons that control the ability to talk, chew, and swallow. Pseudobulbar palsy causes people to laugh or cry with no control.

Progressive Muscular Atrophy

This neurological disease is much less common than ALS or PBP but has the potential to develop into ALS. Progressive muscular atrophy mainly affects your lower motor neurons. Lower motor neurons are in the spinal cord and transmit the messages sent from the upper motor neurons within the brain to

the muscles. Weakness and cramping of the muscles usually start in the hands and then spread to other parts of the body.

Spinal Muscular Atrophy

Spinal Muscular Atrophy is an inherited condition that affects the lower motor neurons. A defect in a gene called SMN1 causes spinal muscular atrophy. The SMN1 gene creates a protein that protects the motor neurons and without it, the neurons atrophy and die. When this occurs, it causes weakness in the muscles of the upper legs, arms, and the body's trunk.

SMA comes in different types that are based on when symptoms first appear:

1. Type 1: (Werdnig-Hoffmann disease), starts around age 6 months. Children with this type can't sit on their own or hold up their heads. They have weak muscle tone, poor reflexes, and trouble swallowing and breathing.
2. Type 2: Starts between 6 and 12 months. Kids with this form can sit, but they can't stand or walk alone. They may also have trouble breathing.
3. Type 3: (Kugelberg-Welander disease), starts between ages 2 and 17. It affects how a child can walk, run, stand up, and climb stairs. Kids with this type may also have a curved spine or shortened muscles or tendons around their joints.
4. Type 4: Usually starts after age 30. People with this type may have muscle weakness, shaking, twitching, or breathing problems. It mainly affects muscles in the upper arms and legs.

Kennedy's Disease

Kennedy's disease is inherited and only affects males. Females can be carriers of the disease but do not have symptoms. A woman with Kennedy's disease gene has a 50% chance of passing it on to a son.

Males with Kennedy's disease have shaken hands, muscle cramps and twitches, and weakness in their face, arms, and legs. This can also affect their

ability to swallow and speak. Men may also have enlarged breasts and a low sperm count.

Multiple Sclerosis (MS)

Multiple sclerosis (MS) can be a disabling disease where the immune system attacks the myelin sheaths of the nerve fibers. MS is considered an inflammatory demyelinating disease. Myelin is a protein that covers the nerves and aids in communication between the central nervous system (brain and spinal cord) and the rest of the body. Eventually, the disease can cause permanent damage or deterioration of the nerve fibers leading to many debilitating symptoms.

The most common form of MS is a relapsing-remitting disease course. There are periods of new symptoms or relapses that develop over days or weeks and usually improve partially or completely. These relapses are followed by quiet periods of disease remission that can last months or even years.

Primary-progressive MS has a gradual onset of the disease and the progression of the disease continues without any relapses. 20% to 40% of clients with relapsing-remitting MS can eventually develop secondary progressive MS within 10-20 years from the onset of the disease and will no longer experience any relapses.

MS affects women approximately twice as often as men.

Neurofibromatosis

Neurofibromatosis involves three different conditions that cause the development of tumors. Neurofibromatosis is usually non-cancerous. These tumors may affect the brain, spinal cord, and the nerves that send signals between the brain and spinal cord and all other parts of the body.

The three different conditions involved in neurofibromatosis are:

1. Neurofibromatosis type 1 (NF1), Von Recklinghausen Disease

a. Neurofibromatosis type 1 is the most common type and usually occurs in childhood. The condition is characterized by changes in skin coloring (pigmentation) and the growth of tumors along nerves in the skin, brain, and other parts of the body. Clients with neurofibromatosis type 1 also have an increased risk of developing other cancers, including brain tumors and cancer of blood-forming tissue like leukemia.

2. Neurofibromatosis type 2 (NF2)

    a. Neurofibromatosis type 2, or NF2 is a condition that causes tumors to form on nerves, particularly those in the skull and spine. It is most common on the skull and spine but these tumors can develop on any nerve within the body. Type 2 normally develops in early adulthood.

    b. The NF2 gene prevents tumors from forming. In clients with type 2 NF2, this gene is impaired and creates a greater risk of developing certain tumors. About 50% to 75% of clients with NF2 will also develop benign tumors in the brain or along the spine. Depending on the location of these tumors, they may result in a variety of symptoms as they grow, such as pain, numbness, and weakness.

3. Schwannomatosis (SWN)

    a. Symptoms usually occur between the age of 20-40 and are localized pain or an asymptomatic mass. Peripheral nerves, outside the central nervous system, and spinal nerves are most affected. Meningiomas, tumors within the meninges of the brain, only account for about 5% of those clients diagnosed with Schwannomatosis. The 5% diagnoses with meningiomas have also been linked to the SMARCB1 gene and carry a higher risk for malignancy.

    b. The development of these conditions is not completely understood but a mutation in certain genes appears to play a role. This mutation appears to cause suppression of growth within the nervous system cells. These mutations prevent the normal

formation of certain proteins that enable the cells to function properly. Without the normal function of these proteins, cell growth increases, leading to the formation of tumors.

c. Neurofibromatosis occurs in both sexes and in all races and ethnic groups.

Parkinson's Disease

Parkinson's disease occurs when neurons within the brain are damaged and eventually die. Parkinson's disease starts slowly but is a progressive disorder that affects the nervous system and the parts of the body controlled by the nerves. When the neurons that produce dopamine are damaged atypical brain activity will occur. This will cause impaired movements as well as slow movements and stiffness. Having a close relative with Parkinson's disease increases the chances that you'll develop the disease and men are more likely to develop Parkinson's disease than women. The common onset of Parkinson's disease is around 60 years of age.

Sciatica

Sciatica is nerve pain either from an injury or irritation to the sciatic nerve. Sciatica is a very common complaint and about 40% of people in the U.S. experience sciatica sometime during their life. Sciatica and back pain is the third most common reason people visit their healthcare provider.

Sciatica can be caused by several different medical conditions including:

1. The most common is a herniated or slipped disk that causes pressure on a nerve root. Pressure from the vertebrae can cause the gel-like substance in the center of a disk to bulge (herniate) through a weakness in its outer wall. If a herniation of a disk occurs in the lumbar spine, it can press on the sciatic nerve.
2. Natural wear and tear on the disks are called degenerative disk disease. The wearing down of the disks shortens their height and leads to the nerve passageways (foremen) becoming narrower (spinal stenosis). Spinal stenosis can pinch the sciatic nerve roots as they leave the spine.

3. Spinal stenosis is the narrowing of the spinal canal that reduces the available space for the spinal nerves.
4. Spondylolisthesis occurs when one vertebra slips out of line with the one above it, narrowing the opening through which the nerve exits.
5. The aging process can cause osteoarthritis which forms bone spurs that can compress lower back nerves.
6. Trauma to the lumbar region of the spine or sciatic nerve.
7. Tumors in the lumbar spinal canal compress the sciatic nerve.
8. The piriformis muscle can become tight or spasm which can place pressure on and irritate the sciatic nerve.
9. A rare but serious condition that affects the bundle of nerves at the end of the spinal cord is called cauda equina syndrome. This syndrome causes pain down the leg, numbness around the anus, and loss of bowel and bladder control.

Shingles

Shingles is a viral infection that causes a painful rash that usually occurs on one of the sides of the torso but can occur anywhere on your body. The rash is typically a band or line of blisters. Shingles is caused by the varicella-zoster virus, which is the same virus that causes chickenpox. Once a person has been exposed to chickenpox the virus will stay dormant in the body and years later can erupt at the shingles.

Shingles can be very painful but are not life-threatening. Prompt treatment will help with the duration of the outbreak or other more severe complications, and vaccines can help lower the risk of shingles. The pain associated with shingles can last long past the breakout phase.

Risk Factors for Neurological Diseases

Alzheimer's Disease

1. Age is the single most significant factor. After age 65 years of age the likelihood of developing Alzheimer's doubles every 5 years. Early-onset Alzheimer's disease can affect people from around the age of 40.

2. Genetics can play a role in the risk of developing Alzheimer's disease, but this is rather small.
3. In rare circumstances, Alzheimer's disease is caused by the inheritance of a single gene (APOE-e4) and remains the gene with the strongest impact on risk.
4. Family members who have developed dementia over the generations, particularly at a young age, may want to seek genetic counseling.
5. Clients with Down's syndrome are at a higher risk of developing Alzheimer's disease.
6. Clients who have had a severe head injury may be at higher risk of developing Alzheimer's disease.
7. Research shows that lifestyle factors and conditions associated with cardiovascular disease can increase the risk of Alzheimer's disease. Risk factors for cardiovascular disease are:
    a. smoking
    b. obesity
    c. diabetes
    d. high blood pressure
    e. high cholesterol

Bell's Palsy

Those between the ages of 15 and 45 are at the highest risk for Bell's Palsy. Risk factors include obesity, hypertension, diabetes, pregnancy, preeclampsia, and upper respiratory infections.

Cerebral Palsy

Some events or medical problems during pregnancy can increase the risk of congenital cerebral palsy. Toxoplasmosis, rubella, cytomegalovirus, and herpes can infect the womb and placenta, leading to brain damage in the fetus.

Risk factors for acquired cerebral palsy include:

1. Infancy
    a. Infants are at greater risk than older children for an event that causes brain damage.
2. Preterm or low birth weight
    a. Children born preterm or at a low birth weight have a higher risk for acquired cerebral palsy.
3. Not getting certain vaccinations
    a. Childhood vaccinations can prevent brain infections that can cause cerebral palsy.
4. Injury
    a. Injuries that can cause cerebral palsy.

Epilepsy

Certain factors may increase the risk of epilepsy:

1. Age
    a. The onset of epilepsy is most common in children and older adults, but the condition can occur at any age.
2. Family history
    a. Family history of epilepsy can increase the risk of developing a seizure disorder.
3. Head injuries
    a. Head injuries are responsible for some cases of epilepsy.
4. Stroke and other vascular diseases
    a. Stroke and other blood vascular diseases can lead to brain damage that may trigger epilepsy.
5. Dementia
    a. Dementia can increase the risk of epilepsy in older adults.
6. Brain infections
    a. Infections such as meningitis, which causes inflammation in your brain or spinal cord, can increase your risk.
7. Seizures in childhood
    a. High fevers in childhood can sometimes be associated with seizures but children who have seizures due to high fevers generally won't develop epilepsy. The risk of epilepsy increases if

a child has a long fever-associated seizure, another nervous system condition, or a family history of epilepsy.

Motor Neuron Disease

Risk factors associated with motor neuron disease are:

1. Direct damage to the neuron
    a. Blunt trauma, electric shock, surgical procedures, or hard physical labor are risk factors associated with motor neuron disease.
2. Occupation and environmental toxins
    a. Leather, textile, and agricultural occupations increase the risk of motor neuron damage along with exposure to metallic toxins like lead and mercury.
3. Social class and the environment in childhood
    a. Differences in childhood environment related to the standard of housing, domestic amenities, overcrowding, and factors related to socioeconomic deprivation in early childhood have been linked to motor neuron disease.

Multiple Sclerosis (MS)

Risk factors for MS include:

1. Certain autoimmune diseases
    a. There is a slightly higher risk of developing MS associated with other autoimmune disorders such as thyroid disease, pernicious anemia (Vit B-12 anemia), psoriasis, type 1 diabetes, or inflammatory bowel disease.
2. Epstein-Barr Virus EBV (mononucleosis)
    a. The Epstein-Barr virus is the strongest known risk factor for MS. Compared with uninfected individuals, the hazard of developing MS is approximately 15-fold higher among individuals infected with EBV in childhood and about 30-fold higher among those infected with EBV in adolescence or later in life.
3. Family history of MS
    a. Identical twin - 1 in 5
    b. Non-identical twin - 1 in 22

c. Other brothers or sisters - 1 in 37
d. Parent - 1 in 67
e. Child - 1 in 48
f. Relatives that were less closely related had a lower risk.
g. The lifetime risk in the general population is about 1 in 330

4. Other risk factors
    a. Smoking
    b. Migraines
    c. Vitamin D deficiency

Neurofibromatosis

Risk factors for Neurofibromatosis are:

1. Genetics
    a. Inheritance is the only real risk factor when looking at neurofibromatosis. In nearly half of all cases of type 1 and type 2 neurofibromatosis, and in 15 percent of schwannomatosis cases, the condition is passed down from parent to child. The remaining diagnoses are the result of chromosomal mutations.
2. Types 1 and 2 neurofibromatoses can be risk factors for other, separate neurological conditions. For instance:
    a. Clients who have been diagnosed with type 1 neurofibromatosis have an elevated risk of developing certain brain tumors such as schwannoma, meningioma, and glioma.
    b. Clients who have been diagnosed with type 2 neurofibromatosis have an increased risk of developing meningioma, vestibular schwannoma, and spinal cord ependymoma.

Parkinson’s Disease

Risk factors for Parkinson’s disease are:

1. Age
    a. Clients with Parkinson’s disease, most symptoms become noticeable at the age of 60 years or older.
2. Sex

    a. Males appear to have a 50 percent higher risk of developing Parkinson's disease than females.
3. Genetic
    a. According to the Parkinson's Foundation, around 10-15 percent of cases may be due to the gene known as *GBA.*
4. Head Trauma
    a. Studies have found that, among military veterans, even a mild traumatic brain injury (TBI) could increase the risk of Parkinson's disease by 56 percent.
5. Herbicides and Pesticides
    a. One review in 2017 found a significant link between the use of some pesticides and the diagnosis of Parkinson's disease.
    b. Vietnam war veterans appear to have a higher risk of developing Parkinson's disease. Scientists have suggested that exposure to dioxin, which is present in the defoliant Agent Orange, may have played a role.
6. Metals
    a. Some researchers have noted a possible link between long-term exposure to certain metals and a higher risk of Parkinson's disease. These metals include:
        i. mercury
        ii. lead
        iii. manganese
        iv. copper
        v. iron
        vi. aluminum
        vii. bismuth
        viii. thallium
        ix. zinc
7. Solvents
    a. The solvent trichloroethylene (TCE) is used by many industries, and it is commonly present in groundwater. People who experience long-term exposure to TCE may increase the likelihood of developing Parkinson's disease later in life. Research has suggested TCE solvent along with perchloroethylene were present

in the water supply at Camp Lejeune which may have contributed to higher rates of Parkinson's disease among veterans of the Vietnam war.

8. Polychlorinated biphenyls
    a. Some researchers have found higher levels of polychlorinated biphenyls (PCBs) in the bodies of clients with Parkinson's disease, suggesting that PCB exposure may increase the risk of this condition.

Sciatica

Risk factors for sciatica include:

1. Age
    a. Age-related changes in the spine, such as herniated disks and bone spurs, are the most common causes of sciatica.
2. Obesity
    a. Being overweight increases stress on the spine.
3. Occupation
    a. Repetitive twisting of the back, carrying heavy loads, or driving a motor vehicle for long periods might play a role in sciatica.
4. Prolonged sitting
    a. Clients who sit a lot or don't move much are more likely to develop sciatica than active clients.
5. Diabetes
    a. This condition, which affects the way the body uses blood sugar, increases the risk of nerve damage.

Shingles

Risk factors of shingles include:

1. Age
    a. The risk of developing shingles increases with age.
2. Some diseases
    a. Diseases that weaken your immune system, such as HIV/AIDS and cancer, can increase your risk of shingles.
3. Cancer treatments

a. Radiation or chemotherapy can lower your resistance to diseases and may trigger shingles.

4. Some medication
5. Anyone who has ever had chickenpox can develop shingles.

Signs and Symptoms of Neurological Diseases

Alzheimer's Disease

Brain changes associated with Alzheimer's disease can contribute to:

1. Memory
    a. Memory loss is progressive and affects how the client functions at work and home.
    b. Clients with Alzheimer's may:
        i. Repeat statements and questions over and over
        ii. Forget conversations, appointments, or events
        iii. Routinely misplace possessions, often putting them in illogical locations
        iv. Get lost in familiar places
        v. Eventually, forget the names of family members and everyday objects
        vi. Have trouble finding the right words to identify objects, express thoughts, or take part in conversations
        vii. Thinking and reasoning
        viii. Concentration and abstract concepts (numbers) become more difficult over time. Multitasking becomes almost impossible.
2. Making judgments and decisions
    a. As Alzheimer's progresses the ability to make reasonable decisions and judgments about daily situations becomes more difficult. Responding appropriately in certain situations such as turning off the bath water before it overflows or wearing a jacket in cold weather becomes challenging.
3. Planning and performing familiar tasks

a. As the disease progresses clients may forget how to do routine or daily tasks. Things that were once a daily practice like getting dressed or making a meal become a challenge.

4. Changes in personality and behavior
    a. Brain changes that occur in Alzheimer's disease can affect moods and behaviors. Problems may include the following:
        i. depression
        ii. apathy
        iii. social withdrawal
        iv. mood swings
        v. distrust in others
        vi. irritability and aggressiveness
        vii. changes in sleeping habits
        viii. wandering
        ix. loss of inhibitions
        x. delusions, such as believing something has been stolen

Bell's Palsy

Signs and symptoms of Bell's palsy come on suddenly and may include:

1. Rapid onset of mild weakness to total paralysis on one side of your face, occurring within hours to days
2. Facial droop and difficulty making facial expressions, such as closing your eye or smiling
3. Drooling
4. Pain around the jaw or in or behind your ear on the affected side
5. Increased sensitivity to sound on the affected side
6. Headache
7. A loss of taste
8. Changes in the number of tears and saliva you produce

Cerebral Palsy

The main symptoms of cerebral palsy are problems with movement, coordination, and development. The severity of symptoms varies significantly from child to child and the parts of the body affected can also vary.

Possible signs in a child include:

1. Delays in reaching development milestones
2. Seeming too stiff or too floppy (hypotonia)
3. Weak arms or legs
4. Fidgety, jerky, or clumsy movements
5. Random, uncontrolled movements
6. Muscle spasms
7. Shaking hands (tremors)
8. Walking on tiptoes

Epilepsy

Seizures are caused by abnormal activity within the brain. This abnormal activity can affect any part of the brain meaning it can affect many different processes of the brain. Seizure signs and symptoms may include:

1. Temporary confusion
2. A staring spell
3. Stiff muscles
4. Uncontrollable jerking movements of the arms and legs
5. Loss of consciousness or awareness
6. Psychological symptoms such as fear, anxiety, or deja vu

Motor Neuron Disease

Motor neuron disease all cause muscle weakness that gradually worsens over time and leads to disability. In some cases, these diseases are fatal.

Multiple Sclerosis (MS)

MS causes a variety of symptoms that can affect many different parts of the body. The most common symptoms are:

1. Fatigue
2. Vision issues
3. Numbness and tingling
4. Muscle spasms, stiffness, and weakness

5. Mobility difficulties
6. Pain
7. Problems with thinking, learning, and planning
8. Depression and anxiety
9. Sexual difficulties
10. Bladder problems
11. Bowel problems
12. Speech and swallowing difficulties

Neurofibromatosis

Neurofibromatosis symptoms include:

1. Type 1:
    a. Bone deformities
    b. Learning disabilities
    c. High blood pressure
2. Type 2:
    a. Hearing loss
    b. Vision loss
    c. Balance issues
3. Type 3:
    a. Chronic pain throughout the body

Parkinson’s disease

Symptoms often begin on one side of the body and usually remain worse on that side, even after symptoms begin to affect the limbs on both sides.

Parkinson's signs and symptoms may include:

1. Tremor
    a. Rubbing of the thumb and forefinger back and forth. This is known as a pill-rolling tremor. The hand may tremble when it's at rest.
2. Slowed movement (bradykinesia)
    a. Over time, Parkinson's disease may slow body movements.
3. Rigid muscles

   a. Muscle rigidity can occur in any part of your body. As the muscles become stiff it can be painful and limit the range of motion.
4. Impaired posture and balance
   a. Posture may become stooped. Falls can become common due to balance problems.
5. Loss of automatic movements
   a. There is decreased ability to perform unconscious movements, including blinking, smiling, or swinging your arms when you walk.
6. Speech changes
   a. Changes with speech include speaking softly, quickly, slurring, or hesitation before talking.
7. Writing changes
   a. Writing may become more difficult and may appear smaller than normal.

Sciatica

Sciatic pain will normally be in the low back to the buttock and then travels down the back of the thigh and calf. The pain varies tremendously from one client to the next. Sensations can be a mild ache to a sharp, burning pain, or an electric jolt. Other sensations are numbness, tingling, or muscle weakness in the leg. Pain can be intensified when sitting for long periods or if sneezing or coughing. Normally, sciatica only affects one side of the body.

Shingles

Shingles cause a painful, blistering rash on the skin. Symptoms are as follows.

1. 1-2 days before the rash appears:
   a. Pain, burning, or tingling on an area of skin where the rash will develop.
2. When the rash appears:
   a. A painful, blistering rash appears on one side of your body, often on the torso.
3. Rash begins to clear:
   a. Blisters may crack open, bleed, and scab over. The rash normally will clear within 2 to 4 weeks.

Treatment of Neurological Diseases

Alzheimer's Disease

Alzheimer's disease is not a preventable condition, but diet and exercise can reduce the risk of developing Alzheimer's disease and dementia. Lifestyle choices that may reduce the risk of Alzheimer's include the following:

1. Exercising regularly
2. Eating a diet of fresh produce, healthy oils, and foods low in saturated fat such as a Mediterranean diet.
3. Following treatment guidelines to manage high blood pressure, diabetes, and high cholesterol.
4. Asking your doctor for help to quit smoking if you do smoke.

Studies have shown that preserving thinking skills later in life can reduce the risk of Alzheimer's disease.

Medication

Cholinesterase inhibitors are prescribed for mild to moderate Alzheimer's symptoms. These drugs may help reduce or control some cognitive and behavioral symptoms.

Bell's Palsy

Most clients with Bell's palsy will fully recover with or without treatment. Protection of the eye on the affected side is important because it may not close fully due to loss of muscle tone. The use of lubricating eye drops, and ointment will keep the eye moist until Bell's palsy subsides.

1. Medications
    a. Corticosteroids (prednisone)
        i. Anti-inflammatory may reduce the swelling of the facial nerve.
    b. Antiviral drugs
        i. Antivirals (Valtrex/Zovirax) added to steroids may benefit some clients.
    c. Pain relievers (aspirin/ibuprofen/acetaminophen)

2. Physical Therapy
    a. Physical therapists can help with the prevention of muscles shrinking and shortening.
3. Surgery
    a. Rare but could include:
        i. Eyebrow lift
        ii. Facial implants
        iii. Nerve grafts
4. Alternative medicine
    a. Acupuncture
    b. Biofeedback training
    c. Botulinum toxin (Botox)

Cerebral Palsy

1. Medications
    a. Muscle or nerve injections (Botox)
    b. Oral muscle relaxants (baclofen/diazepam)
2. Therapy
    a. Physical therapy.
        i. For strength, flexibility, balance, motor development, and mobility.
    b. Occupational therapy.
        i. Help gain independence in daily activities and routines. Assistance with adaptive equipment.
    c. Speech and language therapy
        i. Assistance to speak clearly or to communicate using sign language. Speech therapists can also address difficulties with eating and swallowing.
    d. Recreational therapy
        i. Regular or adaptive recreational or competitive sports can help improve motor skills, speech, and emotional well-being.
3. Surgery
    a. Orthopedic surgery

        i. Severe contractures or deformities might need surgery to place their arms, spine, hips, or legs in their correct positions.
    b. Cutting nerve fibers (selective dorsal rhizotomy)
        i. This relaxes the muscle in the legs and reduces pain but can cause numbness.

Epilepsy

1. Medication
    a. Anti-epileptic (Dilantin/Topamax/Depakote)
2. Surgery
    a. Resective surgery to remove a small part of the brain that is causing the seizures**.**
    b. Vagus Nerve Stimulator (VNS) Implantation
3. Other treatments
    a. Ketogenic diet
    b. Avoid seizure triggers

Motor Neuron Disease

1. Medication

    a. Riluzole has been shown to reduce the release of glutamate and to block sodium channels. Both of these actions may provide protection against damage to motor neurons.

    b. Edaravone, an antioxidant, slows down the decline of physical function and prevents disease progression.

    c. Nusinersen, an injection medication, is a type of treatment called anti-sense oligonucleotide therapy and works by increasing the SMN protein necessary for the muscles and nerves to work normally.

    d. Muscle relaxers may reduce muscle stiffness and help muscle spasms.

    e. Botulinum toxin (Botox) may be used to treat muscle stiffness by weakening overactive muscles.

2. Therapy
    a. Physical therapy
        i. stretching and strengthening exercises
    b. Speech therapy
        i. Chewing, and swallowing difficulties
    c. Heat application
        i. Relieve muscle pain
    d. Assistive devices
        i. Braces, orthotics, speech synthesizers, and wheelchairs
    e. Proper nutrition and a balanced diet
        i. Maintaining weight and strength
    f. Ventilators
        i. Non-invasive positive pressure ventilation (NIPPV) at night can prevent sleep apnea. Some individuals may also require assisted ventilation during the day due to muscle weakness in the neck, throat, and chest.

Multiple Sclerosis (MS)

1. Medications
    a. Corticosteroids
        i. Prednisone/Methylprednisolone
            1. Reduce inflammation
    b. Plasma exchange (plasmapheresis)
        i. Used if your symptoms are new, severe and haven't responded to steroids
    c. Disease-modifying therapies (DMTs)
        i. Interferon beta medications
            1. Decrease inflammation and increase nerve growth
    d. Immunomodulators
        i. Glatiramer acetate
            1. May help block your immune system's attack on your nervous system
    e. Antibodies
        i. Monoclonal antibodies

1. Targets cells that damage the nervous system

2. Infusion treatments
    i. Natalizumab
    ii. Ocrelizumab
    iii. Alemtuzumab
3. Recent developments or emerging therapies
    i. Bruton's tyrosine kinase (BTK) inhibitor
    ii. Stem cell transplantation
4. Therapies
    a. Physical therapy
        i. Build muscle strength and ease some of the symptoms of MS
    b. Muscle relaxants
    c. Medications to reduce fatigue
        i. Ritalin or SSRI may be used

Neurofibromatosis

1. Monitoring for NF1
    a. Assess the child's skin for new neurofibromas or changes in existing ones
    b. Check for signs of high blood pressure
    c. Evaluate the child's growth and development, including height, weight, and head circumference (according to growth charts available for children who have NF1)
    d. Check for signs of early puberty
    e. Evaluate the child for any skeletal changes and abnormalities
    f. Assess the child's learning development and progress in school
    g. Obtain a complete eye examination
2. Medication
    a. Selumetinib
3. Surgery and other procedures
    a. Surgery to remove tumors
    b. Stereotactic radiosurgery
        i. Radiation treatment
    c. Auditory brainstem implants and cochlear implants

4. Cancer Treatment
    a. Malignant tumors and other cancers associated with neurofibromatosis are treated with standard cancer therapies.
        i. Surgery
        ii. Chemotherapy
        iii. Radiation
5. Pain Medications
    a. Gabapentin
    b. Tricyclic antidepressants
    c. Serotonin and norepinephrine reuptake inhibitors
    d. Epilepsy medications

Parkinson's Disease

1. Medication
    a. Levodopa (first choice for treatment)
        i. Produces dopamine
    b. Dopamine agonists
        i. Stimulate the production of dopamine
    c. Enzyme inhibitors
        i. Slows down the enzymes that break down and destroy dopamine
    d. Amantadine
        i. Reduces involuntary movements
    e. Anticholinergics
        i. Reduce tremors and muscle rigidity
2. Treatments
    a. Deep brain stimulation
    b. Physical, occupational, and speech therapies
        i. Help with gait and voice disorders, tremors, and rigidity
        ii. A healthy diet
        iii. Exercises to strengthen muscles and improve balance, flexibility, and coordination
        iv. Massage therapy to reduce tension
        v. Yoga and tai chi to increase stretching and flexibility

Sciatica

1. Medications
    a. Anti-inflammatories
    b. Corticosteroids
    c. Antidepressants
    d. Anti-seizure medications
    e. Opioids
2. Physical therapy
    a. Exercises to correct posture, strengthen the core, and improve range of motion.
3. Steroid injections
    a. Corticosteroid medication injection into the area around the nerve root.
4. Surgery
    a. Surgeons can remove the bone spur or the portion of the herniated disk that's pressing on the nerve.

Shingles

There's no cure for shingles. Early treatment with prescription antiviral drugs may speed healing and lower your risk of complications.

1. Medications
    a. Acyclovir (Zovirax)
    b. Famciclovir
    c. Valacyclovir (Valtrex)
2. Pain medication
    a. Capsaicin topical patch
    b. Gabapentin
    c. Amitriptyline
    d. Lidocaine
    e. Corticosteroids and local anesthetics

Caring For Patients with Neurological Diseases

Caregivers have a wide range of responsibilities when caring for clients with a neurological disease. Pain can cause an array of emotions including

anger, sadness, or frustration. Supporting the client both physically and emotionally is vitally important because having a chronic condition can be very detrimental to a client's outlook on life.

Neurological diseases can affect a client's mobility which can increase the chances of a fall while others may be confined to a wheelchair or need assistance with mobility devices. Muscle stiffness and rigidity can increase pain and affect a client's range of motion. Massage and relaxation techniques can assist with this.

The possibility of a seizure associated with epilepsy increases the chances of injury. Knowing your responsibility if a client has a seizure could prevent injury or even death. Knowing the client's seizure activity triggers and monitoring their medications and diet are the first line of prevention.

Summary

Neurological diseases can present at many different stages in a client's life. Cerebral palsy presents at birth, but ALS or MS could have later onsets. Safety is a primary concern for clients with neurological disease. Difficulties such as memory, movement, swallowing, and breathing create situations that could become life-threatening. Understanding the implications of their disease and related limitations will help you as a caregiver provide the best possible care.

With any disease process, there is a psychological aspect to the disease. Observing a client's body language or disposition can help you determine where the need is on a given day. Open communication between the caregiver and the client will create a clearer picture of where the client's current needs are both physically and emotionally.

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