what is sci/d?

United Spinal Association

A publication of United Spinal Association

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United Spinal Association is dedicated to improving the lives of people with spinal cord injuries or disorders (SCI/D) and a major component of our mission is education. Understanding what a spinal cord injury is and what diseases affect the spinal cord is not only the first stage of rehabilitation, it is also an important key to prevention.

We've prepared this brochure as a general introduction to SCI/D. If you or someone you know has one of the following conditions, or any spinal cord-related disability, you are eligible for membership in United Spinal and we sincerely encourage your participation. Membership is free and we offer a wide range of valuable services and resources for helping individuals of all ages live meaningful and productive lives. For more information and links to numerous useful web sites and related organizations, please visit www.unitedspinal.org.

introduction

Although well-protected by the bones and vertebrae of the spinal column, the spinal cord can be damaged in many ways, producing a variety of symptoms. It can be cut, bruised, or compressed in an accident, injured by infection, damaged when its blood supply is cut off, or affected by diseases that alter its nerve function.

spinal cord injury

The spinal cord is our largest nerve and the pathway for messages traveling between the brain and the rest of the body. The spinal column is divided into four sections, from which 31 pairs of nerves emerge and extend to the various parts of the body. The top portion of the spinal column is the cervical area, which has seven cervical vertebrae (identified as C-1 through C-7) from which eight pairs of cervical nerves emerge. Next is the thoracic area, which includes the chest area and has twelve thoracic vertebrae (identified as T-1 through T-12), from which 12 pairs of thoracic nerves emerge. The lower back section is the lumbar area, with five lumbar vertebrae (L-1 through L-5) and five pairs of lumbar nerves; and the bottom section—the sacral area—has five vertebrae (S-1 through S-5) and five pairs of sacral nerves. The bones in the sacral section, however, are actually fused together into one bone. At the very tip of the column, the coccyx, there is one pair of coccygeal nerves.

In most spinal cord injuries, the backbones, ligaments, or disc material pinch the cord, causing it to become bruised or swollen. Sometimes the injury may tear the spinal cord and/or its nerve fibers. An infection or a disease can result in similar damage. After a spinal cord injury, all the nerves above the level of injury keep working normally. At the level of injury, messages are blocked from being transmitted from above that level to below the level of injury.

Depending on the level of injury, damage to the spinal cord can result in paralysis of the muscles used for breathing; paralysis and/or loss of feeling in all or some of the trunk, arms, and legs; weakness; numbness; loss of bowel and bladder control; and numerous secondary conditions including respiratory problems, pressure sores, and sometimes fatal spikes in blood pressure.

Tetraplegia [formerly called quadriplegia] generally describes the condition of a person with a spinal cord injury in the cervical region. This individual can experience a loss of feeling and/or movement in their head, neck, shoulder, arms and/or chest, stomach, hips, legs, and feet.

Paraplegia is the general term describing the condition of a person who has lost feeling and/or is not able to move the lower parts of his/her body. The body parts that may be affected are the chest, stomach, hips, legs, and feet. An individual with a level from T1 to S5 has paraplegia.

amyotrophic lateral sclerosis

Amyotrophic lateral sclerosis (ALS), sometimes called Lou Gehrig's disease, is a rapidly progressive, invariably fatal neurological disease that attacks the nerve cells (neurons) responsible for controlling voluntary muscles. The disease belongs to a group of disorders known as motor neuron diseases, which are characterized by the gradual degeneration and death of motor neurons.

Motor neurons are nerve cells located in the brain, brainstem, and spinal cord that serve as controlling units and vital communication links between the nervous system and the voluntary muscles of the body. Messages from motor neurons in the brain (upper motor neurons) are transmitted to motor neurons in the spinal cord (lower motor neurons) and from them to particular muscles. In ALS, both the upper motor neurons and the lower neurons degenerate or die, ceasing to send messages to muscles. Unable to function, the muscles gradually weaken, waste away (atrophy), and twitch. Eventually, the ability of the brain to start and control voluntary movement is lost. The cause of ALS is not known, and scientists do not yet know why ALS strikes some people and not others, but it occurs throughout the world with no racial, ethnic, or socioeconomic boundaries. ALS affects as many as 30,000 Americans, with 5,600 new cases diagnosed in the U.S. each year.

multiple sclerosis

Multiple sclerosis (MS) is a chronic, progressive, degenerative disorder that affects nerve fibers in the brain and spinal cord. Surrounding and insulating nerve fibers is a fatty substance known as myelin, which facilitates the conduction of nerve impulse transmissions. MS is characterized by intermittent damage to myelin in a process known as "demyelination" caused by the destruction of specialized cells—oligodendrocytes—that form myelin. Demyelination causes scarring and hardening (sclerosis) of nerve fibers, usually in the spinal cord, brain stem, and optic nerves, which slows nerve impulses and results in weakness, numbness, pain, and vision loss. Because different nerves are affected at different times, MS symptoms often worsen, improve, and develop in different areas of the body. Early symptoms of the disorder may include vision changes (blurred vision, blind spots) and muscle weakness. MS can progress steadily or cause acute attacks (exacerbation) followed by partial or complete reduction in symptoms (remission). MS is the most common neurological cause of debilitation in young people and affects about 500,000 people in the United States. MS is more common in women and in Caucasians. The average age of onset is between 18 and 35, but the disorder may develop at any age.

post-polio

Polio—also know as poliomyelitis—is a contagious viral disease that attacks the central nervous system and can cause temporary or permanent paralysis and weakness. While the disease has been virtually conquered in many areas of the world through vaccines, some survivors of childhood polio have been experiencing a new syndrome called "post-polio" that typically emerges 25 to 30 years after the initial attack. The condition is mainly characterized by new weakening in muscles that were previously affected by the infection and muscles that were unaffected. Symptoms include progressive muscle weakness, unaccustomed fatigue and, at times, muscle atrophy. Post-polio is rarely life-threatening, but untreated respiratory muscle weakness can result in underventilation and weakness in swallowing muscles can result in aspiration pneumonia.

spina bifida

Spina bifida, the most common neural tube defect (NTD), is one of the most devastating of all birth defects. In the developing vertebrate nervous system, the neural tube is the precursor of the central nervous system. Neural tube defects result from the failure of the spine to close properly during the first month of pregnancy. In severe cases, the spinal cord protrudes through the back and may be covered by skin and a thin membrane. Surgery to close a newborn's back is generally performed within 24 hours after birth to minimize the risk of infection and to preserve existing function in the spinal cord.

Because of the paralysis resulting from the damage to the spinal cord, people born with spina bifida may need surgeries and other extensive medical care. The condition can also cause bowel and bladder complications. A large

percentage of children born with spina bifida also have hydrocephalus, the accumulation of fluid in the brain. Hydrocephalus is controlled by a surgical procedure called "shunting" which relieves the fluid build up in the brain by redirecting it into the abdominal area.

transverse myelitis

Transverse myelitis (TM) is a neurologic syndrome caused by inflammation of the spinal cord. TM occurs in both adults and children and is uncommon, but not rare. Conservative estimates of incidence per year vary from 1 to 5 per million population. The term myelitis is a nonspecific term for inflammation of the spinal cord; transverse refers to involvement across one level of the spinal cord.

TM often develops in the setting of viral and bacterial infections, especially those which may be associated with a rash, such as rubella, influenza, or mumps. Approximately one third of patients with TM report flu-like symptoms

prior to the onset of neurologic symptoms. In some cases, there is evidence that there is a direct invasion and injury to the cord by the infectious agent itself—especially poliomyelitis, herpes zoster, and AIDS. A bacterial abscess can also develop around the spinal cord and injure the cord through compression, bacterial invasion, and inflammation.

TM symptoms develop rapidly over several hours to several weeks. Inflammation within the spinal cord interrupts these nerve pathways and causes limb weakness, sensory disturbance, bowel and bladder dysfunction, back pain, and radicular pain (pain in the distribution of a single spinal nerve). Almost all patients will develop leg weakness of varying degrees of severity. Recovery may be absent, partial, or complete and generally begins within 1 to 3 months. Significant recovery is unlikely if no improvement occurs by 3 months. Most patients with TM show good to fair recovery.

syringomyelia

Syringomyelia (sear-IN-go-my-EEL-ya) is a disorder in which a cyst forms within the spinal cord. This cyst, called a syrinx, expands and elongates over time, destroying the center of the spinal cord. Since the spinal cord connects the brain to nerves in the extremities, this damage results in pain, weakness, and stiffness in the back, shoulders, arms, or legs. Other symptoms may include headaches and a loss of the ability to feel extremes of hot or cold, especially in the hands. Signs of the disorder tend to develop slowly. If not treated surgically, syringomyelia often leads to progressive weakness in the arms and legs, loss of hand sensation, and chronic, severe pain. In most cases, the disorder is related to a congenital abnormality of the brain called a Chiari I malformation. This malformation occurs during the development of the fetus and causes the lower part of the cerebellum to protrude from its normal location in the back of the head into the cervical or neck portion of the spinal canal. Syringomyelia may occur as a complication of trauma, meningitis, hemorrhage, a tumor, or arachnoiditis. Symptoms may appear months or even years after the initial injury, starting with pain, weakness, and sensory impairment. Surgery is usually recommended and results in stabilization or modest improvement in symptoms for most patients. Delay in treatment may result in irreversible spinal cord injury.

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