



CLINICAL FOCUS

Peripheral Nervous System Disorders—Spinal Nerves

GENERAL TYPES OF PNS DISORDERS

Anesthesia is the loss of sensation (the Greek word *esthesia* means sensation). It may be a pathologic condition if it happens spontaneously, or it may be induced to facilitate surgery or some other medical treatment.

Hyperesthesia (hī'per-es-thē'zē-ā) is an abnormal acuteness to sensation, especially an increased sensitivity to pain, pressure, or light.

Paresthesia (par-es-thē'zē-ā) is an abnormal spontaneous sensation, such as tingling, prickling, or burning.

Neuralgia (noo-rāl'jē-ā) consists of severe spasms of throbbing or stabbing pain resulting from inflammation or damage along the pathway of a nerve.

Sciatica, or **ischiodica** (is'kē-ad'i-kā), is a neuralgia of the sciatic nerve, with pain radiating down the back of the thigh and leg. The most common cause is a herniated lumbar disk, resulting in pressure on the spinal nerves contributing to the lumbar plexus. Sciatica may also be produced by sciatic neuritis arising from a number of causes, including mechanical stretching of the nerve during exertion, vitamin deficiency, or metabolic disorders (such as gout or diabetes).

Neuritis (noo-rī'tis) is a general term referring to inflammation of a nerve that has a wide variety of causes, including mechanical injury or pressure, viral or bacterial infection, poisoning by drugs or other chemicals,

and vitamin deficiencies. Neuritis in sensory nerves is characterized by neuralgia or may result in anesthesia and loss of reflexes in the affected area. Neuritis in motor nerves results in loss of motor function.

INFECTIONS

Herpes is a family of diseases characterized by skin lesions, which are caused by a group of closely related viruses (the herpes viruses). The term is derived from the Greek word *herpo*, meaning to creep, and indicates a spreading skin eruption. The viruses apparently reside in the ganglia of sensory nerves and cause lesions along the course of the nerves. **Herpes simplex II**, or genital herpes, is usually responsible for a sexually transmitted disease causing lesions on the external genitalia.

The varicella-zoster virus causes the diseases chicken pox in children and **shingles** in older adults, a disease also called **herpes zoster**. Normally, this virus first enters the body in childhood to cause chicken pox. The virus then lies dormant in the spinal ganglia for many years and can become active during a time of reduced resistance to cause shingles, a unilateral patch of skin blisters and discoloration along the path of one or more spinal nerves, most commonly around the waist. The symptoms can persist for 3–6 months.

Poliomyelitis (pō'le-ō-mī'ē-lī'tis; "polio" or infantile paralysis; the Greek word *polio*

means gray matter) is a disease caused by an *Enterovirus*. It is actually a CNS infection, but its major effect is on the peripheral nerves and the muscles they supply. The virus infects the motor neurons in the anterior horn of the spinal cord. The infection causes degeneration of the motor neurons, which results in paralysis and atrophy of the muscles innervated by those nerves.

Anesthetic leprosy is a bacterial infection of the peripheral nerves caused by *Mycobacterium leprae*. The infection results in anesthesia, paralysis, ulceration, and gangrene.

GENETIC AND AUTOIMMUNE DISORDERS

Myotonic dystrophy is an autosomal dominant hereditary disease characterized by muscle weakness, dysfunction, and atrophy and by visual impairment as a result of nerve degeneration.

Myasthenia (mī-as-thē'nē-ā) **gravis** is an autoimmune disorder resulting in a reduction in the number of functional acetylcholine receptors in the postsynaptic terminals and morphological changes in the neuromuscular synapse. T cells of the immune system break down acetylcholine receptor proteins into two fragments, which trigger antibody production by the immune system. Myasthenia gravis results in fatigue and progressive muscular weakness because of the neuromuscular dysfunction.

VIRAL INFECTIONS

Some of the well-known viral infections of the skin include **chicken pox** (varicella-zoster), **measles**, **German measles** (rubella), and **cold sores** (herpes simplex). **Warts**, which are caused by a viral infection of the epidermis, are generally harmless and usually disappear without treatment.

FUNGAL INFECTIONS

Ringworm is a fungal infection that affects the keratinized portion of the skin, hair, and nails and produces patchy scaling and an inflammatory response. The lesions are often circular with a raised edge, and in ancient times they were thought to be caused by worms. Several species of fungus cause ringworm in humans and are usually described by their location on the body; in the scalp, the condition is ringworm; in the groin, it is jock itch; in the feet, it is athlete's foot.

DECUBITUS ULCERS

Decubitus (de-kū'bi-tūs) **ulcers**, also known as bedsores, or pressure sores, develop in patients who are immobile (e.g., bedridden or confined to a wheelchair). The weight of the body, especially in areas over bony projections, such as the hipbones and heels, compresses tissues and causes **ischemia** (is-kē'mē-ā), or reduced circulation. The consequence is destruction, or **necrosis** (nē-kro'sis), of the hypodermis

and deeper tissues, which is followed by necrosis of the skin. Once skin necrosis occurs, microorganisms gain entry to produce an infected ulcer.

BULLAE

Bullae (bul'ē), or blisters, are fluid-filled areas in the skin that develop when tissues are damaged and the resultant inflammatory response produces edema. Infections or physical injuries can cause bullae or lesions in different layers of the skin.

PSORIASIS

Psoriasis (sō-rī'ā-sis) is characterized by a thicker than normal stratum corneum that sloughs to produce large, silvery scales. If the scales are scraped away, bleeding occurs from the blood vessels at the top of the dermal papillae. These changes result from increased cell division in the stratum basale, abnormal keratin production, and elongation of the dermal papillae toward the skin surface. Evidence suggests that the disease has a genetic component and that the immune system stimulates the increased cell divisions. Psoriasis is a chronic disease that can be controlled with drugs and phototherapy (ultraviolet light) but as yet has no cure.

ECZEMA AND DERMATITIS

Eczema (ek'zē-mā, eg'zē-mā, eg-zē'mā) and **dermatitis** (der-mā-tī'tis) are general terms

used for inflammatory conditions of the skin. The cause of the inflammation can be an allergy, an infection, poor circulation, or exposure to physical factors, such as chemicals, heat, cold, or sunlight.

BIRTHMARKS

Birthmarks are congenital (present at birth) disorders of the capillaries in the dermis of the skin. Usually, they are of concern only for cosmetic reasons. A **strawberry birthmark** is a mass of soft, elevated tissue that appears bright red to deep purple. In 70% of patients, strawberry birthmarks disappear spontaneously by age 7. **Portwine stains** appear as flat, dull red or bluish patches that persist throughout life.

VITILIGO

Vitiligo (vit-i-lī'gō) is the development of patches of white skin because the melanocytes in the affected area are destroyed, apparently by an autoimmune response (see chapter 22).

MOLES

A **mole** is an elevation of the skin that is variable in size and is often pigmented and hairy. Histologically, a mole is an aggregation, or "nest," of melanocytes in the epidermis or dermis. They are a normal occurrence, and most people have 10–20 moles, which appear in childhood and enlarge until puberty.