GUILLAIN-BARRÈ SYNDROME

What is Guillain-Barrè syndrome?

Guillain-Barrè (ghee-yan bah-ray) syndrome is a disorder in which the body's immune system attacks part of the peripheral nervous system. The first symptoms of this disorder include varying degrees of weakness or tingling sensations in the legs. In many instances the weakness and abnormal sensations spread to the arms and upper body. These symptoms can increase in intensity until the muscles cannot be used at all and, when severe, the patient is almost totally paralyzed. In these cases the disorder is life threatening - potentially interfering with breathing and, at times, with blood pressure or heart rate - and is considered a medical emergency. Such a patient is often put on a respirator to assist with breathing and is watched closely for problems such as an abnormal heartbeat, infections, blood clots, and high or low blood pressure. Most patients, however, recover from even the most severe cases of Guillain-Barrè syndrome, although some continue to have some degree of weakness.

Guillain-Barrè syndrome can affect anybody. It can strike at any age and both sexes are equally prone to the disorder. The syndrome is rare, however, afflicting only about one person in 100,000. Usually Guillain-Barrè occurs a few days or weeks after the patient has had symptoms of a respiratory or gastrointestinal viral infection. Occasionally surgery or vaccinations will trigger the syndrome.

After the first clinical manifestations of the disease, the disorder can develop over the course of hours or days, or weeks. Most people reach the stage of greatest weakness within the first 2 weeks after symptoms appear, and by the third week of the illness 90 percent of all patients are at their weakest.

What causes Guillain-Barrè syndrome?

No one yet knows why Guillain-Barrè strikes some people and not others. Nor does anyone know exactly what sets the disease in motion.

What scientists do know is that the body's immune system begins to attack the body itself, causing what is known as an autoimmune disease. Usually the cells of the immune system attack only foreign material and invading organisms. In Guillain-Barrè syndrome, however, the immune system starts to destroy the myelin sheath that surrounds the axons of many peripheral nerves, or even the axons themselves (axons are long, thin extensions of the nerve cells; they carry nerve signals). The myelin sheath surrounding the axon speeds up the transmission of nerve signals and allows the transmission of signals over long distances.

In diseases in which the peripheral nerves' myelin sheaths are injured or degraded, the nerves cannot transmit signals efficiently. That is why the muscles begin to lose their ability to respond to the brain's commands, commands that must be carried through the nerve network. The brain also receives fewer sensory signals from the rest of the body, resulting in an inability to feel textures, heat, pain, and other sensations. Alternately, the brain may receive inappropriate signals that result in tingling, "crawling-skin," or painful sensations. Because the signals to and from the arms and legs must travel the longest distances they are most vulnerable to interruption. Therefore, muscle weakness and tingling sensations usually first appear in the hands and feet and progress upwards.

When Guillain-Barrè is preceded by a viral infection, it is possible that the virus has changed the nature of cells in the nervous system so that the immune system treats them as foreign cells. It is also possible that the virus makes the immune system itself less discriminating about what cells it recognizes as its own, allowing some of the immune cells, such as certain kinds of lymphocytes and macrophages, to attack the myelin. Sensitized T lymphocytes cooperate with

B lymphocytes to produce antibodies against components of the myelin sheath and may contribute to destruction of the myelin. Scientists are investigating these and other possibilities to find why the immune system goes awry in Guillain-Barrè syndrome and other autoimmune diseases. The cause and course of Guillain-Barrè syndrome is an active area of neurological investigation, incorporating the cooperative efforts of neurological scientists, immunologists, and virologists.

How is Guillain-Barrè syndrome diagnosed?

Guillain-Barrè is called a syndrome rather than a disease because it is not clear that a specific disease-causing agent is involved. A syndrome is a medical condition characterized by a collection of symptoms (what the patient feels) and signs (what a doctor can observe or measure). The signs and symptoms of the syndrome can be quite varied, so doctors may, on rare occasions, find it difficult to diagnose Guillain-Barrè in its earliest stages.

Several disorders have symptoms similar to those found in Guillain-Barrè, so doctors examine and question patients carefully before making a diagnosis. Collectively, the signs and symptoms form a certain pattern that helps doctors differentiate Guillain-Barrè from other disorders. For example, physicians will note whether the symptoms appear on both sides of the body (most common in Guillain-Barrè) and the quickness with which the symptoms appear (in other disorders, muscle weakness may progress over months rather than days or weeks). In Guillain-Barrè, reflexes such as knee jerks are usually lost. Because the signals traveling along the nerve are slower, a nerve conduction velocity (NCV) test can give a doctor clues to aid the diagnosis.

In Guillain-Barrè patients, the cerebrospinal fluid that bathes the spinal cord and brain contains more protein than usual. Therefore a physician may decide to perform a spinal tap, a procedure in which the doctor inserts a needle into the patient's lower back to draw cerebrospinal fluid from the spinal column.

How is Guillain-Barrè treated?

There is no known cure for Guillain-Barrè syndrome. However, there are therapies that lessen the severity of the illness and accelerate the recovery in most patients. There are also a number of ways to treat the complications of the disease.

Currently, plasmapheresis and high-dose immunoglobulin therapy are used. Both of them are equally effective, but immunoglobulin is easier to administer. Plasmapheresis is a method by which whole blood is removed from the body and processed so that the red and white blood cells are separated from the plasma, or liquid portion of the blood. The blood cells are then returned to the patient without the plasma, which the body quickly replaces. Scientists still don't know exactly why plasmapheresis works, but the technique seems to reduce the severity and duration of the Guillain-Barrè episode. This may be because the plasma portion of the blood contains elements of the immune system that may be toxic to the myelin.

In high-dose immunoglobulin therapy, doctors give intravenous injections of the proteins that, in small quantities, the immune system uses naturally to attack invading organisms. Investigators have found that giving high doses of these immunoglobulins, derived from a pool of thousands of normal donors, to Guillain-Barrè patients can lessen the immune attack on the nervous system. Investigators don't know why or how this works, although several hypotheses have been proposed.

The use of steroid hormones has also been tried as a way to reduce the severity of Guillain-Barrè, but controlled clinical trials have demonstrated that this treatment not only is not effective but may even have a deleterious effect on the disease.

The most critical part of the treatment for this syndrome consists of keeping the patient's body functioning during recovery of the nervous system. This can sometimes require placing the patient on a respirator, a heart monitor, or other machines that assist body function. The need for this sophisticated machinery is one reason why Guillain-Barrè syndrome patients are usually treated in hospitals, often in an intensive care ward. In the hospital, doctors can also look for and treat the many problems that can afflict any paralyzed patient - complications such as pneumonia or bed sores.
Often, even before recovery begins, caregivers may be instructed to manually move the patient's limbs to help keep the muscles flexible and strong. Later, as the patient begins to recover limb control, physical therapy begins. Carefully planned clinical trials of new and experimental therapies are the key to improving the treatment of patients with Guillain-Barrè syndrome. Such clinical trials begin with the research of basic and clinical scientists who, working with clinicians, identify new approaches to treating patients with the disease.

What is the long-term outlook for those with Guillain-Barrè syndrome?
Guillain-Barrè syndrome can be a devastating disorder because of its sudden and unexpected onset. In addition, recovery is not necessarily quick. As noted above, patients usually reach the point of greatest weakness or paralysis days or weeks after the first symptoms occur. Symptoms then stabilize at this level for a period of days, weeks, or, sometimes, months. The recovery period may be as little as a few weeks or as long as a few years. About 30 percent of those with Guillain-Barrè still have a residual weakness after 3 years. About 3 percent may suffer a relapse of muscle weakness and tingling sensations many years after the initial attack. Guillain-Barrè syndrome patients face not only physical difficulties, but emotionally painful periods as well. It is often extremely difficult for patients to adjust to sudden paralysis and dependence on others for help with routine daily activities. Patients sometimes need psychological counseling to help them adapt.