Forty years after surviving a childhood bout of poliomyelitis (polio), 53-year-old Michael B. began experiencing a medley of uncomfortable, frightening, and debilitating symptoms. It started with an overall sense of bone-crushing fatigue, and was soon followed by joint pain and muscle weakness. Finally, when the pain and exhaustion became overwhelming, he went to his physician, who diagnosed his problem as post-polio syndrome (PPS).

A Debilitating Disease

"Polio was America's summer terror," says Dr. Nancy Frick, a polio survivor and an expert on the long-term psychological effects of childhood polio. Summer epidemics of polio ravaged the Western industrial world during the 1940s and 1950s until the development of the Salk (1955) and Sabin (1961) vaccines.

Poliomyelitis, also known as infantile paralysis, is an infectious disease caused by a virus that enters the gastrointestinal tract, then the bloodstream, and finally the central nervous system. Infected nerves in the brain and spinal cord stop working normally, which leads to weakness or paralysis of the muscles in the arms, legs, chest, diaphragm, and throat.

Up to 90% of the motor nerves are affected by the poliovirus, and at least 50% are killed off. According to Alan J. McComas, MD, a Canadian neurologist at McMaster University in Hamilton, Ontario, the remaining healthy nerve cells send out "sprouts" to reconnect the muscle fibers that were orphaned when their motor neurons were killed.

Long-Term Repercussions

Thirty or more years after the initial injury, the sprouted nerves (which have carried up to 500 times their normal workload) begin suffering from overuse. These overused nerves—along with overworked joints that hurt and throb after decades of doing too much work with too little muscle support—make up the syndrome known as post-polio syndrome (PPS). Symptoms of PPS include:

- Generalized fatigue
- Muscle weakness
- Muscle atrophy or wasting
- Joint pain
- Cold intolerance
- Swallowing and breathing problems
- Sleep disorders

A common symptom of PPS is fatigue. Dr. Richard L. Bruno, director of the Post-Polio Institute at Englewood Hospital and Medical Center in Englewood, New Jersey, explains that, "Brain fatigue—the inability of polio survivors to concentrate and stay awake as the day goes on—is associated with a marked reduction in the brain-activating hormone ACTH. Magnetic resonance imaging reveals damage to the brainstem neurons responsible for activating the brain." It also appears that polio survivors suffer from an impaired ability to make
dopamine—a brain chemical necessary for optimal nervous system functioning.

According to Drs. Frick and Bruno, psychological symptoms, such as chronic stress, anxiety, depression, and compulsive and Type A behavior, are also evident in polio survivors.

**Living With PPS**

Polio survivors need to slow down to allow damaged neurons, joints, and muscles to rest. Management of PPS includes measures to both control and relieve existing symptoms.

**Conserving Energy**

Energy conservation techniques that can lead to a noticeable decrease in fatigue, weakness, and pain include:

- Rest periods
- Stress management and relaxation therapies
- Maintenance of a healthy weight
- Use of adaptive equipment (braces, scooters)
- Avoidance of strenuous exercise or physically demanding activities

However, staying active is still important. Strengthening exercises that do not cause fatigue and excessive stress on joints may be helpful. Simple stretching and strengthening exercises may be recommended.

**Relieving Pain**

Physiotherapy (ice applications, heat, and ultrasound) may reduce joint and muscle pain. Acetaminophen and other nonsteroidal anti-inflammatory drugs (NSAIDS) help reduce muscle and joint pain. There are also other drugs that doctors are studying.

Intravenous immunoglobulin, a solution of concentrated antibodies, treats the inflammatory mediators present in patients with post-polio syndrome and may be helpful in some patients in improving quality of life. However, the evidence is mixed on whether it improves muscle strength and pain.

**Breathing and Swallowing**

Patients with breathing and/or swallowing difficulties may find respiratory treatments, diet modification, and instruction in swallowing techniques to be useful.

**How Do You Know if You Have PPS?**

It is difficult to diagnose PPS because there are no definitive tests, and the typical PPS symptoms may also be caused by many other diseases, including:

- Pulmonary, cardiac, hematologic (diseases of the blood and blood-forming organs), or endocrine diseases
- Cancer
- Chronic infection
- Depression
- Fibromyalgia
- Rheumatoid arthritis
- Osteoarthritis
- Amyotrophic lateral sclerosis (Lou Gehrig's disease)
- Multiple sclerosis
- Parkinson's disease

As a result, the diagnosis of PPS is a diagnosis of exclusion, meaning that a doctor can only diagnose PPS by eliminating these other potential causes of the symptoms. In general, a doctor may suspect PPS in a polio
survivor if the person is suffering from new muscle weakness, generalized or muscular fatigue, or pain involving the muscles and/or joints, and has experienced at least 15 years of good health (i.e., muscle functions have not deteriorated) since recovering from polio.

Even if these criteria are met, your doctor must still make sure that your symptoms are not caused by other medical conditions. Fibromyalgia, a musculoskeletal disorder that can cause generalized pain and tenderness as well as fatigue, is frequently seen in polio survivors and may sometimes coexist with PPS. If you are found to have another condition that causes PPS-like symptoms, this does not rule out the possibility that you may also have PPS.

If you have had polio, you owe it to yourself to get a second opinion.

RESOURCES:

National Institute for Neurological Disorders and Stroke
http://www.ninds.nih.gov/

The Post-Polio Task Force Information Center
http://www.post-polio.org/

RESOURCES:

Ontario March of Dimes
http://www.marchofdimes.ca/

Post-Polio Awareness and Support Society of British Columbia
http://www.ppass.bc.ca/

REFERENCES:


Last reviewed May 2011 by Brian Randall, MD
Last Updated: 5/13/2011