Post-polio Syndrome

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Introduction

Polio, or poliomyelitis, is an acute viral illness caused by the polio virus and affecting primarily young children. Symptoms in those affected can range from crippling disability to death. The majority of those infected remain asymptomatic, but in those who do present with symptoms, the disease affects mainly the lower limbs, followed by the muscles of the head, neck, and diaphragm [1, 2].

It is estimated that among survivors of acute poliomyelitis, upwards of 64% of patients go on to develop symptoms consistent with post-polio syndrome (PPS) with an average delay in onset from the initial infection of approximately 35 years [3–6].

Clinical Findings

During an acute attack, patients may experience excruciating back and neck pain as well as symmetric flaccid paralysis in the lower extremities secondary to destruction of motor neurons [1, 2]. After the acute phase, there is a time period of over 8 years, on average, where patients begin to recover physiologically and neurologically [3]. This is then followed by a period where patients may stabilize for several years to decades – on average 25 years, after which patients begin to develop new weakness in muscles, including muscles required for breathing, and complaints of joint symptoms, and generalized pain and weakness – the defining symptoms of PPS [3].

New weakness typically begins to generate around areas that were originally affected and damaged during the acute phase of the poliomyelitis, hence why it was originally thought that PPS was due to reactivation of the poliovirus, which we now know is not the cause of PPS [3].

Pain is one of the most common symptoms patients with PPS present with. Patients may report pain in the muscles and joints. This is due to overuse and exertion. Patients may describe their pain as a soreness and achiness, while others experience a burning sensation and cramps. Although the exact etiology of post-polio muscular pain has not been deduced, it is felt that the likely source is from the primary afferent fibers found in muscle [3].

The increased weakness on the other hand is related to the loss of surviving motor units. These remaining motor units compensate for weakness by branching out and innervating large numbers of muscle fibers after the acute poliomyelitis infection cost the muscle its original motor neuron. Spontaneous loss of these motor units later in life leads to loss of large numbers of muscle fiber innervation in a patient with PPS and hence the marked weakness seen in these patients.

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Diagnostics

Diagnosis is based clinically by a thorough history, physical exam and by excluding other neuromuscular disorders. History includes the acute paralytic event with residual neurologic deficit typically followed by years (10 or more) of stable neuromuscular function. Eventually, a decline in endurance, increased fatigue, pain and new weakness develop.

Treatment

Evidence-Based Treatment for Patients with Post-polio Syndrome [3, 5, 6]:

- Generalized fatigue.
  - Institute lifestyle changes including energy conservation and weight-loss programs.
  - Prescribe appropriate lower extremity orthoses.
- Muscle weakness and fatigue.
  - Prescribe non-fatiguing strengthening exercise program.
  - Institute physical activity pacing with rest periods.
  - Avoid overuse of weakened muscles.
- Bulbar muscle weakness.
  - Respiratory failure.
    - Noninvasive positive-pressure ventilation at night and as needed.
    - Tracheostomy and permanent ventilation.
  - Dysphagia.
    - Instruction on swallowing techniques.
- Musculoskeletal pain and joint instability.
  - Decrease mechanical stress on joints and muscles with lifestyle changes such as weight loss, decrease activities causing overwork, return to using assistive devices (including orthoses, wheelchairs, and adaptive equipment).
  - Prescribe anti-inflammatory medications, heat, massage.
- Cardiopulmonary conditioning.
  - Cycle or arm ergometer exercise.
  - Aquatic exercise training.

Differential Diagnosis

- Myositis.
- SMA.
- ALS.
- Myasthenia Gravis.
- Fibromyalgia.

High Yield Points

- Hallmark of post-polio syndrome is muscle weakness, fatigue, and pain, decades after acute infection and confirmed diagnosis of poliomyelitis.
- The progressive weakness and pain experienced in the same limb decades after the initial acute poliomyelitis infection is not due to reactivation of the poliovirus.
- The pain, fatigue, and weakness experienced by patients with PPS are related primarily to overuse of muscles and excessive exertion.
- Treatment involves stretching, heating, and lifestyle modifications that include decreased physical activity and use of assistive devices.
- Medications have not proven efficacious in treating the pain associated with PPS.

Questions

A 52-year-old M presents with worsening lower extremity pain and weakness for the past 6 months. Patient was diagnosed with poliomyelitis at age 6, however, weakness and pain had stabilized around age 18 and the patient had been able to live a relatively normal life – having attended college and working as a computer programmer. The patient now endorses increased fatigue and pain in multiple joints and states he is only able to walk 5 blocks before having to take a break. Patient states he tried to return to intense exercise after leading a relatively sedentary life, but did not improve in strength and feels weaker now than before he started a new exercise regimen.

1. Which of the following recommendations would not be suggested for a patient with a history of polio?
   A. High intensity exercises
   B. Aquatic therapy
   C. Arm ergometer exercises
   D. Light walking with periods of rest
   Answer: A
2. Which of the following is the most likely etiology for the increased muscle weakness in post-polio syndrome?
   A. Reactivation of polio virus
   B. Loss of motor units
   C. Age
   D. Co-morbidities
   Answer: B
3. How the diagnosis of Post-polio syndrome made?
   A. MRI and muscle biopsy
   B. Electrodiagnostic testing and blood work
   C. Clinical history
   D. Respiratory function testing
   Answer: C

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