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Poliomyelitis Fact Sheet

Poliomyelitis: the Disease

Poliomyelitis is a highly infectious disease caused by the poliovirus which is an entero virus belonging to the virus family Picornaviridae. The disease, which causes paralysis, can strike at any age but mainly affects children under three years of age. One in 200 infected cases end up with irreversible paralysis. Among those, 5% to 10% will die from respiratory paralysis. The disease has no cure although it can be successfully prevented with the polio vaccine.

Causative Organism

There are three antigenic types of the virus, (type 1, type 2, type 3) and all three types can cause paralysis. Most cases of paralysis are due to type 1, while paralysis caused by type 3 is less frequent. Paralysis due to type 2 is uncommon. Most epidemics are due to type 1. Most vaccine-associated cases are due to type 2 or 3.

Poliovirus infects only humans and does not survive long in the environment outside the human body. Poliovirus is rapidly inactivated by heat, formaldehyde, chlorine and ultra violet light.

There is no long term carrier state following infection.

Mode of Transmission

The mode of transmission is primarily from person to person through the faeco-oral route. The virus spreads rapidly to non-immune persons and transmission is usually widespread by the time of onset of paralysis.

Pathogenesis

After entering the body the virus multiplies in throat and intestines. It then spreads to the regional lymph nodes. Once established, the poliovirus can enter the blood stream and invade the central nervous system spreading along the nerve fibres. As it multiplies, the virus destroys the motor neurons that activate muscles. These nerve cells cannot be regenerated and the affected muscles can no longer function. The site of paralysis depends on the location of nerve cell destruction in the spinal cord or brain stem. Paralysis of the muscles of respiration and/or swallowing is life-threatening.

Incubation Period

The time between infection by the virus and onset of paralysis is 10 to 21 days.

Clinical Features

Greater than 90% of infections are silent or presents as non-specific fever. Aseptic meningitis occurs in about 1% of infections. An additional 4-8% of infections will result in a minor illness also known as abortive poliomyelitis.

A minor illness is recognized with symptoms including fever, malaise, headache, nausea and vomiting. Flaccid paralysis occurs in less than 1% of poliovirus infections. In paralytic cases, muscle pain with spasms, and fever are associated with the rapid onset of acute flaccid paralysis. Paralysis of poliomyelitis is characteristically asymmetric with fever present at the onset. The legs are affected more often than the arms. The maximum extent of paralysis is reached in a short period, usually within 3-4 days. Paralysis due to poliomyelitis is considered to be irreversible. Paralysis of respiratory muscles results in death.

Laboratory Diagnosis

Polio virus is excreted via faeces from an infected person or following vaccination intermittently for one month or more. Heavy shedding of the virus occurs just prior to the onset of paralysis and during the first two weeks after initial symptoms occur. Laboratory diagnosis of poliomyelitis involves the growth and identification of polioviruses from faecal samples using cell culture techniques. Timely collection, storage and proper transport of samples are crucial for proper lab diagnosis of poliomyelitis.

The samples should be packed in ice (with sufficient ice packs or ice cubes to maintain the temperature at + 4^0 C during transport) in a reverse cold chain box, thermos flask, or rigifoam box. If there is a delay, the sample should be stored at + 4^0 C until transport, which should be within 5 days of collection. All these precautions are necessary to ensure that no virus is lost from the specimens between the time of collection and the time of receipt in the laboratory.

Two stools specimens should be collected from all cases within 14 days of onset of paralysis. As the virus concentration decreases with time, all attempts must be made to collect stools very early in the infection i.e. within 14 days of onset of paralysis. As the excretion of virus is intermittent, a minimum of two samples, collected preferably 24 – 48 hours apart is recommended. The quantity of the sample should be adequate (size of two adult thumb nails or two tamarind seeds), as part of the original sample has to be stored as back-up samples. Stools have to be collected in a clean, dry, screw capped, leak proof bottle.

Treatment/Prevention

There is no cure for the disease and only symptomatic and supportive therapy is given. However poliomyelitis can be successfully prevented by polio vaccines. There are 2 vaccines available globally; Oral Polio Vaccine (OPV) and Inactivated Polio Vaccine (IPV). OPV is the recommended vaccine for Sri Lanka and is given under the Expanded Programme on Immunization (EPI) for children at 2, 4, 6, 18 months, 1 year 6 months and at 5 years of age.

IPV is used in some of the developed countries which have already been certified polio free and this vaccine is also recommended for immuno suppressed individuals.

Poliomyelitis in the world

Global poliomyelitis case load have declined from an estimated 350,000 cases in more than 125 endemic countries in 1988 to 1315 cases in 11 countries by the end of 2007. This is attributed to the efforts of the global poliomyelitis eradication initiative and the effectiveness of OPV By 2008 only 4 countries remain polio-endemic which are India, Afghanistan, Pakistan and Nigeria and they are the current focus of the global programme. Many previously polio-free countries have been re-infected due to disease importation of the virus.

Poliomyelitis in Sri Lanka

The incidence of poliomyelitis has decreased steadily along with the rapid increase in the immunization coverage of infants and children with OPV since the initiation of the EPI. Sri Lanka had not reported any cases for the last 15 years and the last virologically confirmed case of polio was detected in Sri Lanka in 1993.

A successful surveillance programme is being carried out in the country since 1991 in which all Acute Flaccid Paralysis cases (AFP) under 15 years of age presented to 58 hospitals manned by a specialist paediatrician or physician are investigated individually to rule out polio as a likely diagnosis. This programme is conducted along guidelines of the Global Poliomyelitis Eradication Initiative and 2 stool samples are collected from all the notified cases to be tested for polio virology at the Medical Research Institute.

Surveillance Case Definition of AFP

Any child less than 15 years of age presenting with Acute Flaccid Paralysis (including those diagnosed as having Guillain Barre Syndrome or Infective polyneuritis for which no other cause can be identified) and any patient with Acute Flaccid Paralysis of any age that appears highly suspicious as Poliomyelitis.