

POLIOMYELITIS

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Definition

- Acute viral infectious disease.
- Transmitted by person to person contact , through faeco-oral route or oro-oral route.
- Incubation period- 6 to 20 days.
- Infectious 7-10 days before appearance of symptoms and as long as virus is in saliva or faeces.

Factors that increase the risk of polio infection or affect the severity of the disease include:

- Immune deficiency
- Malnutrition
- Tonsillectomy
- physical activity immediately following the onset of paralysis
- skeletal muscle injury due to injection of vaccines or therapeutic agents
- pregnancy

Outcomes of poliovirus infection

- Asymptomatic 90–95%
- Minor illness 4–8%
- Non-paralytic aseptic meningitis 1–2%
- Paralytic poliomyelitis 0.1–0.5%
 - Spinal polio 79%
 - Bulbospinal polio 19%
 - Bulbar polio 2%

- **Minor Illness**
 - Upper respiratory tract infection.
 - Gastro-intestinal disturbances.
 - Influenza like illness.
- **CNS Involvement-3%.**
 - Non paralytic Aseptic Meningitis-1-2%
 - Paralytic - 0.1-0.5%.
 - Encephalitis - confusion, headache, fever, fits, spastic paralysis.

PATHOPHYSIOLOGY

- Through Mouth to pharynx and intestinal mucosa.
- Replication in intestinal lymphoid cells---
Viremia TO deep cervical and mesenteric lymph nodes.
- Sustained replication in RES, muscle ,fat--
-Major viremia.
- CNS invasion---local inflammatory response.

- Poliovirus spreading along nerve fibers destroys motor neurones within spinal cord, brainstem or motor cortex.
- Lesions in spinal ganglia, also vestibular nuclei, cerebellar vermis, deep cerebellar nuclei, hypothalamus and thalamus.

Early symptoms

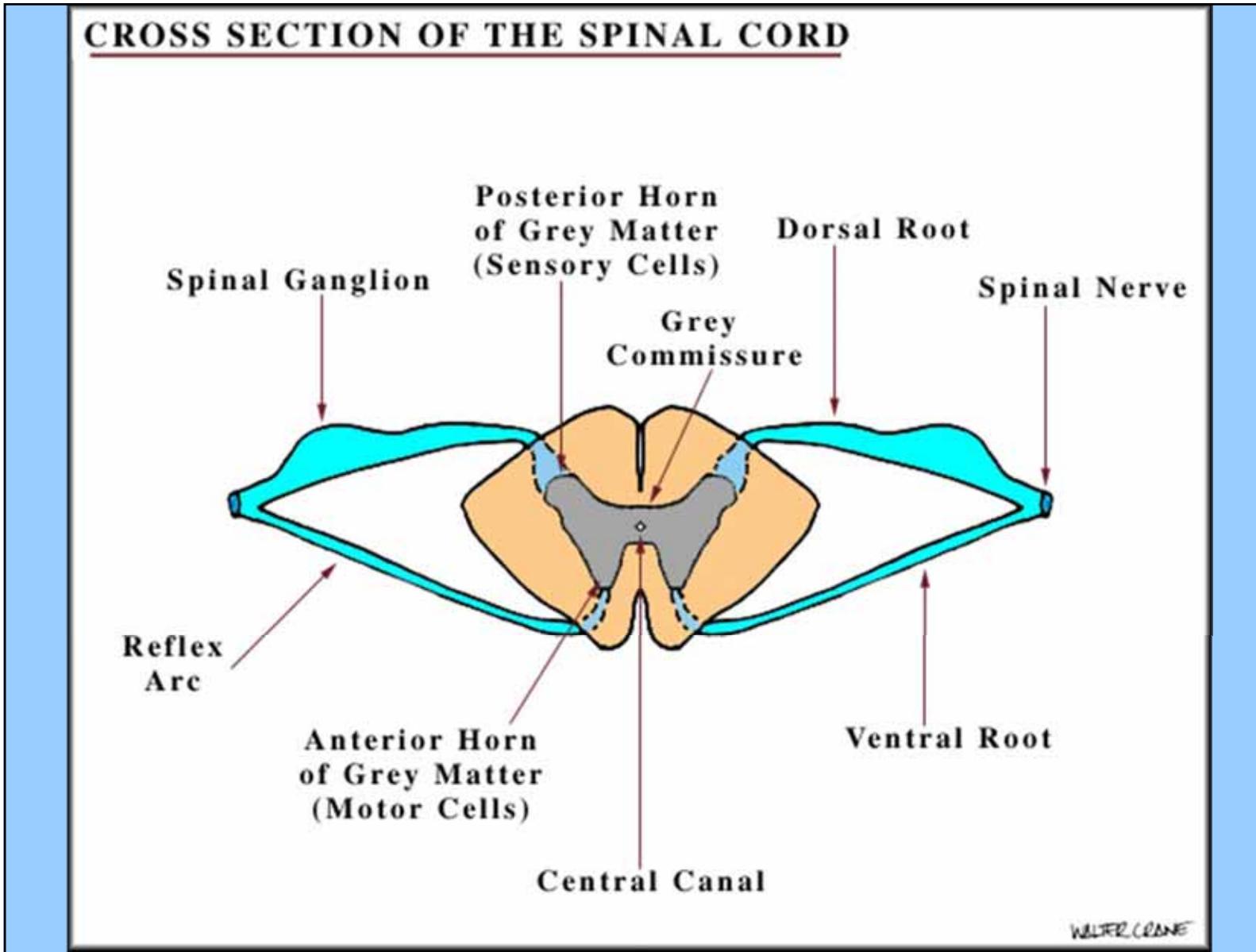
- High fever, headache, stiffness in the back and neck
- Asymmetrical weakness of various muscles, sensitivity to touch, difficulty swallowing, muscle pain, loss of superficial and deep reflexes, paraesthesia (pins and needles)
- Irritability, constipation, or difficulty urinating.

Paralytic polio

- Incidence and extent increase with age.
- In children, non-paralytic meningitis - most likely consequence, and paralysis - only 1 in 1000 cases.
- In adults, paralysis - 1 in 75 cases .
- In children < 5yrs, paralysis of one leg is most common; in adults, extensive paralysis of the chest and abdomen and quadriplegia is more likely.
- Highest rates of paralysis (1 in 200) associated with poliovirus type 1, the lowest rates (1 in 2,000) associated with type 2.

Spinal polio

- Most common form of paralytic poliomyelitis
- Viral invasion of the motor neurons of the anterior horn cells, or the ventral gray matter section in the spinal column, which are responsible for movement of the muscles, including those of the trunk, limbs and the intercostal muscles.

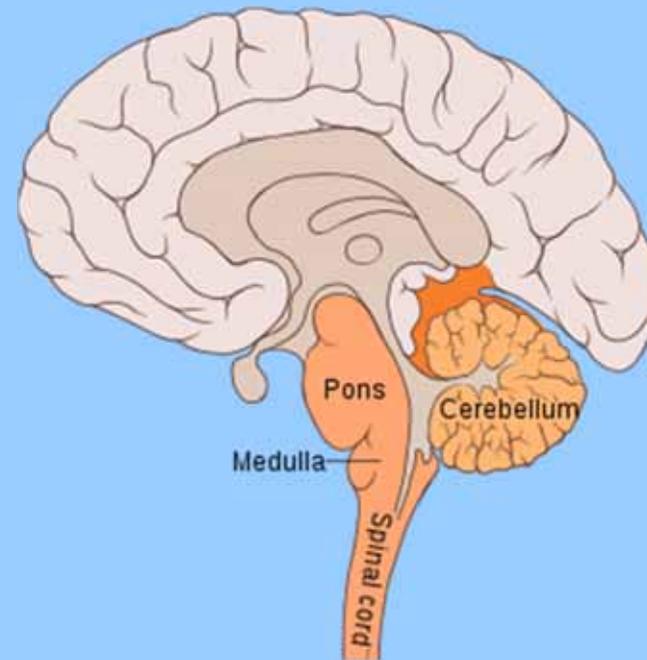


- Without nerve stimulation, the muscles atrophy, (weak, floppy and poorly controlled)
- Progression to maximum paralysis rapid (2 to 4 days),
- Associated with fever and muscle pain .
- Deep tendon reflexes - usually absent or diminished
- sensation - not affected .

- The extent of spinal paralysis depends on region of cord affected (cervical, thoracic, or lumbar)
- Asymmetrical paralysis - Any limb or combination of limbs may be affected— one leg, one arm, or both legs and both arms. More severe proximally than distally (fingertips and toes).

Bulbar polio

- The bulbar region is a white matter pathway that connects the cerebral cortex to the brain stem



Bulbar polio

- Destruction weakens the muscles supplied by the cranial nerves, producing symptoms of encephalitis, and causes difficult breathing, speaking and swallowing .
- Nerves affected:
 - Glossopharyngeal nerve - difficult swallowing, impaired throat, tongue movement and taste
 - Vagus nerve - the heart, intestines, and lungs.
 - Accessory nerve - upper neck movement.
 - Trigeminal nerve and facial nerve - the cheeks, tear ducts, gums, and muscles of the face, double vision; difficulty in chewing; abnormal respiratory rate, depth, and rhythm-- respiratory arrest. Pulmonary edema and shock also possible, and may be fatal .

Bulbospinal polio

- Cervical spinal cord(C3- C5), and paralysis of the diaphragm occurs.
- Nerves affected are the phrenic nerve, which drives the diaphragm to inflate the lungs, and those that drive the muscles needed for swallowing.
- Breathing Affected-ventilator needed.
- Paralysis of the arms and legs and heart functions

Complications

- Skeletal Deformities- Equinus Foot, Scoliosis .Osteoporesis ,Increased bone fractures.
- Neuropathy.
- Pulmonary edema, Aspiration pneumonia,
- UTI, Renal stones,
- Paralytic ileus
- Myocarditis, Cor pulmonale.

TREATMENT

- NO CURE
- SUPPORTIVE MEASURES
 1. Relief of symptoms- Analgesics, Antibiotics
 2. Speeding recovery
 3. Prevent complications- moderate exercise, nutritious diet.

PROGNOSIS

- Minor illness - complete recovery
- Aseptic meningitis - 2-10 days
- Spinal paralysis- rarely fatal.

Recovery - 4-6 weeks up to 6-8 months.

After 1year- Permanent paralysis.

50% complete recovery, 25% mild disability, 25% severe disability.

Prognosis

- Respiratory involvement leading to suffocation and pneumonia.
- Death- 5-10%(children) 15- 30% (adults)
- Bulbar polio- 25- 75% mortality
- Residual Paralysis proportional to degree of viremia and degree of immunity.

Thank You