Acute flaccid paralysis in children (AFP)

Learning objectives:
Students will be able to:
1. Identify the common causes of AFP in children.
2. Demonstrate the ability to differentiate between poliomyelitis and GBS.
3. Understand how poliomyelitis spreads.
4. To review the treatment and outcome of poliomyelitis and GBS.
5. Describe the effects of vaccination and proper sanitation on the prevention and eradication of poliomyelitis.

Acute flaccid paralysis (AFP):
Is defined as onset of paralysis (<4 weeks) in a child (age <15 years) for which no obvious cause has been found.
The Paralysis is associated with loss of muscle tone and loss of reflexes.
Reporting of all AFP cases less than 15 years of age is mandatory in Iraq.

All AFP cases should be investigated within 48 hours.
Differential diagnosis:

1. **Poliomyelitis**
2. **GBS**
3. **Acute transvers myelitis**
4. **Other non-polio enteroviruses like Coxsackie virus**
5. **Post traumatic neuritis**

POLIOMYELITIS
Ø polio= gray matter
Ø Myelitis= inflammation of the spinal cord
Is an enterovirus infection that can manifest as?
1. Inapparent infection
2. Abortive disease
3. Nonparalytic poliomyelitis
4. Paralytic disease

Pathophysiology:
Poliomyelitis is an RNA virus that is transmitted by oral-fecal route, or by ingestion Of contaminated water, three serotypes are able to cause human infection, the The incubation period is 5-35 days, the viral particles initially replicates in the Nasopharynx and GIT and then invade lymphoid tissues, with subsequent Hematological spread, after a period of viremia, the virus becomes neurotropic and Produces destruction of the motor neuron of the spinal cord and brainstem which Leads to flaccid paralysis of spinal or bulbar in distribution.

Epidemiology:
Males and females of pediatric age are affected in equal frequency.
And it occurs mainly in children, however, it can occur at any age especially in Immunocompromised individuals.
The mortality is more frequently observed in paralytic poliomyelitis, and is

Associated with complications such as respiratory failure.

Presentation
90 % of cases are asymptomatic (*inapparent infection*).

Abortive disease (5-10%):
The following are observed with normal neurological examinations:
Anorexia, nausea, vomiting, abdominal pain, fever, headache, nasopharyngeal hyperemia,
The duration of the illness usually less than 5 days.

Nonparalytic poliomyelitis:
Is characterized by the symptoms of abortive disease in addition to the following
Nuchal rigidity, more severe headache, back and lower extremity pain, meningitis
With lymphocytic pleocytosis (usually).

Paralytic poliomyelitis:
Occurs in 0.1-1% of cases and in addition to symptoms observed in non-paralytic
Poliomyelitis is characterized by the following: compromise of the motor neuron
May be localized or widespread, more frequently asymmetric loss of muscle
The function is observed with the involvement of major muscle groups, muscle atrophy is
Observed several weeks after the beginning of symptoms. Recovery may be complete
, partial, or absent.

Differential diagnosis
1 Guillain-Barre syndrome
2 Botulism
3 Enterovirus infections
4 Rabies
5 Tetanus
6 Aseptic meningitis
7 Encephalitis

Diagnosis:
Stool specimens should be collected 24–48 HR. Apart, as soon as possible after the
Diagnosis of poliomyelitis is suspected. Poliovirus concentrations are high in the
Stool in the 1st week after the onset of paralysis.
Treatment:
***No antiviral* is effective against polioviruses. The treatment is mainly supportive:**
1. *Analgesia* for myalgia's and headache,
2. *Mechanical ventilation* is often needed in cases of bulbar paralysis.
3. *Tracheostomy* care is often needed in patients who required long-term ventilator
Support.
4. *Physical therapy* is indicated in cases of paralytic disease
5. *Fecal impaction* is common in paralytic disease and can be treated with a laxative
As soon as it develops.
6. *Diet rich in fibers* usually indicated to prevent constipation.
7. *Catheterization* for bladder dysfunctions is frequently required

Prevention:
1. *Vaccinations*:
- OPV (oral lived attenuated poliovirus) Sabin
- IPV (inactivated poliovirus vaccine administered parenterally). Salk
2. Improving sanitation.

Prognosis:
Maximum paralysis usually occurs 2–3 days after the onset of the paralytic phase of The illness, with stabilization followed by a gradual return of muscle function. The Recovery phase lasts usually about 6 mo., beyond which persisting paralysis is Permanent.
Bulbar paralytic poliomyelitis has been associated with the highest rate of Complications and a mortality rate as high as 60 %, spinal poliomyelitis follows. Patients with in apparent or abortive poliomyelitis recover without significant Sequelae.

Guillain-Barre Syndrome (GBS):
-Is a post infectious polyneuropathy that causes demyelination in mainly motor? But sometime also sensory nerves.
The paralysis usually follows a nonspecific viral infection by about 10 days
-The triggering agents are: Campylobacter jejuni, Mycoplasma pneumonia, Hepatitis viruses, EBV, CMV, immunizations.
-The paralysis is bilateral symmetrical ascending type progress over days or Weeks to involve the trunk respiratory muscles and finally the bulbar muscles. Pain and tenderness are common in the initial stages, paresthesia occurs in some Cases.
-Bulbar involvement occurs in half of patients and leads to dysphagia, facial Weakness, aspiration, dysphagia and facial weakness are often impending signs Of respiratory failure.
-Urine retention or incontinence 20%.
-Autonomic neuropathy: lability in blood pressure, postural hypotension, Episodes of profound bradycardia, or even asystole

Laboratory findings:
1. CSF examination it's usually diagnostic (the dissociation between high protein And lack of cellular response).
2. NCS (nerve conduction study), EMG (electromyography) denervation of Muscle.

Treatment:
Observation in the ICU for mechanical ventilation and prevention of decubital Ulcers and treatment of infections.
IVIg for 5 days, plasmapheresis.
Corticosteroids have not been found to have a clinical benefit in GBS, consequently, this class of drugs is not currently employed in treatment of the syndrome.

Prognosis:
Usually most patients recover completely within weeks, small group develop

Permanent paralysis, chronic disease or relapsing form

Protocol for AFP surveillance

Step	Timing	Description
Case Detection	at diagnosis	Follow case definition for AFP
Case Reporting	≤ 48 hours of report	Tel:
Timing of stool specimens	within 2 weeks of onset of paralysis	2 stool specimens collected no less than 24 hours apart .
Collection of specimens		Fresh stool, or rectal swabs containing fecal material (at least 8g – size of an adult thumb). Place in a sterile glass bottle
Transport of Stools	as soon as able. Specimens arriving at national laboratory ≤ 3 days of being sent	Maintain a cold chain of 2 - 8 ^{0}C. Transport in dry ice if transportation will take > 24 hours Caution: avoid desiccation, leakage; ensure adequate documentation
Follow up of patients	60 days from	To determine whether there is residual paralysis on follow up

References:

- **Nelson Textbook of Pediatrics.**
- **Acute flaccid paralysis and surveillance 2018, SlideShare.**
- **Illustrated Text Book of Pediatrics.**