

PAEDIATRIC RULES

1. IMMUNISE. Always check the health record book and immunise if the child is due or overdue for it.
 - a. There is no contraindication to giving measles vaccine
 - b. TA, Hepatitis B and Pigbel vaccines should not be given if the child has a fever above 38 °C. They should be given when the temperature has settled
 - c. Check the child's brothers and sisters and immunise them as well if they are not immunised up to date
 - d. Do not send a child who is due for immunisation away just to save vaccine just because he is the only one
 - e. If the mother is pregnant, she needs Tetanus Toxoid. Check that she is going to Antenatal Clinic.

2. ADMIT children who have any of the following:
 - a. intercostal recession - chest indrawing
 - b. dehydration
 - c. convulsion with fever
 - d. fever and not sucking
 - e. drowsiness or confusion
 - f. continued abdominal pain and vomiting
 - g. oedema (swelling)
 - h. weight less than 60% line, and flat or falling weight curve
 - i. MUAC less than 12.5 cm
 - j. sudden onset of paralysis
 - k. swelling of limb or joint
 - l. under 6 months with whooping cough
 - m. stridor (noisy breathing)
 - n. snakebite
 - o. swallowed poison
 - p. passing blood in the urine
 - q. vomiting blood
 - r. passing a lot of blood in the stool
 - s. history of unconsciousness after head injury
 - t. suspicious injuries which do not fit the history.

Also admit neonates with any sign of infection.

3. WEIGH. Always weigh the child. Give the correct dose of medicine for this weight. Plot the weight on the weight chart in the health record book.

4. REFER to hospital:
 - a. **Urgent referral:**
 - i. Babies born with an imperforate anus
 - ii. Babies with bile stained vomiting
 - iii. Babies with frequent vomiting and lots of saliva in the first few hours of life
 - iv. Babies less than 4 weeks old with meningitis, severe jaundice (orange) or those with sepsis who are not improving after 2 days of treatment
 - v. Babies with ambiguous genitalia (not sure whether the baby is a boy or a girl)
 - vi. Children with conjunctivitis who are not improving after 2 days of treatment
 - vii. Children with meningitis who are not improving after 2 days of treatment
 - viii. Children in coma
 - ix. Children with fever, tenderness and swelling of a limb or a joint which does not improve after 2 days of treatment
 - x. Children passing blood in the urine with or without oedema, who do not improve after 2 days of treatment
 - xi. Children with Kwashiorkor
 - xii. Children with a distended, tender abdomen
 - xiii. Children with sudden onset of paralysis
 - xiv. Children with polyuria (passing a lot of urine), dehydration and sweet smelling breath.

- b. **Non-urgent - but important referral:**
- i. Children with slow development or who are poorly responsive and who have an umbilical hernia
 - ii. Children with a persistent heart murmur
 - iii. Malnourished children who do not respond to treatment for malnutrition
 - iv. Other children not responding to standard treatment.
5. Amoxicillin or procaine penicillin (procillin) must **only** be given to outpatients for the following diagnoses:
- a. mild pneumonia (see p.311)
 - b. otitis media (see p.285)
 - c. skin sores (see p.350)
 - d. sudden swelling of lymph glands
 - e. tonsillitis (see p.355).

Note: “Strong cough”, “big cough” or “productive cough” are **not** reasons for giving amoxicillin or procillin **unless** the child has **fast breathing** or one of the above conditions.

6. Avoid giving injections unless the child is moderately or severely sick. Intramuscular injections to children less than 2 years old should be given on the upper and outer part of the thigh.
7. Do not give single doses of antibiotics. Do not give single doses of antimalarials for fever.

PAEDIATRIC SURVEILLANCE UNIT

The Papua New Guinea Paediatric Surveillance Unit was established in 1996. It is a combined project between the Paediatric Society of Papua New Guinea, responsible for determining the conditions under surveillance, and for the follow up of reported cases, and HOPE Worldwide (PNG), responsible for the administration of the Unit.

The aim of the unit is to obtain information relating to conditions occurring in Papua New Guinean children which, though not among the leading causes of death and morbidity, are nevertheless of importance.

All paediatricians, and a number of other doctors and health workers throughout the country actively participate in the Unit's programme. Each month the Unit sends out a card listing the diseases under surveillance to the participants, who return the card indicating if they have seen any children affected during the previous month. The paediatrician responsible for a particular condition then communicates with the reporter in order to obtain further information about the cases seen. This allows a central database on that condition to be built up.

There are currently about 40 participants reporting to the Unit.

Initially the diseases under surveillance were:

1. Insulin dependent diabetes mellitus
2. Paediatric HIV infection and AIDS
3. Congenital hypothyroidism
4. Thalassaemia
5. Renal tubular acidosis
6. Neurologic endemic cretinism
7. Paediatric malignancies.

A number of other conditions have been added, and, as adequate information has been obtained, some of the conditions have been deleted. Acute flaccid paralysis was one of the conditions added, and the Surveillance Unit worked closely with the Health Department Surveillance Unit in the successful programme to document the eradication of polio.

The Unit has provided important information on a number of conditions since its inception. Of particular note perhaps has been the information on paediatric malignancy, HIV/AIDS, subacute sclerosing panencephalitis and renal tubular acidosis.

The latest condition to be added is pigbel. It is anticipated that surveillance of this condition will help to provide a rational basis for decisions relating to pigbel vaccination.

Diseases currently under surveillance are:

1. Insulin dependent diabetes mellitus
2. Congenital hypothyroidism
3. Renal tubular acidosis
4. Neurologic endemic cretinism
5. Subacute sclerosing panencephalitis
6. Acute flaccid paralysis
7. Pigbel

PARALYSIS - ACUTE

An acute presentation with paralysis is not uncommon in Papua New Guinea. It is important to determine whether the paralysis is of **UPPER OR LOWER MOTOR NEURONE TYPE**.

Classically, the signs of **upper motor neurone** paralysis are hypertonia with hyperreflexia (spastic paralysis), upgoing plantars, and, if due to spinal cord compression, loss of sensation and impaired bowel and bladder function.

The signs of **lower motor neurone** paralysis are hypotonia, hyporeflexia (flaccid paralysis) downgoing or non-reacting plantars and no objective sensory loss. However, it should be remembered that in the early stages of spinal cord compression, which is normally associated with upper motor neurone paralysis, patients may present with hyporeflexia and downgoing plantars (spinal shock).

Cerebellar lesions cause hypotonia with decreased reflexes, but there is ataxia and nystagmus.

Disorders of the motor end plate (myaesthesia gravis) and of the muscles (the muscular dystrophies) should be considered in the differential diagnosis of hypotonic paralysis but there is usually a chronic presentation.

Hypokalaemia may also cause flaccid paralysis.

ACUTE FLACCID PARALYSIS

The child with acute flaccid paralysis presents the clinician with the need to make urgent decisions. All children with acute flaccid paralysis must be notified immediately to the provincial and national disease control officers, and to the Paediatric Surveillance Unit, as part of the disease surveillance requirements for the certification of polio eradication (see Poliomyelitis eradication, p.163).

Papua New Guinea was declared polio free in October 2000. There have been no confirmed cases of endemic wild polio for several years. Sabin vaccine associated poliomyelitis has occurred but is extremely rare. The paralysis is usually asymmetrical and there may be associated features such as symptoms of an aseptic meningitis.

The most likely diagnosis of acute flaccid paralysis is Guillain-Barre syndrome (acute postinfective polyneuritis). The classical presentation is with ascending symmetrical flaccid paralysis with hyporeflexia and downgoing or absent plantar responses and little, if any, objective sensory loss.

Less common causes of acute flaccid paralysis are hypokalaemia, botulism (cases in Papua New Guinea associated with eating turtle meat have been described), myopathy, neuropathy, diphtheria (no recent cases described but something to consider in an unimmunised child) and tick bite paralysis (the tick vector is not established in Papua New Guinea but the diagnosis should at least be considered, see p.333). Hypokalaemia may occur in people used to a diet of sweet potato (high in potassium) who suddenly change to eating rice (low in potassium). The paralysis is rapidly reversed by intravenous infusion of potassium 0.3 mEq/kg/hour MAXIMUM, followed by oral potassium.

Transverse myelitis may also present in the early stages with a flaccid paralysis which, over time, changes to a spastic paralysis.

As noted above, it should also always be remembered that patients with spinal cord compression, which is usually associated with spastic paralysis, may, in the early stages (spinal shock), present with flaccidity and hyporeflexia.

In assessing the child with acute flaccid paralysis the clinician should, therefore, seek a history of trauma to the spine (although vague histories of trauma are sometimes produced by parents as their explanation for what is happening to their child), signs of toxicity (including elevated neutrophil counts, that may suggest abscess formation), evidence of weight loss suggestive of tuberculosis or malignancy (Burkitt's lymphoma) or more subtle clues such as skin pigmentation suggestive of neurofibromatosis. For most clinicians practicing in Papua New Guinea, the only way to exclude a cord compression syndrome (spinal shock) requiring urgent surgical decompression is by performing a myelogram.

IF IN DOUBT, A MYELOGRAM SHOULD BE DONE.

Features suggesting Guillain-Barre syndrome (polyneuritis) rather than cord compression (a myelogram is not necessary):

1. Weakness of the face is never due to cord compression, but may occur in polio or polyneuritis.
2. Optic neuritis or papilloedema occasionally occur in transverse myelitis or polyneuritis, but not in cord compression.
3. Flaccid paralysis for longer than 6 weeks suggests poliomyelitis or polyneuritis rather than cord compression. Spinal shock rarely lasts longer than 6 weeks, so hyperreflexia with upgoing plantars has almost always begun to develop by then in cord compression.
4. Pain and tenderness of the calf muscles (often with slight fasciculation) and CSF lymphocytosis (which may have gone by 14 days after the onset of symptoms) suggest poliomyelitis.
5. A prodromal febrile illness, a latent period of up to 2 weeks, progressive symmetric flaccid paralysis from the legs up over hours to days, downgoing plantars, no sensory loss on testing (although subjective parasthesiae may be present) and normal bowel and bladder function: if ALL these features are present in a child old enough to co-operate with testing of sensation, the diagnosis is polyneuritis and myelography need not be done. Polyneuritis may occur without a prodromal illness, the latent period may be longer than 2 weeks, the paralysis may not be ascending and it may be somewhat asymmetric, and there may be retention of urine, but in such cases a myelogram should be done.

Features suggesting cord compression (a myelogram is indicated):

1. Localised back pain or tenderness.
2. Diminished pinprick sensation in the feet (often with no definite upper level).
3. Loss of position and vibration sense in the feet.
4. Decreased sweating below the level of the lesion.

Late signs of cord compression include the development of hyperreflexia and upgoing plantars, a sensory level to pinprick and/or vibration, and loss of anal tone with absent abdominal reflexes.

INVESTIGATIONS

1. If cord compression is a possibility, x-ray the chest and spine. If the arms and legs are paralysed, x-ray the cervical spine. If only the legs are paralysed, x-ray the thoracic and lumbar spine.
2. Examine the abdomen and look at the chest x-ray for evidence of a primary tumour. Examine the skin carefully for evidence of neurofibromatosis.
3. Do a full blood examination.
4. Do a serum potassium.
5. Do a myelogram if it is indicated.
6. Do NOT do a lumbar puncture until the time of myelography if cord compression is a possibility. If you do a lumbar puncture and viscous fluid is obtained (suggesting a high protein due to cord compression, Froin's syndrome), do NOT remove the needle until you have injected Myodil (p.233).

CSF findings:

1. Cord compression - the CSF is usually normal, but with total obstruction, there is xanthochromia with a high protein (over 1 gram/l).
2. Transverse myelopathy - normal CSF, or a mild increase in protein and cells.
3. Guillain-Barre syndrome - acute idiopathic polyneuritis - the CSF has a normal or slightly raised cell count with a disproportionately high protein after the first few days of illness.
4. Polymyelitis - for the first few days there are many polymorphs, with normal protein and sugar. After 2-3 weeks, the cell count is normal, but the protein increases to up to 3 gram/l.

MANAGEMENT

Care of the paraplegic patient is very demanding. Attention should be paid to the 5 “B”s:

1. Bowels - make sure the patient is not constipated. Give laxative if necessary.
2. Bladder - make sure there is no bladder retention. Expression of the bladder or catheterisation may be required.
3. Bed sores - make sure the patient is turned regularly.
4. Breathing - make sure the airway is kept clear. The best way to do this is by correct positioning. If there is respiratory paralysis, a decision concerning ventilation needs to be made.
5. Behaviour - remember that a paralysed patient may well be very wide awake. It is important to talk with him/her and to show “respect” at all times.

It is also very important to maintain adequate fluid and nutritional intake. This may mean inserting a nasogastric tube.

Regular physiotherapy is required (this can be done by the parents) to prevent contractures.

Guillain-Barre syndrome - postinfective polyneuritis

This is the commonest cause of acute flaccid paralysis in Papua New Guinean children. Steroids should NOT be given. The main threat to survival is respiratory paralysis. Unlike poliomyelitis, recovery from polyneuritis is usually rapid. Tracheostomy (p.364) and ventilation with a Bird respirator (p.46) is indicated if respiratory paralysis develops. Plasma exchange and intravenous human immunoglobulin have been shown to be equally effective treatments. In plasma exchange, whole blood is removed from the patient one unit at a time, the red cells are allowed to settle, and then returned to the patient with plasma from a normal blood donor. This is very labour intensive and time consuming. On the other hand, human immunoglobulin is very expensive. These treatments should probably only be used in very rapidly progressive disease. Recovery should be timed from the day that the paralysis ceases to progress - children (but not adults) who do not start to improve within 2 weeks of that day are unlikely to make a full recovery. Complete recovery usually occurs within 2 months, but may take up to 18 months.

Poliomyelitis

Give paracetamol for relief of pain. Prophylactic antimalarials should be given, but antibiotics should only be given to treat established infection. Steroids should not be given. No intramuscular injections should be given, since they may precipitate paralysis in that limb. Great care should be taken to prevent the development of contractures. A child with bulbar paralysis may die from inhalation of food or secretions. Nurse the child in the semi-prone position, turning him from side to side every two hours. The foot of the bed should be raised 15°. Give nasogastric tube feeds.

Most of the improvement will occur in the first year, but there may be some improvement in the second year. If the child has not been immunised, give three doses of Sabin vaccine to prevent a recurrence. The immediate prognosis depends on whether the patient develops respiratory or bulbar paralysis. Ventilation should not normally be attempted for a child with respiratory paralysis due to poliomyelitis, because prolonged or even indefinite ventilation may be required.

Transverse or ascending myelitis

Myelitis limited to a few segments of the cord is called transverse myelitis; when it spreads progressively upwards it is called ascending myelitis. It may follow a viral infection or any vaccination, or there may be no obvious cause. Occasionally, myelitis is caused by syphilis, pyogenic infection or tuberculosis.

If the patient survives the acute attack, there is usually considerable functional recovery. 60% have a good return to function and only 15% have no significant improvement. Steroids have no effect on the outcome unless swelling is so severe that it causes spinal block.

Spinal shock (cord compression)

Laminectomy should be performed urgently, before the ischaemic necrosis of the cord is irreversible. Some cases of acute paralysis with a block shown on myelogram will be found at laminectomy to be due to myelitis (non-specific inflammation of the spinal cord) - the block is due to gross oedema and swelling of the cord, which usually extends over too many segments for laminectomy to be done to decompress all the swollen cord. Such patients with extensive oedema of the cord causing compression should be given dexamethasone 0.25 mg/kg (maximum 10 mg) daily for one week, then reducing over a further week.