

HYPOGLYCAEMIA

DEFINITION

There is no absolute cut-off point, but the generally accepted limit at all ages is a blood sugar level less than 2.6 mmol/l.

SIGNS AND SYMPTOMS

There is a progression of responses to hypoglycaemia, starting with release of counter-regulatory hormones, then an autonomic warning (sweatiness, tachycardia, pallor), then acute neuroglycopenic symptoms (headache, irritability, weakness), and then deteriorating cerebral function (confusion, coma, seizures). In repeated hypoglycaemia, the warning symptoms are often absent and the child progresses straight to deteriorating cerebral function.

In neonates, signs are non-specific - apnoeas, cyanosis, hypotonia, poor feeding, seizures.

Hypoglycaemia is frequent and often unsuspected in sick children. A visual dextrostix reading, glucometer reading, or blood sugar level should be done in any unwell/premature/small neonate, any seriously ill child, or in any child with an unexplained CNS deterioration.

CAUSES

Common

Malaria - particularly with falciparum, and after quinine, but often occurs before treatment
Gastroenteritis/dehydration
Any sick/premature/small-for-dates neonate
Advanced malnutrition
Other severe childhood illness
Infant of a diabetic mother.

Uncommon but important

Adrenal crisis - treat with dextrose and hydrocortisone

- Congenital adrenal hyperplasia - see p.286.
- Hypopituitarism - often with hypogonadism, other dysmorphism

Hyperinsulinism - repeated hypoglycaemia with high dextrose need
Various inborn errors of metabolism - present in neonates, or in childhood after prolonged fasts.

TREATMENT

If the baby/child is conscious and able to drink and eat, the baby should be fed and the older child given a sweet drink followed by some more complex carbohydrate.

Otherwise, IV dextrose/glucose, given as a bolus of either 1 ml/kg of 50% or, if available, 5 ml/kg 10%. Check sugar level in 10-15 minutes. A glucose infusion is often necessary, of up to 10% dextrose (amounting to 4-8 mg/kg/min dextrose). Specialist advice should be sought if there is a dextrose infusion need of >10 mg/kg/min, or repeated unexplained hypoglycaemia.

HYPOTHYROIDISM

This is usually due to an absent or hypoplastic thyroid gland. Deficiencies of thyroid hormone synthetic enzymes (resulting in a goitre), hypopituitarism (with hormonal deficiencies), and autoimmune thyroiditis (presenting in later childhood) also occur. Congenital hypothyroidism occurs throughout the world with an incidence of about 1/4000 births.

Fewer than 1 in 3 affected children have obvious signs at birth, and signs become more marked with time. Affected children are lethargic and floppy, with a large protruding tongue, delayed development, constipation, bradycardia, and often a protuberant abdomen with an umbilical hernia, a hoarse cry, and puffy features. Prolonged neonatal jaundice is common and should raise suspicion. Later, myxoedematous features develop and growth failure and intellectual delay is profound. Children are short, and bone age is delayed (the lower femoral and upper tibial epiphyses should be present in normal children by birth, but their appearance is delayed in hypothyroidism).

In primary hypothyroidism (all gland problems), the serum thyroxine is low and TSH markedly elevated. Neonatal screening programmes in many countries have demonstrated that early thyroid hormone replacement is associated with good neurological outcome. Each month of delayed treatment from birth causes further neurological impairment. With no newborn screening as yet in PNG, it is important to have a high level of suspicion. Therapy should be commenced immediately the diagnosis is proved or highly suspected and blood for TFTs is taken. If blood cannot be collected or sent, treat anyway, and at a later stage stop treatment for one month and do the TFTs at the end of this month. Treatment should be begun immediately with thyroxine in a dose of 50 microgram/day (one half a tablet) if aged 0-6 months and 75 microgram ($\frac{3}{4}$ tablet) if >6 months. After two weeks the dose can be dropped to a maintenance dose of 100 microgram/m² (generally 25-50 microgram (0-6 months), 50-75 microgram (6-12 months), 75-100 microgram (1-5 yr)). Dose is adjusted to maintain normal growth, clinical euthyroidism, and normal TFTs.

Endemic cretinism - see p.94.

IMMUNISATION

NOTES

Immunisation of children against infectious disease is a highly cost effective intervention. It is an integral part of Papua New Guinea Health Policy. It is everyone's duty to ensure that all children are vaccinated. The days when immunisation was left to the MCH services are long since gone. Every health facility and every health worker should ensure that children in their care are fully immunised.

The child's health record book should always be examined. If the child is due for vaccination, this should be given, unless there is a specific contraindication (the only common contraindication is a fever of $>38^{\circ}\text{C}$ when triple antigen, hepatitis B and pigbel should be deferred. Fever is NOT a contraindication for measles vaccination. The only vaccine contraindicated in children with HIV infection is BCG - and then only when the child has AIDS).

Immunisation should be regarded as part of the child's admission procedure. Failure to immunise the child may result in severe consequences. Hospital-acquired measles may be fatal, as may hospital-acquired whooping cough - particularly in a child who is already sick.

The Papua New Guinea Immunisation Policy (see chart) is, by generally accepted practice, very aggressive. TA and Sabin are given at monthly intervals from the age of one month (many countries use a schedule of 2, 4 and 6 months) and measles vaccine at 6 and 9 months (many countries give a single dose at a year or 15 months). **THERE ARE SOUND PRACTICAL AND EPIDEMIOLOGICAL REASONS FOR THE PNG POLICY.** The schedule should be followed as far as possible. On the other hand, immunisation policy is "opportunity based" and should be flexible.

Four doses of sabin vaccine are given. This is part of the Polio Eradication by 2000 strategy.

BCG, Sabin and hepatitis B should be given as soon after birth as possible. They should ideally be part of labour ward routine (giving the hepatitis B vaccine prevents perinatal hepatitis B transmission, and hence greatly reduces the possibility of the child becoming a chronic hepatitis carrier with its associated morbidity and mortality).

Doctors must be actively concerned about the maintenance of the COLD CHAIN. They must therefore ensure that the ward/health centre vaccine storage facilities are adequate and efficient.

NEW VACCINES. It is probable that at least one new vaccine - the Haemophilus influenzae type B conjugate vaccine will be introduced within the next 5 years. This will almost certainly be given together with TA.

IMMUNISATION CHART

Always check the expiry date on the ampoule or vial. Never use expired vaccine.

Keep all vaccines in the main compartment of the refrigerator (temperature 2-8 °C), not in the freezer. Only ice packs are kept in the freezer compartment.

Do not use alcohol or an alcohol swab to clean the skin before giving any injection. Use only cool boiled or distilled water for this purpose.

- On patrol:
- pack vaccines with ice packs in a vaccine carrier
 - if the ice packs have melted by the end of the day, all remaining vaccines, whether opened or not, should be discarded
 - if ice packs are still partly frozen by the end of the day, put all unopened vials back in the refrigerator and use these first at the next immunisation session. Write the date on the vials before returning them to the refrigerator.
 - if ice packs are still partly frozen, all opened vials should be discarded at the end of the day, whatever amount of vaccine they contain.

VACCINE	WHEN GIVEN	DOSE	ROUTE
BCG	As soon as possible after birth	0.05 ml	Intradermal into left upper arm
<p>BCG vaccine is best given at birth. Unvaccinated children between 1 and 5 years of age should also be given 1 dose of this vaccine, but use the child dose which is 0.1 ml instead of the infant dose. Only one dose is given per child, no booster doses are needed.</p> <p>When diluted, protect vaccine from heat and light and use within 6 hours. Discard reconstituted vaccine at the end of each immunisation session.</p>			
HEPATITIS B VACCINE	1 st dose: As soon as possible after birth 2 nd dose: At least one month after 1 st dose (with 1 st TA/OPV). 3 rd dose: At least two months after 2 nd dose (with 2 nd or 3 rd TA/OPV)	0.5 ml (10 mcg) “ “	Intramuscular into left thigh “
<p>The first dose of Hepatitis B vaccine is best given at birth and every child must receive a full course of three doses. Unvaccinated children between 1 and 5 years of age should also be given 3 doses of this vaccine, but use the child dose which is 0.5ml (10 microgram) instead.</p> <p>At the end of each immunisation session return the opened Hepatitis B vial with the remaining vaccine to the refrigerator. It can be used within the next 5 days.</p>			
TRIPLE ANTIGEN (TA/DPT)	1 st dose: One month of age 2 nd dose: One month after 1 st dose 3 rd dose: One month after 2 nd dose	0.5 ml “ “	Intramuscular into right upper arm. “
<p>Every child must receive a full course of three doses of DPT. At the end of each immunisation session return the opened TA vial with the remaining vaccine to the refrigerator. It can be used within the next 5 days.</p>			

VACCINE	WHEN GIVEN	DOSE	ROUTE
ORAL POLIO VACCINE (OPV/Sabin)	1 st dose: As soon as possible after birth 2 nd dose: At one month of age 3 rd dose: One month after 2 nd dose 4 th dose: One month after 3 rd dose	2 drops “ “ “	Orally at the back of the tongue
At the end of each immunisation session return the opened Polio vial with the remaining vaccine to the refrigerator. It can be used within the next 5 days.			
PIGBEL VACCINE	1 st dose: At one month of age 2 nd dose: One month after the 1 st dose 3 rd dose: One month after the 2 nd dose 4 th dose: First year community school 5 th dose: Last year community school	0.5 ml “ “ “ “	Intramuscular into right thigh
At the end of each immunisation session return the opened Pigbel vial with the remaining vaccine to the refrigerator. It can be used within the next 5 days.			
MEASLES VACCINE	1 st dose: At six months of age or as soon as possible thereafter 2 nd dose: At nine months of age or 3 months after the first dose	0.5 ml “	Subcutaneous into right upper arm.
When diluted, protect vaccine from heat and light and use within 6 hours. Discard reconstituted vaccine at the end of each immunisation session.			
TETANUS TOXOID	1 st dose: First year community school 2 nd dose: Last year community school 3 rd dose: During pregnancy (2 doses 4 weeks apart in the first pregnancy, 1 dose in each of the next pregnancies, maximum 5 doses)	0.5 ml “ “	Intramuscular into left upper arm.
At the end of each immunisation session return the opened TT vial with the remaining vaccine to the refrigerator. It can be used within the next 5 days.			

1. The above mentioned doses are recommended for the vaccines currently available in PNG, but in all cases the manufacturer's leaflet should be checked for the recommended doses.
2. Don't forget to check whether the patient's brothers and sisters and mother need immunisation also.
3. It is important to check the immunisation status of every child that you see in any clinic and to give any vaccines due immediately without referral to the immunisation clinic. The only vaccines ever to be withheld are Triple Antigen, Hepatitis B and Pigbel if the child has a fever of more than 38 °C. In such cases, the vaccine is only temporarily withheld while the fever persists. As soon as the child's temperature returns to normal, continue and complete the normal course of immunisation with these vaccines.
4. You must always immunise a child even though you may have to open a new vial for only one child. If necessary, order more vaccine to make sure you have sufficient for all children expected at the clinic, plus a reserve.

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