



British Inherited Metabolic Disease Group

This protocol has 4 pages

Contact Details Name:

Hospital

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MANAGEMENT OF A BABY AT RISK OF AN ORGANIC ACIDAEMIA AT BIRTH

1. Is the diagnosis of the fetus already known for certain? If yes go to 2. If not, go to 3.
2. When did the sibling (or relative) become ill?

If the previous sibling became ill in the neonatal period: [Go to section A on page 2](#)

If the previous sibling became ill after the neonatal period: [Go to section B on page 4](#)

If the diagnosis is not known proceed to 3.

3. The pregnancy should proceed normally. A careful history is essential and should be reviewed by a specialist. In particular when did the previous child become ill, in the neonatal period or later? Is the likely diagnosis known? Work out the quickest way to establish the diagnosis. Seek specialist help if necessary.
4. If a previous sibling became ill shortly after birth, discuss management with specialist.
 - Consider prenatal testing at a late stage if possible. This will facilitate management of the new baby if this was not done at an earlier stage in pregnancy.
 - Consider transferring the mother before birth to a centre with all facilities for managing an affected baby.
 - Consider delivering the baby by caesarian section as this minimizes the metabolic stress of birth and the timing of the delivery is known.
5. In the third trimester obtain supplies of enteral and intravenous carnitine. If the previous child had severe neonatal hyperammonaemia, see if your pharmacy is willing to obtain a supply of N-carbamylglutamate (1g, enteral), as this can correct hyperammonaemia in organic acidaemias.
6. Inform the clinical biochemistry laboratory about the impending birth, as it is essential that results are available quickly.

At this stage the management will depend on the illness in the previous sibling.

If the previous sibling became ill in the neonatal period: [Go to section A on page 2](#)

If the previous sibling became ill after the neonatal period: [Go to section B on page 4](#)

SECTION A

IF THE PREVIOUS SIBLING BECAME ILL IN THE NEONATAL PERIOD:

A1. Transfer to the neonatal unit immediately after birth and start an intravenous infusion of 10% glucose at 4 ml/kg/hr (6.6 mg/kg/min) as soon as possible, preferably within 30 minutes of birth. This is to prevent the normal fall in blood glucose that initiates catabolic pathways in the baby.

A2. If the baby remains well, at 4 hours offer a milk feed (breast or infant formula) but continue the intravenous infusion.

A3. At 6-12 hours of age measure blood gases, plasma ammonia, aminoacids (quantitative), blood spot acylcarnitine profile and urine organic acids and ketones (dipstick).

Then give L-carnitine orally at 50 mg/kg. Continue the same dose 6 hourly thereafter until the diagnosis is known or a change is advised.

NOTE: There is no one single routine test that can be used to monitor for organic acidaemias. It is necessary to consider all the available evidence, clinical status and biochemical investigations until the carnitine profile and organic acids are available. These are urgent so discuss with the laboratory and discuss any concerns and all the results with the specialist.

Until the results are available it is necessary to rely on the following:

Blood gases: Whilst a metabolic acidosis is often regarded as characteristic of an organic acidaemia, the blood gases in practice are varied. There may even be a respiratory alkalosis secondary to hyperammonaemia.

Plasma ammonia concentration: This is commonly raised in the neonatal period and may be responsible for serious brain damage.

Urine ketones: Test urine with dipstick. These are rarely present in normal babies and if detected suggest an organic acidaemia.

⇒ If all the results are within normal limits (ammonia <80 µmol/l), repeat tests in 6 hours and provided they remain normal, monitor at 12 hourly intervals. Continue to offer milk feeds approximately 4 hourly. Stop the intravenous infusion if the baby is well and the tests are normal at 24 hours of age.

⇒ If the values show minor abnormalities (for example ammonia 80-120 µmol/l), repeat in 4 hours and if they persist, monitor at 6 hourly intervals. Stop the milk feeds and instead give feeds as 10% soluble glucose polymer. ([Click here for instructions on making 10% Glucose Polymer Solution](#))

⇒ If any of the results are clearly abnormal and/or if the baby becomes clinically unwell repeat the tests immediately and seek advice from the metabolic centre.

Note: If metabolites are being used to make the diagnosis, the treatment proposed may mask the biochemical changes of disease. Careful follow-up is essential.

A4. IF UNWELL

- Contact the specialist centre.
- Try to get the results of the blood spot carnitine and urine organic acids as soon as possible.

Depending on the clinical state and the results consider the following:

- Stopping feeds
- Giving the carnitine intravenously (The standard dosage (BNF for children) is 100 mg/kg over 30 minutes and then 4mg/kg/hour)
- Transferring to a hospital with specialist facilities including haemodialysis/filtration.

A5. HYPERAMMONAEMIA

- If plasma ammonia is rising fast or it is $>250 \mu\text{mol/l}$ (unless it is only rising very slowly), the baby should be transferred to a centre with facilities for haemofiltration/dialysis
- If plasma ammonia is $>300 \mu\text{mol/l}$, give N-carbamylglutamate 250 mg/kg through a naso-gastric tube (if it is available)
- If plasma ammonia is $>350 \mu\text{mol/l}$, ask appropriate colleagues to arrange haemodialysis/filtration. This generally takes about 4 hours to set up. Repeat ammonia measurement before it is started – particularly if N-carbamylglutamate has been given.

A6. If mother wishes to breast feed, she should express as she should be able to breast feed her baby, even if affected, once the metabolic state is stable.

A7. Get the results of investigations.

SECTION B

IF THE PREVIOUS SIBLING BECAME ILL AFTER THE NEONATAL PERIOD:

B1. If the birth is complicated (birth asphyxia, etc) start a glucose infusion as soon as possible after birth. This is to prevent the normal fall in blood glucose that triggers catabolic pathways in the baby. Admission to SCBU for assessment is advisable. Complications not only may be responsible for symptoms that mimic those of an organic acidaemia but they may also be responsible for abnormal results.

B2. If all proceeds normally, start milk feeds (breast or infant formula).

B3. At 24-48 hours of age measure blood gases, plasma ammonia, aminoacids (quantitative) blood spot carnitine profile and urine organic acids and ketones.

B4. If any of the results are clearly abnormal and/or the child is unwell at any time (refusing to feed, tachypnoeic, drowsy, floppy, vomiting, etc), repeat the tests at once at once and follow the instructions on A4. For more information about the feeds refer to the end of the protocol.

If there are minor abnormalities (for example plasma ammonia 80 -120 $\mu\text{mol/l}$) and the baby appears well repeat at 12 hourly intervals. Try to get results of the investigations as soon as possible. Change feeds to 10% soluble glucose polymer. ([Click here for instructions on making 10% Glucose Polymer Solution](#))

If the plasma ammonia remains less than 80 $\mu\text{mol/l}$ at 48 hours continue milk feeds and discuss follow up at specialist centre.

B5. If mother wishes to breast feed, she should express as she should be able to breast feed her baby, even if affected, once the metabolic state is stable.

B6. Get the results of investigations