### HIE clinical features, investigations and management

#### Hypoxic insult
- Low cardiac output
- Decreased tissue perfusion
- Ischaemia

#### Multi-organ dysfunction

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<td>- Anticipate need for resuscitation from maternal/obstetric/labour history (including CTG trace)</td>
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<td>- Monitor for seizures</td>
<td>- Refer to QCG: Neonatal resuscitation</td>
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<td>- Cord blood gas</td>
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<td>- Arterial blood gas</td>
<td>- Supportive treatment</td>
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<td>- Treat seizures [refer to QCG: Neonatal seizures]</td>
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<td><strong>Metabolic</strong></td>
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<td>- Creatinine</td>
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| Renal failure     | - Blood gas  | - Restrict fluid intake  |
|                   | - Cord blood gas  |  - Core temperature of 33–34°C within 6 hours of birth for 72 hours  |
|                   | - Arterial blood gas  | - Monitor urine output  |
| Haematology       | - FBC including platelets  | - Nutritional support: TPN if required  |
|                   | - LFTs  | - Therapeutic hypothermia if criteria met  |
|                   | - Coagulation screen  |  - Core temperature of 33–34°C within 6 hours of birth for 72 hours  |

**Ongoing care and assessment**
- Physio and speech therapy
- Family support
- Developmental assessment

### Differential diagnosis investigations
- Consider:
  - Lumbar puncture
  - Bloods for chromosome analysis, ammonia, amino acids
  - Urine for amino and organic acids, ketones, reducing substances
  - Early NNST [repeat NNST at normal collection date]
  - Cranial US

### Investigations
- Continuous aEEG/EEG
- Monitor for seizures
- Cord blood gas
- Arterial blood gas
- CXR
- Blood gas
- Echocardiography
- FBC including platelets
- LFTs
- Coagulation screen

### Management
- Anticipate need for resuscitation from maternal/obstetric/labour history (including CTG trace)
- Refer to QCG: Neonatal resuscitation
- Maintain breathing & circulation
- Supportive treatment
- Treat seizures [refer to QCG: Neonatal seizures]
- Avoid:
  - Hypo/hyper ventilation
  - PaCO₂ in normal range
  - Hypoxaemia/hyperoxia
  - Hyperthermia
  - Hypotension
  - Inotropes as indicated
- Correct metabolic acidosis
- Maintain normal blood glucose, calcium and magnesium
- Restrict fluid intake
  - Core temperature of 33–34°C within 6 hours of birth for 72 hours

### Abbreviations:
- aEEG: Amplitude-integrated electroencephalograph
- CTG: Cardiotocograph
- CXR: Chest x-ray
- DIC: Disseminated intravascular coagulation
- EEG: Electroencephalograph
- FBC: Full blood count
- IV: Intravenous
- LFTs: Liver function tests
- MRI: Magnetic resonance imaging
- NEC: Necrotising enterocolitis
- NNST: Newborn screening test
- PaCO₂: Partial pressure of carbon dioxide
- QCG: Queensland Clinical Guideline
- RBC: Red blood cells
- TPN: Total parental nutrition
- US: Ultrasound

Queensland Clinical Guideline: Hypoxic-ischaemic encephalopathy (HIE) F16.11-3-V9-R21

Queensland Clinical Guidelines

ABBREVIATIONS: aEEG Amplitude-integrated electroencephalograph; CTG Cardiotocograph; CXR Chest x-ray; DIC Disseminated intravascular coagulation; EEG Electroencephalograph; FBC Full blood count; IV Intravenous; LFTs Liver function tests; MRI Magnetic resonance imaging; NEC Necrotising enterocolitis; NNST Newborn screening test; PaCO₂ Partial pressure of carbon dioxide; QCG Queensland Clinical Guideline; RBC Red blood cells; TPN Total parental nutrition; US ultrasound