Neonatal and infant health

What to look out for
in babies up to 6 months old…

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Paediatric Basic Life Support
(Healthcare professionals with a duty to respond)

UNRESPONSIVE?

Shout for help

Open airway

NOT BREATHING NORMALLY?

5 rescue breaths

NO SIGNS OF LIFE?

15 chest compressions

2 rescue breaths 15 compressions

Call resuscitation team

October 2010
Hold head in neutral position
Paediatric choking treatment algorithm

Assess severity

Ineffective cough

Unconscious
- Open airway
- 5 breaths
- Start CPR

Conscious
- 5 back blows
- 5 thrusts
  - (chest for infant)
  - (abdominal for child > 1 year)

Effective cough

Encourage cough
- Continue to check for deterioration to ineffective cough or until obstruction relieved

October 2010
**STEP 1**

1. Support baby’s neck with one arm.
2. Position baby face down with head lower than body.
3. Apply 5 back thrusts between shoulder blades with one hand.

**STEP 2**

1. Turn baby over. Support neck.
2. Apply 5 chest thrusts, using 2-3 fingers.
3. Compress about 1” deep.
4. Repeat process until object is removed.
Keep Warm

Crying/Colic

‘Definition’

• Crying is normal physiological behaviour in young infants. At 6 - 8 weeks age, a baby cries on average 2 - 3 per 24 hours. Excessive crying is defined as crying >3 hours/day for >3 days/week. This is often referred to as "colic". However, many babies present with lesser amounts of crying, as the parents perceive it as excessive

• Infants with colic are well and thriving. There is usually no identifiable medical problem. The parents are often distressed, exhausted, and confused, having received conflicting advice from various health professionals and lay sources
Crying/Colic

• Does it get any better?
  • Yes. Most infants will have grown out of colic by 3-4 months

• Differential Diagnosis
  • Urinary tract infection
  • Otitis media
  • Raised intracranial pressure
  • Hair tourniquet of fingers / toes
  • Corneal foreign body
  • Incarcerated hernia
  • Acute Abdomen
Regular review in general practice
Vomiting

• Possets
  • normal

• Gastro-oesophageal Reflux
  • common - 50%
  • spectrum - mild thicken feeds and positioning advice
  • Severe may require drug therapy
  • Very severe may need fundoplication
  • worse in neuro-developmental disabilities
  • Complications - oesophagitis or Barrett’s, failure to thrive
### Box 1: Symptoms and signs suggestive of alternative underlying pathology

<table>
<thead>
<tr>
<th>Gastrointestinal disease</th>
<th>Neurological disease</th>
<th>Cardiac or Respiratory disease</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bilious (green) vomits</td>
<td>• Bulging fontanelle</td>
<td>• Persistent cough</td>
<td>• Fever suggestive of UTI or systemic infection</td>
</tr>
<tr>
<td>• GI bleeding</td>
<td>• Macrocephaly</td>
<td>• Recurrent lower respiratory tract infections</td>
<td>• Lethargy</td>
</tr>
<tr>
<td>• Consistently forceful vomiting suggestive of pyloric stenosis (age 0-3 months)</td>
<td>• Microcephaly</td>
<td>• Persistent wheeze</td>
<td>• Faltering growth</td>
</tr>
<tr>
<td>• Onset of vomiting after 6 months</td>
<td>• Seizures</td>
<td>• Stridor or noisy breathing suggestive of laryngomalacia or tracheomalacia</td>
<td>• Renal disease</td>
</tr>
<tr>
<td>• Constipation</td>
<td>• Genetic abnormalities (e.g. Trisomy 21)</td>
<td>• Heart murmur</td>
<td></td>
</tr>
<tr>
<td>• Diarrhoea</td>
<td>• Hypotonia</td>
<td>• Hepatomegaly</td>
<td></td>
</tr>
<tr>
<td>• Abdominal tenderness or distension</td>
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</tbody>
</table>
Box 2: Complicated GOR

- Weight loss or faltering growth
- Feeding problems or refusal
- Oesophagitis, irritability and disturbed sleep
- Respiratory problems
- Haematemesis
- Anaemia
- Sandifer syndrome (arching of the back, torsion of the neck and lifting of the chin)
- GORD is often considered as a cause of apnoea and apparent life-threatening events (ALTE) but this is rarely established with certainty.
### Treatment Algorithm

**Infant presents with a history suggestive of GOR**
- Are there any features to suggest underlying pathology (box 1) or Complicated GOR (box 2)?

#### Uncomplicated GOR
- Parental reassurance
- Ensure not overfeeding
- Correct feeding volumes
- Calm atmosphere
- Correct tachyzois
- Positional advice such as elevation of the head of the cot
- Consider early weaning at 4 months

#### Complicated GOR
- Add infant Cimetidine if not already started (not with thickened formula)
- Introduce Ranitidine if there has been a poor response to Cimetidine
- Consider a 2-week trial of hydrolysed infant formula (box 3)
- Consider referral to paediatric outpatients if any diagnostic uncertainty

### Formulary

#### Ranitidine (oral)
- 0-1 month: 2.0 mg/kg 8 hourly
- 1-6 months: 1.3 mg/kg 8 hourly
- 6 months-3 years: 2.4 mg/kg 12 hourly (maximum 150 mg twice daily)

#### Gaviscon Infant (oral)
- Under 4.5 kg: 1 dose (half sachet) mixed with feeds or water for breast fed infants as required (maximum 6 doses in 24 hours)
- Over 4.5 kg: 2 doses (full sachet) mixed with feeds or water for breast fed infants as required (maximum 6 doses in 24 hours)

#### Cimetidine (oral)
- 0.5mg: Maximum 500 microgram/kg once daily
- 1 month-2 years: 0.7-3 mg/kg once daily (maximum 50 mg)

#### Omeprazole (oral)
- 0.5 mg: 700 microgram/kg once daily
- 1 month-2 years: 0.7-3 mg/kg once daily (maximum 50 mg)

#### Domperidone (oral)
- 5 mg: 100-300 microgram/kg 4-6 times daily before feeds

**Upper GI contrast series are neither definitive nor specific for diagnosing GOR and routine performance is not justified. pH studies are invasive and results do not always correlate with symptoms**
Bronchiolitis

How common is it?
- Very common
- 70% of infants will contract it in the first year of life
- 22% symptomatic
- 3% of all infants < 1 year will be hospitalised with bronchiolitis

When is it most prevalent?
- Winter (Between October and March)
- Infants 3-6 months old

How do babies present?
- Respiratory distress (tachypnoea, recessions, decreased sats)
- Decreased feeding
- Neonates can present with apneas without respiratory distress
A B C – Identify severe disease (figure 1)

History and examination suggestive of bronchiolitis
- Coryza
- Cough
- Poor feeding
- Pyrexia (but can be afebrile)
- Widespread inspiratory crackles & expiratory wheeze
- Respiratory distress
- Apnoea

Bronchiolitis has a peak incidence in infants 3-6 months old between October and March. Most cases occur in babies under 1 year of age. Influenza H1N1 can cause bronchiolitis. Please use in conjunction with pandemic flu guideline when appropriate.

Consider other diagnoses
- Sepsis (especially if temperature >39°C)
- Cardiac, particularly if:
  - Absent femoral pulses
  - Heart murmur
  - Hepatomegaly
  - Sweating
- Recurrent viral wheeze

Lower threshold for admission
- Age <6 weeks (corrected)
- Prematurity (<35 weeks)
- Low birth weight (<2.5 kg)
- Pre-existing lung disease
- Congenital heart disease
- Neuromuscular weakness
- Immunocompromise
- Psycho-social concerns or re-attendance (require senior review)

Admission criteria
- Respiratory rate >50 with moderate to severe recession
- Hydration/nutrition support required
- Requiring oxygen to maintain SpO2 >92% (infants with SpO2 92-94% require senior review prior to discharge)
- Apnoeas

Investigations
Traffic light system for identifying risk of serious illness

<table>
<thead>
<tr>
<th>Green – low risk</th>
<th>Amber – intermediate risk</th>
<th>Red – high risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour (of skin, lips or tongue)</td>
<td>- Normal colour</td>
<td>- Pallor reported by parent/carer</td>
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<tr>
<td>Activity</td>
<td>- Responds normally to social cues</td>
<td>- Not responding normally to social cues</td>
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<tr>
<td></td>
<td>- Content/smiles</td>
<td>- No smile</td>
</tr>
<tr>
<td></td>
<td>- Stays awake or awakens quickly</td>
<td>- Wakes only with prolonged stimulation</td>
</tr>
<tr>
<td></td>
<td>- Strong normal cry/not crying</td>
<td>- Decreased activity</td>
</tr>
<tr>
<td>Respiratory</td>
<td>- Nasal flaring</td>
<td>- Tachypnoea: RR &gt;50 breaths/minute, age 6–12 months</td>
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<tr>
<td></td>
<td></td>
<td>- RR &gt;40 breaths/minute, age &gt;12 months</td>
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<tr>
<td></td>
<td></td>
<td>- Oxygen saturation ≤95% in air</td>
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<td>- Crackles in the chest</td>
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<tr>
<td>Circulation and hydration</td>
<td>- Normal skin and eyes</td>
<td>- Tachycardia: &gt;160 beats/minute, age &lt;12 months</td>
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<tr>
<td></td>
<td></td>
<td>- Most mucous membranes</td>
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<tr>
<td>Other</td>
<td>- None of the amber or red symptoms or signs</td>
<td>- Age &lt;3 months, temperature ≥38°C</td>
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</table>

*This traffic light table should be used in conjunction with the recommendations in the guideline on investigations and initial management in children with fever. See http://guidance.nice.org.uk/GG160 (update of NICE clinical guideline 47).*

First, healthcare professionals should identify any immediately life-threatening features, including compromise of the airway, breathing or circulation, and decreased level of consciousness. [2007]

Children with any ‘red’ features but who are not considered to have an immediately life-threatening illness should be referred urgently to the care of a paediatric specialist. [2007]

If any ‘amber’ features are present and no diagnosis has been reached, provide parents or carers with a ‘safety net’ or refer to specialist paediatric care for further assessment. The safety net should be 1 or more of the following:

- providing the parent or carer with verbal and/or written information on warning symptoms and how further healthcare can be accessed (see chapter 10)
- arranging further follow-up at a specified time and place
- liaising with other healthcare professionals, including out-of-hours providers, to ensure direct access for the child if further assessment is required. [2007]

Children with ‘green’ features and none of the ‘amber’ or ‘red’ features can be cared for at home with appropriate advice for parents and carers, including advice on when to seek further attention from the healthcare services (see chapter 10). [2007, amended 2013]
### Table 3 Risk stratification tool for children aged under 5 years with suspected sepsis

<table>
<thead>
<tr>
<th>Category</th>
<th>Age</th>
<th>High risk criteria</th>
<th>Moderate to high risk criteria</th>
<th>Low risk criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behaviour</strong></td>
<td>Any</td>
<td>No response to social cues&lt;br&gt;Appears ill to a healthcare professional&lt;br&gt;Does not wake, or if roused does not stay awake&lt;br&gt;Weak high-pitched or continuous cry</td>
<td>Not responding normally to social cues&lt;br&gt;No smile&lt;br&gt;Wakes only with prolonged stimulation&lt;br&gt;Decreased activity&lt;br&gt;Parent or carer concern that child is behaving differently from usual</td>
<td>Responds normally to social cues&lt;br&gt;Content or smiles&lt;br&gt;Stays awake or awakens quickly&lt;br&gt;Strong normal cry or not crying</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td>Any</td>
<td>Grunting&lt;br&gt;Aproea&lt;br&gt;Oxygen saturation of less than 91% in air or increased oxygen requirement over baseline&lt;br&gt;Nasal flaring</td>
<td>Oxygen saturation of less than 91% in air or increased oxygen requirement over baseline&lt;br&gt;Nasal flaring</td>
<td>No high risk or moderate to high risk criteria met</td>
</tr>
<tr>
<td></td>
<td>Under 1 year</td>
<td>Raised respiratory rate: 60 breaths per minute or more</td>
<td>Raised respiratory rate: 50–59 breaths per minute</td>
<td>No high risk or moderate to high risk criteria met</td>
</tr>
<tr>
<td><strong>Circulation and hydration</strong></td>
<td>Any</td>
<td>Bradycardia: heart rate less than 60 beats per minute</td>
<td>Capillary refill time of 3 seconds or more&lt;br&gt;Reduced urine output&lt;br&gt;For catheterised patients, passed less than 1 ml/kg of urine per hour</td>
<td>No high risk or moderate to high risk criteria met</td>
</tr>
<tr>
<td></td>
<td>Under 1 year</td>
<td>Rapid heart rate: 160 beats per minute or more</td>
<td>Rapid heart rate: 150–159 beats per minute</td>
<td>No high risk or moderate to high risk criteria met</td>
</tr>
<tr>
<td><strong>Skin</strong></td>
<td>Any</td>
<td>Mottled or ashen appearance&lt;br&gt;Cyanosis of skin, lips or tongue&lt;br&gt;Non-blanching rash of skin</td>
<td>Normal colour</td>
<td>No high risk or moderate to high risk criteria meeting</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Any</td>
<td>Less than 36°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under 3 months</td>
<td>38°C or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3–6 months</td>
<td>39°C or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>Any</td>
<td>Leg pain&lt;br&gt;Cold hands or feet</td>
<td></td>
<td>No high risk or high to moderate risk criteria met</td>
</tr>
</tbody>
</table>
Child Protection

Physical

Emotional

Sexual

Neglect
Child Protection

- Frequent Attendance
- History/Examination don’t match
- Bruising in non mobile children
- Tension between child and parent
- Safety net review if appropriate
- Emergency Duty Team 01454 615165
- Community Paediatrician 0117 9230000
Advice for safer paediatric prescribing

- Limit the drugs you use to a well-tried few and familiarise yourself with their dosages, indications, contraindications, interactions and side-effects.
- Refer to a paediatric formulary when appropriate. [http://www.bnf.org/bnf/index.htm](http://www.bnf.org/bnf/index.htm)
- Include the child’s age & write the exact dose required in weight & (if liquid) volume.
- Calculate doses on paper & if possible, get a colleague to check your arithmetic.
- When writing a dosage put a zero in front of a decimal point, eg, 0.2mg.
- Never abbreviate micrograms.
- For amounts less than 1 milligramme, prescribe in microgrammes.
Litigation

Documentation

• Keep clear, contemporaneous and detailed notes of any consultation
• Remember to always think about how you would justify your actions, if they were ever called into question.
• Documenting every consultation, including telephone consultations.
• A reminder regarding telephone consultations is that arrangements should be made for face to face review if any concerns are raised regarding a patient’s clinical condition.
RESOURCES

• Paediatric ED BCH 0117 3428666

• Rapid access Clinic Fax 01173428684

• Community Paediatrician 0117 9230000


• SystmOne template for the management of a feverish child aged under five years
Automated incision device designed for use on newborns

Adapted from Jain & Rutter [37]

Diagram A
For full-term and preterm infants

Diagram B
For infants who have had repeated heel punctures