Minor Illness and Minor Injuries in Children

Respiratory Illnesses
Respiratory Examination

- Effective examination techniques?
Three wisdoms of clinical assessment

• Know the normal

• Know the variants of normal

• Then ... know the abnormality, remembering that there are often borderline findings and a thin dividing line between
Respiratory Assessment

**Inspection**
- Size / shape of chest
  - may given an indication of chronic respiratory disease / FTT / Obesity
- Presence of cyanosis / clubbing / prominence of venous markings:
  - indicative of chronic hypoxia
- Scars from previous interventions
- Rate:
  - inversely proportional to age
- Pattern
- Work of breathing

**Percussion**
- Gentle approach - use middle fingers
- Seldom informative in infants
- Localised dullness – presence of collapse / consolidation, fluid collection
Considerations for Newborns / Infants

- In new-borns the chest is usually round with the anteroposterior diameter approximately the same as the transverse diameter

- Circumference is almost equal to that of the head until the child is about 2 yrs of age - in an full term healthy infant this equates to 30-36cms

- Distance between the nipples is approximately ¼ of the circumference of the chest

- Observe for supernumerary nipples – often indicative of other congenital abnormalities especially in Caucasian population
Considerations for Newborns / Infants

- Coughing in new-borns is rare and is normally pathological in origin but sneezing in new-borns is frequent and expected.

- Hiccups in new-borns are common, usually silent and associated with feeds – Frequent non-feed associated hiccups may be suggestive of seizures, drug withdrawal or encephalopathy.

- Cyanosis of hands and feet (Acrocyanosis) is common in the new-born and may persist for several days in a cool environment.
Considerations for older children / adolescents

- Anteroposterior diameter is normally less than the transverse diameter – often by as much as half
- Hyperexpanded chest in chronic obstructive airways disease e.g. asthma
  - Pectus Carinatum – prominent sternal protrusion
  - Pectus Excavatum - indentation of lower sternum above the xiphoid process
Respiratory Assessment

**Palpation**
- Maybe used to assess chest expansion (3 - 5cm in school aged children)
- Allows for assessment of symmetry of movement during both inspiration and expiration
- Tracheal position – midline above sternal notch slight deviation to the right is common and normally asymptomatic finding
- Assess for pulsations / bulges / depressions

**Tactile / vocal Fremitus**
- Difficult to assess in younger children
  - Palpable vibrations transmitted from lung to chest wall (posterior) when child cries or speaks which should be symmetrical

**Decreased fremitus**
- Presence of excessive air in the lungs, pleural thickening, bronchial obstruction
Respiratory Assessment

Auscultation

Assess for the following –

1. The presence and location of normal breath sounds

2. The presence of normal breath sounds in abnormal locations

3. The presence of adventitious breath sounds

Symmetrical assessment, moving from top to bottom anteriorly then posteriorly (remember to include axilla)
Respiratory Assessment

Considerations:

- Breath sounds from RML and L lingular lobe are best heard in respective axillae.
- Breath sounds are usually louder in infants and young children – thinner chest wall and bronchovesicular sounds may be heard right to lung edges.
- Referred breath sounds are common in infants / young children due to small thoracic cavity – even in presence of significant pneumothorax, breath sounds may be heard over collapsed areas.
Normal Breath Sounds

- [http://www.medicalive.net/296_breath_sounds](http://www.medicalive.net/296_breath_sounds)
Cough

Cough is the most common symptom of respiratory disease and is indicative of irritation of the nerve receptors in the pharynx, larynx, trachea or large bronchi but must be considered in light of other clinical findings

Causes of cough –

- Infection – acute, chronic or recurrent
- Asthma
- Cigarette smoking (active or passive)
- Inhaled foreign body
- TB
- CF
Wheeze

Wheeze usually presents as a clinical finding of acute LRT infections but differential diagnosis includes -

- Recurrent aspiration of feeds
- Cow’s milk intolerance
- Inhaled foreign body (can be a longstanding wheeze)
- Congenital abnormality of the airway / lungs
- Congenital heart disease
Stridor

If accompanied by a cough, hoarseness and recession then it is significant for a problem in the trachea and or larynx

It may not be associated with acute infective process particularly in the neonatal population where consideration should be given for the presence of congenital / acquired abnormalities e.g.

• Subglottic stenosis
• Laryngomalacia
Summary

Laryngeal-tracheal
• Stridor, grunting, wheezing

Tracheal-bronchiole
• Rhonchi, wheezing
• Coarse crackles

Bronchio-alveoli
• Fine crackles
Respiratory Illnesses

Interesting Facts.....

Accounts for 50% of GP consultations for acute illness in the younger child

Average preschool child has between 6 and 8 episodes of respiratory illness per year

Respiratory illnesses account for 35% of all acute hospital admissions for children under the age of 5 years

80-90% of childhood respiratory illnesses are viral in origin

What is your workload?
Respiratory Illnesses

Common Respiratory Illnesses in Children

- Bronchiolitis
- Asthma
- Pneumonia
- Croup

Not so common

- Pertussis
Bronchiolitis

- An acute seasonal viral illness of the lower respiratory tract which affects mainly infants and children < 2 yrs of age
Epidemiology

- 75% of all bronchiolitis is caused by Respiratory Syncytial Virus (RSV)

- Other pathogens include
  - Parainfluenza types 1, 2, and 3
  - Influenza B
  - Adenovirus types 1, 2 and 5
  - Mycoplasma - older children
Epidemiology

- Nearly 100% of children will experience an RSV infection within two RSV seasons

- 1% will be hospitalised
- 50% will be between 1 and 3 months of age

- Boys are more affected than girls:
  - 1.7 x attack rate
  - 1.5 x hospitalisation
Epidemiology

800 000 live births

80 000 will develop symptomatic bronchiolitis

8000 will become inpatients

800 will become inpatients

800 require PICU

5 – 25 die

775 – 795 survive

720 000 RSV positive

72 000 Primary Care / ED

7200 Paeds Wards
Risk factors for symptomatic RSV infection include:

- Low birth weight
- Prematurity
- Lower socioeconomic group
- Crowded living conditions
- Parental smoking
- Day care
- Absence of breast feeding (colostrum appears to be protective)
Clinical Signs / History

Initially
- coryzal symptoms
- low grade fever
- upper airways congestion

40% progress to LRTI within 2 – 5 day:
- Cough
- Dyspnoea
- Wheezing
- Feeding difficulties
- Apnoeas

In severe infections:
- Nasal flaring, recession cyanosis
Clinical Scenario 1

A 2 month old infant, Elvis, is brought in by his parents who are concerned that his breathing is very fast and he has a cold.

What would be your initial clinical assessment process for this infant?
Clinical Scenario

Clinical assessment findings

A – patent, good cry present
B – RR 50, slight nasal flare present, slight wheeze on expiration, SpO2 – 94% in room air
C – HR – 146 warm, pink and well perfused, CRT < 2 seconds
D – responsive to parents
E – no evidence of a rash, temperature 37.1°C

History:
Two day history of a cold

Fluid status:
Taking normal feeds and no reduction in wet nappies

What is your plan for this infant?
Clinical Scenario 1

Plan –

Home:

• Parental advice – advice sheet
  F:\MIMIC Teaching\026_bronchiolitis.pdf

• Encourage oral fluids

• Calpol if febrile and miserable
Clinical Scenario 1

The infant is brought back the following day after an apnoeic episode at home.

What would your initial assessment on re-presentation be?
Clinical Scenario

Clinical assessment findings

A – patent, good cry present
B – RR 70, slight nasal flare present, widespread wheeze on expiration, $\text{SpO}_2$ – 92% in oxygen
C – HR 169, warm, pink and well perfused, CRT < 2 seconds
D – responsive to parents
E – no evidence of a rash, temperature 37.9°C

History:
Three day history of a cold

Fluid status:
Still taking feeds but has not been able to take a full bottle since previous evening and Mum reports one wet nappy today

What is your plan for Elvis?
Admission Criteria

Referral on / Admission is likely to be needed if:

- Sustained SpO₂ < 92% in room air
- < 6 months of age
- Inability to maintain oral hydration
- Markedly elevated respiratory rate
- Chronic lung disease with O₂ dependency
- Congenital heart disease with pulmonary hypertension
Parental Advice

- Viral illness – antibiotics not indicated
- Acute illness lasts 10-14 days
- Cough may persist for up to 2 months
- Infants usually lose weight while acutely ill – they will regain weight within 1-2 weeks after acute illness episode
- Siblings < 1 yr may well develop bronchiolitis – good hand washing necessary
- Smoking advice....
Asthma
**Asthma**

- A disease which results from the interaction of genetic and or environmental influences on the tone or reactivity of the airways causing symptoms of breathlessness, cough and wheezing

**Status asthmaticus is defined as:**

Asthma that is unresponsive or poorly responsive to oral, inhaled or injected bronchodilator drugs
Causes of Acute Asthma

10% of all asthmatics are affected by certain types of food and or drink

Common causes in children include:

- Milk (including formula milks)
- Eggs
- Fish
- Cereals
- Nuts
- Chocolate
- Flavourings in soft drinks
- Preservatives in soft drinks e.g. Tartrazine
Causes of Acute Asthma

- Viral infections in early years
- Air pollution
- Tobacco smoke
- Gastro-oesophageal reflux (GORD)
- Exercise
- Animals – up to 25% of asthmatics are sensitive to animals
- Pollens – most common in Europe is grass pollen
- Psychological factors – stress, shock, excitement and laughter can all provoke asthmatic responses
- House dust / mites – most asthmatics (80%) report symptoms following exposure to house dust
Assessment of Acute Asthma

History of episode – key points:

1. Duration of symptoms

2. Treatments already given and response of child

3. Course of any previous attacks
Assessment of Acute Asthma - Physical examination

- Work of breathing
- Effectiveness of breathing
- Auscultation
Assessment of Severity of Asthma

Key considerations

- Wheeze and respiratory rate are poor indicators of severity of asthma
- Presence of clinical signs of increased work of breathing and heart rate are better assessment criteria

If in doubt – refer on for second opinion
Assessment of Acute Asthma - Physical examination

Peak flow readings – Reliable indicator of severity of the attack however:

Unreliable in children under 5 years of age and in children with severe dyspnoea

(APLS 2005)

<table>
<thead>
<tr>
<th>Height (cms)</th>
<th>Peak flow (litres/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>150</td>
</tr>
<tr>
<td>120</td>
<td>200</td>
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<td>130</td>
<td>250</td>
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<td>140</td>
<td>300</td>
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<td>150</td>
<td>350</td>
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<tr>
<td>160</td>
<td>400</td>
</tr>
<tr>
<td>170</td>
<td>450</td>
</tr>
</tbody>
</table>
### Acute severe asthma

- Too breathless to talk / feed
- Recession / use of accessory muscles
- Respiratory rate > 50 bpm
- SpO2 < 92% in room air
- Tachycardia > 140 bpm
- Widespread audible expiratory wheeze
- Peak flow 33-50% of expected / known best

### Life-threatening asthma

- Depressed level of consciousness
- Exhaustion
- Poor respiratory effort
- SpO2 < 85% in room air
- Central cyanosis
- Silent chest
- Peak flow < 33% of expected / known best
Initial Management of Acute Asthma

*High dose inhaled bronchodilators*

- Given via metered dose / spacer devices
- Dose 2-10 puffs of Salbutamol (can build up to 10 puffs by adding 2 puffs every 2 minutes up to 10 puffs)

- Little or no improvement after 10 puffs – refer to hospital

- Continue with further doses while awaiting transport

- Transferred children should receive nebulised Salbutamol and oxygen therapy if symptoms severe / not improving
Clinical Scenario

- Lucy, a 18 months old infant presents with a history of nocturnal cough and ‘wheeze’ which has persisted for 2-3 weeks

What would be your plan for Lucy?

History taking / assessment process
Possible Asthma diagnosis

- Difficult in this age group and there is no real consensus about the age at which asthma can be safely diagnosed

- Prolonged post viral cough (usually unresponsive to asthma therapy) is a common diagnosis after referral to specialist advice

- Trial of inhaled β agonists can be undertaken
  - Response - referral on and proper trial over 2-3 months followed by a stop period
  - No response – stop treatment
• An acute clinical syndrome with respiratory stridor, a barking cough, hoarseness and variable degrees of respiratory distress

Can be associated with atopic disease
Epidemiology

- 95% of croup is caused by viral pathogens
- Bacterial infection is rare
- Peak incidence of viral croup is second year of life
- Most hospital admissions for croup are in children between ages of 6 months and five years
- Fewer than 5% of children admitted to hospital will require intubation for airway protection
Epidemiology

- Usually preceded by 1 - 3 day history of coryzal symptoms
- Symptoms are worse at night
- Some children may present with repeated episodes of croup but no preceding symptoms
- Cough is usually at its worst 48 hours from onset of the cough after which there is gradual improvement

Bacterial Tracheitis (pseudomembranous croup) is uncommon but can be distinguished by presence of copious secretions (and mucosal necrosis)
Clinical Presentation

- Barking cough
- Stridor
- Hoarseness
- Mild fever < 38.5°C
- Tachypnoea
- Tachycardia
- Respiratory distress – usually mild
- Hypoxaemia (mild)
- Wheeze if infection had spread to lower respiratory tract
## Croup Score (Westley et al 1978)

<table>
<thead>
<tr>
<th>Sign / Symptom</th>
<th>Severity</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stridor</td>
<td>None, At rest on auscultation, At rest without auscultation</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>Intercostal / costal muscle recession</td>
<td>None, Mild, Moderate, Severe</td>
<td>0, 1, 2, 3</td>
</tr>
<tr>
<td>Air entry</td>
<td>Normal, Decreased, Severely decreased</td>
<td>0, 1, 2</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>None, With agitation, At rest</td>
<td>0, 4, 5</td>
</tr>
<tr>
<td>Level of consciousness</td>
<td>Normal, Altered</td>
<td>0, 5</td>
</tr>
</tbody>
</table>
Croup Score

Score -
< 4 mild croup (manage at home with parental advice)
4-6 moderate croup
6-17 severe croup

Medications:
Mild - Dexamethasone 0.15mg/kg (150 mcg/kg) orally x 1 (BNFC 2010)
Severe – as above or Prednisolone 1-2mg/kg orally before transfer to ED

In ED
As above can also consider Budesonide 2mg (nebulised) repeat after 12 hours
Parental Advice

- Most cases of croup do not need to be treated medically because the condition is usually self limiting
- Antibiotics are not indicated

Home care

- Positioning - while the child is sleeping try supporting them in a more upright position (propping them up with pillows)
- Where possible stay with the child – reduces distress
- Avoid smoky places as smoke may irritate the child’s airway.
- Do not smoke around the child - try keeping a window open to circulate fresh air (safety advice)
- Cough medicines, short acting beta-agonists (as often used in inhalers to treat asthma), and decongestants are of no benefit to treating croup
- Calpol should be used if the child is feverish / miserable
- Encourage the child to drink regularly (warm drinks)
Parental Advice

Return / when to get help advice

• Sudden change in symptoms – breathing becomes noisier and looks more difficult

• High fever (> 38.5°C) and child looks very unwell

• Child not drinking adequately to maintain hydration
**Pneumonia**

Caused by a wide variety of organisms according to the age of the child

<table>
<thead>
<tr>
<th>Group</th>
<th>Commonality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Newborn</strong></td>
<td></td>
</tr>
<tr>
<td>Group B strep</td>
<td>(common)</td>
</tr>
<tr>
<td>E-coli</td>
<td>(uncommon)</td>
</tr>
<tr>
<td><strong>Infants</strong></td>
<td></td>
</tr>
<tr>
<td>Respiratory viruses</td>
<td>(very common)</td>
</tr>
<tr>
<td>Strep pneumoniae</td>
<td>(common)</td>
</tr>
<tr>
<td>Haemophillus influenzae</td>
<td>(uncommon)</td>
</tr>
<tr>
<td>Staph aureus</td>
<td>(rare but severity of illness higher)</td>
</tr>
<tr>
<td><strong>Older Children</strong></td>
<td></td>
</tr>
<tr>
<td>Mycoplasma pneumoniae</td>
<td>(most common)</td>
</tr>
<tr>
<td>but consider differential diagnosis of TB</td>
<td></td>
</tr>
</tbody>
</table>
Clinical Presentation

- Fever
- Cough
- Breathlessness
- Lethargy
- Shallow / rapid breathing

Neck stiffness and or abdominal pain may be present in children with pleural inflammation in addition to or in the absence of pleuritic chest pain.
Referral / Admission Criteria
**Pertussis**

- Highly infectious form of bronchitis
- Caused by Bordetella pertussis

2-3 day history of coryzal symptoms precede the development of the classic spasmodic coughing which has an inspiratory ‘whoop’ at the end of it **BUT** infants may lack the this sign

Worse at night and may end with child vomiting
Child may become cyanosed during coughing spells

Treatment is supportive – erythromycin can be given to reduce spread amongst close contacts but it does not reduce the duration of illness
**Pertussis**

**Referral / Admission Criteria**

*Any infant / child with severe coughing episodes or marked cyanosis associated with coughing should be referred as soon as possible.*

**Parental advice**

- Symptoms can last up to 3 months
- Immunisation reduces the risk of developing the disease by between 80 and 90% but does not guarantee complete protection
Sub-conjunctival haemorrhage associated with Pertussis coughing episodes
References / Resources

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Oxford University Press
References / Resources

Websites:

www.asthma.org.uk

http://www.sign.ac.uk/pdf/sign91parent.pdf (bronchiolitis advice sheet)

www.sign.ac.uk