Children with Respiratory Difficulties

Children frequently present with respiratory problems to general practitioners. The importance of these conditions is highlighted by the fact that they account for 20-35% of acute paediatric admissions and are the fifth most common cause of death in children between the ages of 1 and 14 years in the UK.

This article focuses on identifying the sick child and suggests underlying diagnoses.

Identifying the sick child

**History**

- Establish what the parent or carer is worried about.
- Note what symptoms there are and how long they have been going on for.
- Specifically find out about recent activities suggesting foreign body ingestion (make no assumptions relating to a young baby's age: an older toddler may try to 'feed' the new baby) and anaphylactic reaction:

  **Foreign body ingestion**
  - Suggestive features: witnessed episode, sudden onset of coughing or choking, recent history of playing/eating small objects.
  - Effective coughing suggested by: crying or verbal response to questions, being able to take breath in before coughing, loud cough, fully responsive child.
  - Ineffective coughing suggested by: inability to vocalise, quiet or silent cough, inability to breathe, cyanosis, decreasing level of consciousness.

- Specifically find out about past respiratory disease:

  **Past history of asthma**
  - Previous severe asthma.
  - Previous hospitalisations.
  - Dependence on inhaled or systemic corticosteroids.
  - Non-compliance with medications.
  - Labile asthma with pronounced diurnal obstruction.
  - Brittle asthma with unexpected sudden deterioration of airway function.
  - Chronic asthma with depressive symptoms/manipulative use of asthma.

- Complete usual paediatric history. When enquiring about social history in a young child, enquire about smokers in the house (relatives, frequent visitors).
Examination

- General observations.
- Respiratory system:

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<tr>
<th>Sign</th>
<th>Comment</th>
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<tbody>
<tr>
<td>Tachypnoea</td>
<td>Normal respiratory rates:</td>
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<tr>
<td></td>
<td>- &lt;1 year: 30-40 breaths per minute.</td>
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<td>- 1-2 years: 25-35 breaths per minute.</td>
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<td>- 2-5 years: 25-30 breaths per minute.</td>
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<td>- 5-12 years: 20-25 breaths per minute.</td>
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<td>- &gt;12 years: 15-20 breaths per minute.</td>
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<td>Very slow respiratory rates in children suggest imminent respiratory arrest or poisoning with narcotic drugs.</td>
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<tr>
<th>Intercostal and sternal recession</th>
<th>Intercostal and abdominal muscles are drawn in with each inspiration. This is seen more easily in very young children; therefore, it is particularly significant if seen in the child over 6-7 years of age.</th>
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<td>Use of accessory muscles</td>
<td>Look for the head bobbing up and down in infants.</td>
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<td>Tripodding or anchoring</td>
<td>The child may sit forward and grasp their feet or hold on to the side of the bed.</td>
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<td>Nasal flaring</td>
<td>Particularly seen in infants.</td>
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<td>Inspiratory/expiratory noises</td>
<td>- Stridor: high-pitched inspiratory noise - sign of upper airway obstruction.</td>
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<td>- Wheezing: tends to be louder on expiration - sign of smaller-calibre lower airway obstruction.</td>
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<td>- Grunting: expiration against a partially closed glottis - sign of severe respiratory distress in infants.</td>
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Assess chest expansion and auscultate: beware of the silent chest (this means that very little air is going in and out). Pulse oximetry should show an oxygen saturation close to 100% in normal healthy children breathing air. Acute severe asthma is defined by an SpO₂ ≤92%, respiration rate raised and the child being unable to talk in normal sentences[4].

- Other systems - these need assessing to gauge to what extent the respiratory distress has affected them:
  - Cardiac system - tachycardia is generally seen (the heart rate should roughly be four times the normal respiratory rate) - eg, pulse ≥140 beats per minute (bpm) (2-5 years) or ≥150 bpm (≥5 years old) in acute severe asthma. NB: bradycardia occurs in the presence of severe or prolonged hypoxia and is a pre-terminal sign.
  - Skin colour - pallor occurs initially. Cyanosis is a late and pre-terminal sign.
  - Agitation ± drowsiness. This may be difficult to assess and the parents will need to be consulted in the case of the very young child or baby.

Aetiology

Respiratory distress may result from[5]:

- Laryngomalacia.
- Foreign body ingestion.
- Laryngeal oedema: anaphylaxis, inhalation injury.
- Upper respiratory tract infection: epiglottitis, croup, retropharyngeal abscess.
- Lower respiratory tract causes: asthma, bronchiolitis and bronchitis, pneumonia, acute respiratory distress syndrome.

Clinical clues to alternative diagnoses other than asthma in wheezy children[4].

Perinatal and family history:

- Symptoms present from birth or perinatal lung problem: cystic fibrosis, chronic lung disease of prematurity, ciliary dyskinesia, developmental lung anomaly.
- Family history of unusual chest disease: cystic fibrosis, neuromuscular disorder.
- Severe upper respiratory tract disease: defect of host defence, ciliary dyskinesia.

Symptoms and signs:

- Persistent moist cough: cystic fibrosis, bronchiectasis, protracted bacterial bronchitis, recurrent aspiration, host defence disorder, ciliary dyskinesia.
- Excessive vomiting: gastro-oesophageal reflux (with or without aspiration).
- Paroxysmal coughing bouts leading to vomiting: pertussis.
- Dysphagia: swallowing problems (with or without aspiration).
Breathlessness with light headedness and peripheral tingling: dysfunctional breathing, panic attacks.
Inspiratory stridor: tracheal or laryngeal disorder.
Abnormal voice or cry: laryngeal problem.
Focal signs in chest: developmental anomaly, post-infective syndrome, bronchiectasis, tuberculosis.
Finger clubbing: cystic fibrosis, bronchiectasis.
Failure to thrive: cystic fibrosis, host defence disorder, gastro-oesophageal reflux.

Investigations:
Focal or persistent chest radiological changes: developmental lung anomaly, cystic fibrosis, post-infective disorder, recurrent aspiration, inhaled foreign body, bronchiectasis, tuberculosis.

Management
This will be guided by the degree of respiratory distress and the underlying diagnosis:

- Life-threatening respiratory distress warrants immediate initiation of life support measures and immediate ambulance transfer to hospital.
- Children with moderate-to-severe respiratory distress should be referred to the local paediatric team.
- Where the decision is made to treat the child at home, parental education and frequent reviews are mandatory.

Remember
Almost all ill (or injured) children will benefit from high-concentration oxygen therapy. The only small group of infants to be careful with are those with duct-dependent congenital heart disease.
- It is usually counterproductive to make an unwilling child wear an oxygen mask. Avoid any other action that may agitate the child (which worsens the respiratory distress) unless the child is critically ill. Most of the assessment and initiation of treatment can be done with the child in their parent's arms.
- Do not put anything (including a thermometer) in the mouth of a child with stridor as this may precipitate complete respiratory obstruction.

Further reading & references
- Resuscitation and support of transition of babies at birth; Resuscitation UK Guidelines, 2015
3. Paediatric Choking Treatment Algorithm; Resuscitation Council (UK), 2015
4. British Guideline on the management of asthma; Scottish Intercollegiate Guidelines Network - SIGN (2016)
5. Asthma; NICE CKS, Dec 2013 (UK access only)

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