Asthma
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Joint update in GIM and acute medicine
Friday 17 November 2017
Asthma

- The diagnosis of asthma is a clinical one.
- The absence of consistent gold-standard diagnostic criteria means that it is not possible to make unequivocal evidence-based recommendations on how to make a diagnosis of asthma.
Definition

- Central to all definitions is the presence of
  - symptoms (more than one of wheeze, breathlessness, chest tightness, cough)
  - and of variable airflow obstruction

- More recent descriptions of asthma in both children and adults have included airway hyper-responsiveness and airway inflammation as components of the disease
Asthma History – More Likely

- Episodic symptoms
- Characteristic triggers eg exercise, cold air, exposure to inhaled allergens
- Work related exposures eg flour, animal workers, farmers, spray painting, wood and metal work, chemical workers, rubber and plastic manufacturers
- Personal or family history of atopy
- History of asthma as a child
Asthma History - Less Likely

- Lack of improvement with asthma meds esp PO steroid
- Onset of symptoms after 50 years of age
- Concomitant cardiac symptoms
- History of smoking (esp > 20 pack years)
Investigations

- Pulmonary function testing
  - Spirometry
  - Bronchodilator response – increase in FEV1 of 12% and >200mls
  - Bronchoprovocation testing – methacholine or mannitol
  - Peak expiratory flow – typical diurnal variation, 20% variation
  - Exhaled nitric oxide (FeNO)
- Bloods inc eosinophills and IgE
- Allergy tests
- Imaging
Typical spirometric tracings

Note: Each FEV$_1$ represents the highest of three reproducible measurements.
Components of Asthma Mx

- Routine monitoring of symptoms and lung function
- Patient education to create a partnership between clinician and patient
- Controlling environmental factors (trigger factors) and comorbid conditions that contribute to asthma severity
- Pharmacologic therapy
- Aiming to reduce impairment and risk
Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check adherence and reconsider diagnosis if response to treatment is unexpectedly poor.

**STEP 1**
Mild intermittent asthma

**STEP 2**
Initial add-on therapy

**STEP 3**
Persistent poor control

**STEP 4**
Continuous or frequent use of oral steroids

**STEP 5**
Use daily steroid tablet in lowest dose providing adequate control

- Maintain high dose inhaled corticosteroid at 2,000 micrograms/day
- Consider other treatments to minimise the use of steroid tablets
- Refer patient for specialist care

**Inhaled short-acting β₂ agonist as required**

Add inhaled corticosteroid 200-800 micrograms/day*
400 micrograms is an appropriate starting dose for many patients
Start at dose of inhaled corticosteroid appropriate to severity of disease.

1. Add inhaled long-acting β₂ agonist (LABA)
2. Assess control of asthma:
   - good response to LABA - continue LABA
   - benefit from LABA but control still inadequate - continue LABA and increase inhaled corticosteroid dose to 800 micrograms/day* (if not already on this dose)
   - no response to LABA - stop LABA and increase inhaled corticosteroid to 800 micrograms/day. If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline

Consider trials of:
- increasing inhaled corticosteroid up to 2,000 micrograms/day*
- addition of a fourth drug (eg leukotriene receptor antagonist, SR theophylline, β₂ agonist tablet)

*BDP or equivalent
Acute Asthma

- Moderate
- Acute Severe
- Life threatening
- Near Fatal
Features of Acute Moderate Asthma include?

A. Increasing symptoms eg wheeze, SOB, cough
B. Increasing symptoms eg drowsy, haemoptysis
C. PEF >50-75% best or predicted
D. PEF <50% best or predicted
E. No features of acute severe asthma
Features of Acute Moderate Asthma include:

A. Increasing symptoms eg wheeze, SOB, cough
B. 
C. PEF >50-75% best or predicted
D. 
E. No features of acute severe asthma
Features of Acute Severe Asthma include?

A. PEF >50% best or predicted
B. PEF 33-50% best or predicted
C. Respiratory rate < 25/min
D. Respiratory rate >= 25/min
E. Heart rate < 110/min
F. Heart rate >= 110/min
G. Able to converse in full sentences in one breath
H. Inability to complete sentences in one breath
Features of Acute Severe Asthma include:

A. 
B. PEF 33-50% best or predicted 
C. 
D. Respiratory rate $\geq$ 25/min 
E. 
F. Heart rate $\geq$ 110/min 
G. 
H. Inability to complete sentences in one breath
Features of Life Threatening Asthma include?

A. Altered conscious level or exhaustion
B. Arrythmias
C. Hypotension
D. Cyanosis
E. Silent chest or poor respiratory effort
F. PEF <33% best or predicated
G. SpO₂ <92%
H. PaO₂ <8kPa
I. “normal” PaCO₂ (4.6-6.0kPa)
Features of Life Threatening Asthma include:

A. Altered conscious level or exhaustion
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H. \( \text{PaO}_2 \) <8kPa
I. “normal” \( \text{PaCO}_2 \) (4.6-6.0kPa)
Features of Near Fatal Asthma include?

A. Normal pCO$_2$
B. Raised pCO$_2$
C. Normal pO$_2$
D. Requiring non-invasive ventilation
E. Requiring mechanical ventilation with raised inflation pressures
Features of Near Fatal Asthma include:

A.
B. Raised pCO$_2$
C.
D.
E. Requiring mechanical ventilation with raised inflation pressures
Immediate Management of Acute Severe Asthma

- Oxygen to maintain SpO2 94-98%
- Salbutamol 2.5mg via an oxygen driven nebuliser
- Ipratropium bromide 0.5mg via an oxygen driven nebuliser
- Prednisolone 40-50mg PO or Hydrocortisone 100mg IV
- No sedatives of any kind
- CXR
If Life Threatening Features are Present

- Discuss with senior clinician and ICU team
- Consider IV magnesium 1.2-2g infusion over 20min
- Give nebulised salbutamol 2.5mg back to back
Subsequent Management

- If patient is improving continue:
  - Oxygen to maintain SpO$_2$ 94-98%
  - Prednisolone 40-50 mg PO daily or Hydrocortisone 100mg IV QDS
  - Nebulised salbutamol and ipratropium bromide every 4-6hours

- If the patient is not improving after 15-30min:
  - Use continuous nebulisation of salbutamol
Subsequent Management 2

- If patient is still not improving:
  - Discuss patient with senior clinician and ICU team
  - Consider IV magnesium
  - Senior clinician may consider use of IV beta2 agonist or IV aminophyline or progress to mechanical ventilation
Monitoring

- Repeat measurement of PEF 15-30 minutes after starting treatment
- Oximetry maintain $\text{SpO}_2 > 94%$
- Repeat ABG within 1 hour of starting treatment if:
  - Initial $\text{pO}_2 < 8 \text{ kPa}$
  - $\text{pCO}_2$ normal or raised
  - Patient deteriorates
- Chart PEF before and after giving salbutamol and at least 4 times a day
Monitoring 2

- Transfer to ICU accompanied by a doctor prepared to intubate if:
  - Deteriorating PEF, worsening or persistent hypoxia or hypercapnia
  - Exhaustion, altered consciousness
  - Poor respiratory effort or respiratory arrest
Discharge – Patients should

- Have been on discharge medication for 12-24 hours and have had inhaler technique checked and recorded
- PEF >75% best or predicted and PEF diurnal variability <25% unless discharge agreed with respiratory physician
- Treatment with PO **and inhaled steroids** in addition to bronchodilators
Discharge – Patients should 2

- Have own PEF meter and written action plan
- Have a discharge summary sent to the GP within 24 hours of discharge
- Have GP follow up arranged within 2 working days
- Have FU OPA in a respiratory clinic within 4 weeks
Asthma UK

- 5.4 million people in the UK are currently receiving treatment for asthma

- Every 10 seconds someone is having a potentially life-threatening asthma attack in the UK

- Every day, the lives of three families are devastated by the death of a loved one to an asthma attack

- Tragically two thirds of these deaths are preventable
“Why Asthma still kills”

- The National Report of Asthma Deaths
- RCP May 2015

- The NRAD was undertaken over a 3-year period from May 2011 to May 2014
- It reviewed information on all certified asthma and anaphylaxis deaths occurring in the UK between February 2012 and January 2013
“Why Asthma still kills”

- The number of people affected by asthma in the UK is amongst the highest in the world.
- It accounts for high numbers of consultations in primary care, out-of-hours services and hospital emergency departments.
- During 2011–2, there were over 65,000 hospital admissions for asthma in the UK.
- The number of reported asthma deaths in the UK remains amongst the highest in Europe, and comparable with those for Australia, New Zealand and the USA.
BTS Quality Standards

- People with newly diagnosed asthma are diagnosed in accordance with BTS/SIGN guidance.
- Adults with new onset asthma are assessed for occupational causes.
- People with asthma receive a written personalised action plan.
- People with asthma are given specific training and assessment in inhaler technique before starting any new inhaler treatment.
- People with asthma receive a structured review at least annually.
BTS Quality Standards 2

- People with asthma who present with respiratory symptoms receive an assessment of their asthma control.
- People with asthma who present with an exacerbation of their symptoms receive an objective measurement of severity at the time of presentation.
- People aged 5 years or older presenting to a healthcare professional with a severe or life-threatening acute exacerbation of asthma receive oral or intravenous steroids within 1 hour of presentation.
BTS Quality Standards 3

- People admitted to hospital with an acute exacerbation of asthma have a structured review by a member of a specialist respiratory team before discharge.
- People who received treatment in hospital or through out-of-hours services for an acute exacerbation of asthma are followed up by their own GP practice within 2 working days of treatment.
- People with difficult asthma are offered an assessment by a multidisciplinary difficult asthma service.
BTS Asthma Care Bundle

- The five actions most likely improve the care of patients
  - Assessment of inhaler technique
  - Review of medications
  - Provision of a written action plan and patient self-management
  - Consideration of triggering and exacerbating factors
  - Appropriate follow up arrangements
BTS Asthma Discharge Care Bundle: 2016

This care bundle describes 5 high impact actions to ensure the best clinical outcome for patients attending hospital with an acute asthma attack. The aim is to reduce the number of patients who are readmitted following discharge and to ensure that all aspects of the patient's asthma care are considered. This bundle applies to patients from age 2 onwards (but may not always be suitable for patients under 5).

1. **All Patients (or Family Members/Careers Administering Medicines) Should Have Their Inhaler Technique Assessed Prior to Discharge**
   Correct use of inhalers is associated with improved outcomes for patients including a reduction in risk of exacerbations and hospital admission. Repeated instruction is required to ensure that inhaler technique is optimised. Every opportunity must be taken to promote good inhaler technique in order to ensure adequate delivery of therapy.

<table>
<thead>
<tr>
<th>Inhaler technique checked?</th>
<th>YES</th>
<th>NO</th>
<th>Inhaler use instruction provided?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

2. **All Patients Should Have Their Medications Assessed. The Importance of Medication Adherence to Good Asthma Control Should Be Reinforced to Patients (and/or Any Family Members or Caregivers Administering Medicines) Prior to Discharge**
   Review of medication is vital following a hospital attendance or admission as intentional and unintentional non-adherence to preventative therapies (principally inhaled corticosteroids) frequently causes deterioration in asthma control.

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<tr>
<th>Medication classes reviewed?</th>
<th>YES</th>
<th>NO</th>
<th>Doses reviewed (increasing/decreasing as necessary)?</th>
<th>YES</th>
<th>NO</th>
<th>Was the importance of adherence to preventative medication discussed with the patient/family?</th>
<th>YES</th>
<th>NO</th>
</tr>
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3. **A Written Asthma Action Plan for How to Manage Care Should Be Provided to Patients and Families/Careers**
   Self-management/action plans for asthma provide information for patients and their families on how to carry out disease specific elements of self-care. There is strong evidence that providing written action plans, in addition to verbal information, is associated with improved patient/carer understanding of asthma and thereby reduces risk of further attack and hospitalisation. Examples of asthma action plans and further information on self-management can be found at www.asthma.org.uk.

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<tr>
<th>A written action plan has been provided?</th>
<th>YES</th>
<th>NO</th>
<th>Already has a plan</th>
</tr>
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4. **Triggering and Exacerbating Factors in the Patient's Overall Environment Should Be Considered**
   Attacks may have an identifiable trigger which should be recognised in order to minimise exposure and reduce risk of further asthma attacks. Trigger factors include NSAIDs, smoking/smoke exposure in the home, psychosocial instability and other issues such as pets. Explicit attention should be paid to potential occupational factors. Recognition of these and other potential causes was identified as an important factor in the NRAD report.

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<tr>
<th>Have trigger factors* with the patient's environment been considered?</th>
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<td>YES</td>
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5. **Subsequent Care: Follow-up in the Community to be Arranged Within 2 Working Days Plus Specialist Care According to Criteria Within 2 Weeks**
   National guidance clearly recommends early primary care follow up to improve outcomes. Local discussions may need to be held in order to fit this into local systems and care pathways.

   | Community follow up arranged within 2 working days? | YES | NO | Specialist follow up arranged within 2 weeks? | YES | NO |
References

- 2016 BTS/SIGN Guideline for the management of asthma
- NICE: Asthma Quality standard [QS25] Published date: February 2013
- Asthma UK www.asthma.org.uk
- www.ginasthma.org Global Initiative for Asthma (GINA) 2017 update
Any Questions?

Thank you