Asthma - An update
BTS Asthma Guidelines 2016
Dr Ian Clifton

Overview

• Diagnosis
• Supported self-management
• Non-pharmacological management
• Drugs / inhaled therapy
• Difficult asthma services

• Case discussions
What is asthma?

• GINA 2008
  • A chronic inflammatory disorder of the airways
  • Airway hyper-responsiveness
  • Recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning.
  • Variable, airflow obstruction within the lung that is often reversible either spontaneously or with treatment.

Background

• Over 5 million people per year affected by asthma in UK

• Approximately 1000 asthma deaths per year in UK
Asthma deaths

• Majority of deaths in chronic severe patients
• Inadequate medical management
  • Overuse of beta-agonist
  • Inadequate steroid use
  • Under-use of management plans

• Asthma reviews key
  • Concordance
  • Inhaler technique
  • Self-management

Diagnosis
Structured clinical assessment

- A history of recurrent episodes (attacks) of symptoms, ideally corroborated by variable peak flow when symptomatic and asymptomatic
- Symptoms of wheeze, cough, breathlessness and chest tightness that vary over time
- Recorded observation of wheeze heard by a healthcare professional
- Personal/family history of other atopic conditions (in particular, atopic eczema/dermatitis, allergic rhinitis)
- No symptoms/signs to suggest alternative diagnoses.

Structured clinical assessment

- No single diagnostic test
- Spirometry
  - Obstructive spirometry with positive bronchodilator response
    - 12% or 200mL improvement
  - Normal spirometry when asymptomatic does not exclude
- Peak flow
  - May demonstrate variability in symptomatic individuals, but should be interpreted with caution
  - Can be useful in context of occupational asthma
Structured clinical assessment

- Bronchial challenge testing
  - Methcholine / Histamine / Mannitol
  - Can be useful in patients with normal spirometry
- Exhaled nitric oxide (FeNO)

Structured clinical tests

- Blood eosinophil levels
- Total IgE / Specific IgE
- Skin prick testing
Who to refer?

- Diagnostic uncertainty
- Suspected occupational asthma
- Poor response to treatment
- Severe/life-threatening asthma
- Prominent systematic features
- Unexpected clinical findings
- Non-variable breathlessness
- Chronic sputum
- Restrictive spirometry
- Abnormal CXR
- Marked blood eosinophilia
Monitoring of people with asthma

Factors to monitor in primary care

• Symptomatic asthma control
• Lung function assessed by spirometry or by PEF
• Asthma attacks, oral corticosteroid use and time off work since last assessment
• Inhaler technique
• Adherence
• Bronchodilator reliance
• Possession of and use of a self-management plan/personal action plan.
Are patients with asthma controlled?

Assessment of symptom control

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Measurement characteristics</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCP 3 questions</td>
<td>No to all three compatible with controlled asthma</td>
<td>Not well validated</td>
</tr>
</tbody>
</table>
| Asthma control questionnaire | Well controlled ≤0.75  
Inadequately controlled ≥1.5  
Minimal important difference 0.5 | Well validated    |
| Asthma control test      | Controlled – 25  
Well controlled – 20-24  
Uncontrolled ≤19  
Minimal important difference 3 | Well validated    |
Supported self-management
Self management works!

• 22 systematic reviews

• 261 RCTs

• Reduces emergency healthcare resource use
  • ED attendance / admissions / unscheduled consultations

• Improves markers of asthma control
  • Symptoms / QoL / Days of work or school

Self management

• Personalised asthma action plans
  • Symptoms or peak flow
  • 2-3 action points
    • Increase ICS
    • Start oral steroid
    • Seek immediate medical attention

• Education
  • Education combined with PAAP and regular review more effective than less intense regimens
To double or not to double?

• If taking >400mcg BDP a day probably not effective

• If taking <400mcg BDP a day then increase to 1200mcg

• The cynical view
  • Reminds the patient to start taking their inhalers!

Non-pharmacological management

• House dust mite avoidance
  • Ineffective and should not be recommended

• Smoking cessation

• Weight loss
  • Can be considered for overweight or obese patients
Concordance

Concordance in patients with difficult asthma

Gamble et al 2009; ARJCCM 180: 817-22
Can we improve concordance?

• Medical concordance interview
  • 37% of non-concordance patients improved
    • Reduced daily ICS
    • Reduced prednisolone courses
    • Reduced hospital admissions

• Subsequent nurse-led interventions
  • 62% of non-concordance patients improved
    • Reduced oral maintenance steroid

Gamble et al Respir Med 2011

Drugs / inhaled therapy
Aims of asthma therapy

• No daytime symptoms
• No night-time awakening due to asthma
• No need for rescue medication
• No asthma attacks
• No limitations on activity including exercise
• Normal lung function (in practical terms FEV1 and/or PEF>80% predicted or best)
• Minimal side effects from medication.

GINA 2008

How much SABA is enough for asthma control?

• Aim for less than 2 administrations per week
  • Salbutamol MDI every 50 weeks
  • Ventolin Accuhaler every 30 weeks
  • Bricanyl Turbohaler every 50 weeks

• Anything else is partly controlled!
Confusing corticosteroids

<table>
<thead>
<tr>
<th>Brand</th>
<th>Device</th>
<th>Low dose</th>
<th>Medium dose</th>
<th>High dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone</td>
<td>Non-propriety Clenil</td>
<td>100 2p BD</td>
<td>200 2p BD</td>
<td>200 4p BD</td>
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<tr>
<td>Beclamethasone</td>
<td>QVAR Autohaler Easibreathe</td>
<td>50 2p BD</td>
<td>100 2p BD</td>
<td>100 4p BD</td>
</tr>
<tr>
<td>Ciclesonide</td>
<td>Alvesco MDI</td>
<td>80 2p BD</td>
<td>160 2p BD</td>
<td></td>
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<tr>
<td>Fluticasone</td>
<td>Flixotide MDI</td>
<td>50 2p BD</td>
<td>125 2p BD</td>
<td>250 2p BD</td>
</tr>
<tr>
<td>Fluticasone</td>
<td>Flixotide Accuhaler</td>
<td>100 1p BD</td>
<td>250 1p BD</td>
<td>500 1p BD</td>
</tr>
<tr>
<td>Budesonide</td>
<td>Non-propriety Pulmicort Easyhaler</td>
<td>100 2p BD</td>
<td>200 2p BD</td>
<td>400 2p BD</td>
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<tr>
<td>Mometasone</td>
<td>Asmanex Twisthaler</td>
<td>200 1p BD</td>
<td>400 1p BD</td>
<td></td>
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</table>
Even more confusing ICS / LABA

<table>
<thead>
<tr>
<th></th>
<th>Brand</th>
<th>Device</th>
<th>Low dose</th>
<th>Medium dose</th>
<th>High dose</th>
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<tbody>
<tr>
<td>Beclomethasone / formoterol</td>
<td>Fostair</td>
<td>MDI</td>
<td>100/6 1P BD</td>
<td>100/6 2P BD</td>
<td>200/6 2P BD</td>
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<tr>
<td></td>
<td>Nexthaler</td>
<td></td>
<td></td>
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<tr>
<td>Budesonide / formoterol</td>
<td>Symbicort</td>
<td>Turbohaler</td>
<td>100/6 2P BD</td>
<td>200/6 2P BD</td>
<td>400/12 2P BD</td>
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<tr>
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<td></td>
<td></td>
<td>200/6 1P BD</td>
<td>400/12 1P BD</td>
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<td>Budesonide / formoterol</td>
<td>DuoResp</td>
<td>Spiromax</td>
<td>160/5 1P BD</td>
<td>160/5 2P BD</td>
<td>320/10 2P BD</td>
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<td></td>
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<td>320/10 1P BD</td>
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<td></td>
<td></td>
<td>320/10 2P BD</td>
</tr>
<tr>
<td>Fluticasone / formoterol</td>
<td>Flutiform</td>
<td>MDI</td>
<td>50/5 2P BD</td>
<td>125/5 2P BD</td>
<td>250/10 2P BD</td>
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<td>Fluticasone / Salmeterol</td>
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<td></td>
<td></td>
<td>Accuhaler</td>
<td>100/50 1P BD</td>
<td>250/50 1P BD</td>
<td>500/50 2P BD</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluticasone / vilanterol</td>
<td>Relvar</td>
<td>Ellipta</td>
<td>99/22 1P OD</td>
<td>184/22 1P OD</td>
<td></td>
</tr>
</tbody>
</table>

How Frequently are Patients able to Use Inhaler Devices?
Impact of “Show and Tell” Inhaler Technique Counselling Service

Basheti IA et al. Patient Education and counseling 2008;72:26-33

Leeds Adult Asthma Algorithm (Leeds Preferred Formulary)

- Prescribing by Brand name is recommended.
- Treatment recommendations are based on the BTS/SIGN British guideline on the management of asthma 2014.
- Combination ICS/LABA inhalers are preferred to separate inhalers.
- The preferred ICS regimes listed are based on (i) ease of use of inhaler device; (ii) evidence of safety and efficacy from clinical trials; (iii) cost.
- However, if the patient cannot use or declines the listed inhaler device, appropriate alternatives should be prescribed.

### First Line

**Preferred Preventer Choice if Symptomatic and Patient Preference**

- **DPI**
- **MDI**

### Second Line

- **MDI**
- **DPI**

### Maintenance and Reliever Therapy [MART]

- **MDI**
- **DPI**

### Other Preventer Options

- **MDI**

### Reliever

- **MDI**

Any patient who has required more than 12 salbutamol inhalers in 12 months should be invited for an urgent asthma review.

**Key**

- [Key](#)
Incheck device

Inspiratory flow and inhaler choice

<table>
<thead>
<tr>
<th>Inspiratory flow</th>
<th>Good actuation-inhalation coordination</th>
<th>Poor actuation-inhalation coordination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 30 L/min</td>
<td>&lt; 30 L/min</td>
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<tr>
<td>Inhalers</td>
<td>BA-MDI</td>
<td>pMDI</td>
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<tr>
<td></td>
<td>DPI</td>
<td>Nebuliser</td>
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<td>SMI</td>
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<tr>
<td></td>
<td>SMI</td>
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Difficult asthma services

What is difficult asthma

- Asthma which requires treatment with guidelines suggested medications for GINA steps 4–5 asthma (high dose ICS and LABA or leukotriene modifier/theophylline) for the previous year or OCS for 50% of the previous year to prevent it from becoming “uncontrolled” or which remains “uncontrolled” despite this therapy

- Uncontrolled asthma defined as at least one of the following:
  - Poor symptom control: ACQ consistently > 1.5 or ACT < 20
  - Frequent severe exacerbations: > 2 bursts of systemic CS in the previous year
  - Serious exacerbations: > 1 hospitalisation, ICU stay or IPPV in the previous year
  - Airflow limitation: after appropriate bronchodilator withhold FEV1 <80% predicted

Chung et al. ERJ 2014
What can a difficult asthma service offer?

• Systematic assessment
• Alternative / co-existent diagnosis
  • 12% of patients have alternative diagnosis
    • COPD / α1-antitrypsin deficiency
    • CF / Bronchiectasis
    • Cardiomyopathy / Pulmonary hypertension
    • Obliterative bronchiolitis
    • Respiratory muscle incoordination
    • Severe anxiety/VCD
    • Hyper-eosinophilic syndromes / Churg-Strauss
    • Reflux cough / Rhino-sinusitis
• Asthma phenotyping

Robinson et al ERJ 2003: 22; 478-83

Not all asthmatics are the same

• Severe asthma phenotypes
  
  • Two significant studies
    • Leicester (UK)\(^1\)
    • SARP (USA)\(^2\)
  
  • Broadly similar studies, but US study included lung function and UK study included sputum eosinophils

1. Halder et al AJRCCM 2008; 178: 218-224
Identified phenotypes

• Early onset allergic asthma\textsuperscript{1,2}
  • 35-40\% of all patients with severe asthma
  • Strong hereditary component
  • Onset early in childhood
  • Elevated high IgE
  • Multiple positive skin prick reactions
  • Probably Th2 type immune response, but not fully established

1. Halder et al AJRCCM 2008; 178: 218-224

Identified phenotypes

• Late onset asthma\textsuperscript{1,2}
  • Eosinophilic asthma despite corticosteroid therapy
    • Includes aspirin insensitivity
    • Onset in late 20’s
    • Maybe associated with chronic rhinosinusitis
  • Later onset asthma\textsuperscript{1,2}
    • Predominantly obese females
    • Onset in 30-40’s
    • Less airflow obstruction
    • Lots of exacerbations, but unlikely to need invasive ventilation

1. Halder et al AJRCCM 2008; 178: 218-224
Asthma phenotypes

What can a difficult asthma service offer?

• Novel therapies
  • Steroid sparing agents

• Targeted therapy
  • Biological therapies
    • Omalizumab – anti-IgE therapy
    • Mepolizumab – anti-IL5 therapy

• Bronchial thermoplasty
Any questions?

Case study 1

- 20 year old male referred in for poor control
- Chest wheezy +++ on examination
- CXR – hyper-inflated
- Spirometry
  - FEV1 30% predicted with an obstructive pattern
- Previous bloods – total IgE > 5000
Case study 1

• Diagnosis?

• Next step?

Case study 1

• Assessed by Respiratory nurse specialist
  • Concordance a major issue
• Returned after 2 months
  • Excellent concordance
  • “If I don’t take my treatment I won’t get better”
  • “Inhalers on bedside cabinet”
  • FEV1 now 65% predicted
Case study 2

• 56 year old man
  • Asthma since 20’s
  • Last 2 years frequent exacerbations
  • Requiring oral prednisolone every 2-3 weeks
    • Feels much better then starts to deteriorate after a few days
  • Not attended clinic for 12 months due to frequent exacerbations

• Maintenance therapy
  • High dose ICS / LABA
  • Montelukast and theophylline preparation

Case study 2

• No obvious triggers
• No change to home environment
• No change to employment
• No concurrent psychosocial issues
• Concordance reported to be very good
Case study 2

• Any thoughts?

Case study 2

• What happens when you have an exacerbation?
  • Stops steroids for few days
  • Becomes irritable
  • Generally feels awful
  • Always sleeps through the night

• Random cortisol < 50

• Diagnosis adrenal suppression
Case study 3

• 21 year old male
• Asthma since age of 12
• Very keen athlete
• Currently training to be a PE teacher

• Eczema + hayfever

• Recent C-Spine injury playing rugby

• High dose ICS / LABA + SABA

Case study 3

• Some nasal symptoms

• Main symptoms breathlessness on exertion

•Feels throat closing

• Two episodes of pre-syncope on exercise

• Occasional paraesthesia

• Spirometry normal (FEV1 120% predicted)

• Peak flow persistently above 700
Case study 3

• Any thoughts?

Case study 3

• Well controlled asthma
• Element of vocal cord dysfunction
• Element of dysfunctional breathlessness
• Probable physical de-conditioning secondary to recent injury
• Referred to physiotherapy
• Consider for montelukast and reduce ICS
Case study 4

• 24 year old female

• Longstanding atopic asthma and eczema
  • Previous ICU admissions
  • Requiring ciclosporin for control

• Generally well controlled therefore gradual reduction in ciclosporin undertaken

• Previous concordance issues

Case study 4

• Initially reduction in ciclosporin successful

• Deteriorating control
  • Repeated steroid courses
  • Life-threatening exacerbation
Case study 4

• Had recently acquired a house rabbit
• Total IgE >5000
• Specific IgE to rabbit >100

• Rabbit moved and symptoms much improved, therefore continued reduction in cyclosporin undertaken

• Stopped cyclosporin and recently delivered healthy twin girls