Acute respiratory emergencies: recognition and management

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Disclosures / conflicts

• None

Disclaimer

• My personal views
Topics

• Acute breathlessness
  • Asthma and COPD
  • Pneumonia
  • Heart failure
  • Pulmonary embolism

• Drowsiness
  • Could it be hypercapnia?
Asthma and COPD
National Review of Asthma Deaths (2014)

- 45% died without seeking medical assistance or before emergency medical care could be provided.
- 53% had never been admitted to hospital for asthma.
- Depression and mental health issues in 32 (16%)
- Substance misuse in 12 (6%)

www.rcplondon.ac.uk/nrad
COPD

• Smoking and COPD are more prevalent in patients with severe mental disorders.

• “(COPD) kills more than 3 million people worldwide every year.

• Despite progress in the treatment of symptoms and prevention of acute exacerbations, few advances have been made to ameliorate disease progression or affect mortality.

• Smoking cessation programmes, increasing physical activity, and early detection and treatment of comorbidities are further key components to reduce the burden of the disease.”

World Psychiatry 2011;10:52-77

Lancet 2017; 389: 1931–40
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Differentiating

<table>
<thead>
<tr>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset in mid-life</td>
<td>Onset early in life (often childhood)</td>
</tr>
<tr>
<td>Symptoms slowly progressive</td>
<td>Symptoms vary from day to day</td>
</tr>
<tr>
<td>Long smoking history</td>
<td>Symptoms worse at night/early morning</td>
</tr>
<tr>
<td></td>
<td>Allergy, rhinitis, and/or eczema also may be present</td>
</tr>
<tr>
<td></td>
<td>Family history of asthma</td>
</tr>
</tbody>
</table>

http://goldcopd.org
Clinical features of an acute exacerbation

• An exacerbation is a sustained worsening of the patient's symptoms from their usual stable state which is beyond normal day-to-day variations, and is acute in onset.

• Commonly reported symptoms are
  • worsening breathlessness
  • waking from sleep with symptoms (asthma)
  • decreased exercise tolerance
  • feeling ‘tight-chested’
  • cough
  • wheeze
  • increased sputum production and change in sputum colour

www.nice.org.uk/guidance/cg101
www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2016/
### Management

<table>
<thead>
<tr>
<th>Same</th>
<th>Asthma</th>
<th>COPD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inhaled salbutamol (Ventolin)</strong></td>
<td><strong>Oral corticosteroids (Pred 30mg OD for 7 days)</strong></td>
<td><strong>Assess severity – where should they be treated?</strong></td>
</tr>
<tr>
<td><strong>Antibiotics</strong></td>
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</table>

| Different             | **Oxygen targeting SpO2 95-98%**                                      | **Oxygen targeting SpO2 88-92%**                                      |
|                       | **Inhaled ipratropium bromide (Atrovent)**                            | **Inhaled ipratropium bromide (Atrovent)**                            |
Where should they be treated?

• If in doubt (diagnosis or severity of attack) then get urgent medical evaluation

• Concerning features of both include:
  • Fast breathing rate ≥25/minute
  • Fast heart rate 110 bpm
  • Low SpO2
  • Too breathless to complete sentences
  • Drowsy or confused
What’s new?

• Huge expansion in inhaled medications for maintenance in asthma and COPD
  • “Blue and brown” is totally obsolete.

• In asthma – we should aim for absence of symptoms

• In severe asthma there are monoclonal antibody immunotherapies

• In both – increased recognition of the importance of co-morbidities, including depression and anxiety.
When is asthma not asthma?

• “Vocal cord dysfunction” / paradoxical vocal fold motion (PVFM) / Munchausen’s stridor

• Episodic unintentional paradoxical adduction of the vocal cords (or other laryngeal structures), resulting in upper airway obstruction.

• Signs and symptoms that are hard to distinguish from acute severe asthma

• Often co-exists with asthma

• Features suggestive of VCD include previous similar episodes, a wheeze heard most prominently over the larynx, and dysphonia

• Treatment is different:
  • Avoid harm
  • Speech therapy and psychological counselling
  • Specialist respiratory physician
Pneumonia
Poor Clinical Outcomes Among Pneumonia Patients With Schizophrenia

Yi-Hua Chen¹, Hsiu-Chen Lin², and Herng-Ching Lin³

• Patients with hospital admission due to pneumonia in Taiwan
• Comparing those who had also had an admission due to schizophrenia with a matched cohort who had not.
• Independently associated with:
  • 1.8x risk of ICU admission
  • 1.4x risk of acute respiratory failure
  • 1.3x risk of receiving invasive mechanical ventilation

• Other studies have shown a x2 risk of death if hospitalised with sepsis/respiratory failure

Schizophrenia bulletin 37.5 (2010): 1088-1094
Arch Gen Psychiatry. 2006;63(3):267–272
Clinical features

Symptoms
• Characteristic
  • Breathlessness, initially on exertion
  • Cough with sputum, often purulent
  • Fever
• Compatible:
  • Pleuritic chest pain
  • Altered mental status: Delirium / Drowsiness / Headache
  • GI: diarrhoea, abdo. Discomfort
  • Pain in ears / throat
  • Rash

Signs
• A region of lung with decreased air entry, altered breath sounds, crackles or rub, dull to percussion
• ↑ resp. rate / heart rate
• Pyrexia
• Discoloured sputum
• Low SpO2

Lancet 2015; 386: 1097–108
Pneumonia ≠ ‘Chest infection’

• Upper respiratory tract infection
  • Rhinitis
  • Sinusitis
  • Pharyngitis
  • Laryngitis

• Lower respiratory tract infection
  • Bronchitis
  • Pneumonia = infection of the substance of the lung, the parenchyma

• Pulmonary infiltrate on CXR is needed for definite diagnosis (but it’s not 100% sensitive)
Management

Amoxycillin or Clarithromycin

Confusion
Urea>7
RR>30
BP <90 / <60
Age 65

Sepsis 6

Lancet 2015; 386: 1097–108
Heart failure
What does it mean?

Heart failure is a clinical syndrome in which patients have the following features:

- **Symptoms typical of heart failure**
  (breathlessness at rest or on exercise, fatigue, tiredness, ankle swelling)
  and

- **Signs typical of heart failure**
  (tachycardia, tachypnoea, pulmonary rales, pleural effusion, raised jugular venous pressure, peripheral oedema, hepatomegaly)
  and

- **Objective evidence of a structural or functional abnormality of the heart at rest**
  (cardiomegaly, third heart sound, cardiac murmurs, abnormality on the echocardiogram, raised natriuretic peptide concentration)
Clinical features

Symptoms
• Breathlessness
• Sweating, clammy skin
• Anxiety
• Fatigue
• Swollen legs
• Confusion / somnolence

Signs
• Rapid respiratory rate
• Crackles bilaterally
• Dull bases (effusion)
• Prolonged CRT
• Rapid heart rate
• High/low blood pressure
• S3 or S4 heart sounds, murmurs
• Peripheral oedema
• Raised JVP
• Ascites
• Low SpO2

Acute new HF or decompensated HF causing pulmonary oedema
Management

• Oxygen target 94-98%
  or 88-92%

• Nitrates – could start with sublingual GTN

• Ambulance/ED:
  • Diuretics (IV furosemide)
  • Opiates – IV
  • CPAP
What’s new?

• Heart failure with preserved ejection fraction
  • Adequate LV systolic function on echocardiography
  • But features of heart failure
  • Sometimes called diastolic heart failure
  • Particularly common in elderly, hypertensive and obese patients

European Journal of Heart Failure (2008), 933–989
Pulmonary Embolism
VTE prophylaxis in psychiatric hospitals

• Recognised that all hospital in-patients are at increased risk of VTE, and that this is a cause of death

• Psychiatric patients are at additional risk due to:
  • Medications (anti-psychotics, particularly quetiapine)
  • Inactivity / restricted mobility

• Audits suggest that >50% of patients are not assessed

• The compliance with using TEDS and receiving LWMH?

BMJ 2010;341:c4245
BMJ quality improvement reports; 2015; vol. 4 (no. 1)
VTE prophylaxis in psychiatric hospitals

Score 2 risk factors
- History of deep-vein thrombosis or pulmonary embolism
- Cancer (active/treated)
- Age > 75 years
- Acute infections including sepsis or acute respiratory disease

Score 1 risk factors
- Immobilisation (including paralysis of lower extremity, physical restraint > 8 h, catatonia)
- Hormone therapy (oral contraception, hormonal replacement therapy)
- Obesity (body mass index > 30)
- Age 60–74 years
- Varicose veins/venous insufficiency
- Dehydration
- Thrombophilia
- Treatment with antipsychotics

Low risk 0–3 points
- Regular physical exercise of lower extremities
- Sufficient hydration
- Graduated compression stockings

Medium risk 4–7 points
- Regular physical exercise of lower extremities
- Sufficient hydration
- Graduated compression stockings
- LMWH <3400 units daily s.c.

High risk 8 points
- Regular physical exercise of lower extremities
- Sufficient hydration
- Graduated compression stockings
- LMWH >3400 units daily s.c.
Clinical features of acute pulmonary embolism

**Symptoms**
- Breathlessness
- Chest pain - pleuritic
- Cough – haemoptysis

**Signs**
- Rapid respiratory rate
- Rapid heart rate, may be irregular
- Low blood pressure
- Low SpO2
Management

• Oxygen target 94-98%
  or 88-92%

Assessed in hospital

• Where should they be treated?
  • In-patient / Out-patient

• What treatment should they get?
  • LMWH and then warfarin
  • DOAC (apixaban / rivaroxaban etc...)
  • Other treatments if severe
Drowsy – could it be hypercapnia?
Hypercapnic respiratory failure

• Inadequate ventilation (infrequent / shallow breath) inevitably leads to increased arterial CO2 (hypercapnia).
• Hypercapnia leads to drowsiness, to unconsciousness
• Why might this occur?
Affidavit

Incident Report/Affidavit

Incident #: 201608777
Report Date: Wednesday, September 7, 2016

Incident Information

Call type: DRUG ACTIVITY
Location: 1 ST CLAIR AVE EAST LIVERPOOL
Occur Between: 08/07/2016 15:11:00 And 08/07/2016 15:11:00
Supervisor: U71 PATRICK WRIGHT
Reporting: U89 KEVIN THOMPSON
Assigned: U99 KEVIN THOMPSON
Jurisdiction: East Liverpool

Dispatch Times

Received: 15:11 Dispatched: 15:13 Arrived: 15:13 Cleared: 15:44 Total: 0:32

Incident Names

Entry Type: ARA Name: Pasek, Rhonda L DOB: 08/05/1966
Entry Type: ARA Name: Acord, James Lee DOB: 03/04/1969

Narrative

Affiant says that there is probable cause to believe that the defendant committed an offense, based upon the summary of the facts below.

To Wit:

To Wit: On Wednesday September 7, 2016 at or about 1511hrs I was traveling southbound on St Clair Ave in my personal vehicle. I was following a dark Ford Explorer with West Virginia registration 6ZV709. The suspect vehicle was driving very erratic weaving back and forth in the lane while driving on the yellow center line and back to the right edge of the roadway.

At Prospect Street an East Liverpool School Bus was in the process of discharging children. The suspect vehicle began to brake hard and skidded to a stop. The bus pulled away and the suspect vehicle remained in the roadway before slowing just drifting onto Prospect Street in an angle and stopping.

I made contact with the driver who was later identified as James Acord. I noted his head bobbing back and forth his speech was almost unintelligible. I also noted pin point pupils. I inquired as to what was going on. James Acord stated he was taking his front seat female passenger, who was identified as Rhonda Pasek to the hospital. He then began to try to manipulate the gear shift. I had to reach in and turn the vehicle off and remove the keys. I also noted a 4 year old male seated in a car seat behind the front seat passenger. He was later identified as the son of Rhonda Pasek.

The driver eventually went completely unconscious. Rhonda Pasek was completely unconscious and turning blue. I summoned an ambulance and attempted to keep her airway open. LifeTeam EMS responded along with Patrolman Fred Flati and Patrolman Shawn Lens. I noted LifeTeam administered several rounds of a drug known as Naxcan which is commonly used to reverse an opiate overdose. Both occupants regained consciousness and were transported to East Liverpool City Hospital for evaluation. A yellow folded up piece of paper was located on the right front passenger seat between Rhondas Legs. It contained a small amount of a pink powdery substance. The evidence was packaged and will be sent to the crime lab for analysis. The vehicle was towed from the scene by First Class Towing.
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Causes

1. Insufficient neural respiratory drive (or its transmission)
   • Excessive sedation / opiate analgesia
   • Oxygen toxicity in predisposed conditions...

2. Load that cannot be overcome by the capacity of the respiratory muscle pump, e.g.:
   • Advanced COPD / severe exacerbation of COPD
   • Neuromuscular or musculoskeletal disease
   • **Obesity-related respiratory failure**
     • OSA
     • OHS = Pickwickian syndrome
Summary

• People still die of asthma – early recognition of exacerbations
• Patients with COPD* shouldn’t be given too much oxygen
  (BTS Oxygen guidelines)
• Treat pneumonia with oral antibiotics (requires a CXR to diagnose) if low CURB65 score, and low threshold for seeking assistance
• Assess risk of VTE and give prophylaxis; acute PE is easy to miss – remain vigilant
• In obese patients who are drowsy – remember to exclude hypercapnia as a cause, particularly if they snore
Thanks for listening

bencb@nhs.net
Presentation with respiratory symptoms: wheeze, cough, breathlessness, chest tightness\(^1\)

Structured clinical assessment (from history and examination of previous medical records)

Look for:
- recurrent episodes of symptoms
- symptom variability
- absence of symptoms of alternative diagnosis
- recorded observation of wheeze
- personal history of atopy
- historical record of variable PEF or FEV\(_1\)

High probability of asthma
- Code as: suspected asthma
- Initiation of treatment
- Assess response objectively (lung function/validated symptom score)
- Good response
- Asthma
- Adjust maintenance dose. Provide self-management advice. Arrange on-going review

Intermediate probability of asthma
- Test for airway obstruction spirometry + bronchodilator reversibility
- Poor response
- Options for investigations are:
  - Test for variability: reversibility, PEF charting, challenge tests
  - Test for eosinophilic inflammation or atopy: FeNO, blood eosinophils, skin-prick test, IgE

Suspected asthma:
- Watchful waiting (if asymptomatic)
- Commence treatment and assess response objectively
- Good response
- Poor response

Low probability of asthma
- Other diagnosis unlikely
- Investigate/treat for other more likely diagnosis
- Other diagnosis confirmed

\(^1\)In children under 5 years and others unable to undertake spirometry in whom there is a high or intermediate probability of asthma, the options are monitored initiation of treatment or watchful waiting according to the assessed probability of asthma.