Breathlessness in Primary care

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Public Health England

• Screening & Diagnosis Team
• March 2014
• Breathlessness public awareness campaign
• Aims to reach people who are chronically breathless, and undiagnosed, or under managed
• To encourage them to make an appointment with their GP!
Breathlessness in Primary Care

- Breathless when walking up hill, or worse

855 men born in 1913 in Sweden, assessed by Questionnaire, Exam, ECG, CXR, Gases, Spirometry

<table>
<thead>
<tr>
<th></th>
<th>Age 57</th>
<th>Age 67</th>
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<tbody>
<tr>
<td>Breathless</td>
<td>5.2%</td>
<td>10.3%</td>
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<tr>
<td>Probable Cardiac cause</td>
<td>21%</td>
<td>32%</td>
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<tr>
<td>Probable Respiratory cause</td>
<td>29%</td>
<td>26%</td>
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<tr>
<td>Both</td>
<td>29%</td>
<td>22%</td>
</tr>
<tr>
<td>Neither</td>
<td>21%</td>
<td>19%</td>
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Eriksson H et al  Europ Heart J 1987;8:1015-23
• Do you have a breathlessness service in your CCG?
• Would you like one?
• What should it consist of?
Breathless Patient

History (inc occupation) & Examination

Clear Diagnosis

Additional CXR

Smoking history:

Bloods (U&E, LFT, HbA1c, RBS) ECG & RFTs

Reversibility Study

Normal ECG, No history IHD

Abnormal ECG &/or history IHD

Serum BNP off diuretics

Echocardiogram

Bloods (U&E, LFT, HbA1c, RBS) ECG & RFTs

Restrictive Picture

Imaging???

Reversibility

How to do this???
Reversibility with SABA- either PF or via spirometry
Serial PF
Reversibility with 1-2 weeks oral pred
Reversibility wit 6 week inhaled steroid
As blanket term could just say assess for reversibility of airways obstruction

Other Considerations
• Recurrent PE
• CAD
• Pulmonary Fibrosis
Barriers to Accurate Diagnosis and Effective Management of Breathlessness

- Uncertainty in clinical practice
  - Diagnosis difficult, particularly in obese and elderly
  - Concerns about drug side effects
  - Co-morbidities and polypharmacy

- Local organisational factors
  - Availability of diagnostic services
  - Interactions with secondary care
  - Different levels of training

- Awareness of relevant evidence
  - Perceived complex therapeutic area
  - Doubts about applicability in primary care
  - Fear of information overload

Fuat A, Hungin APS, Murphy JJ. BMJ 2003;326:196-200
Algorithm for the evaluation of patients with chronic dyspnea.

1. Approach breathlessness using three dimensions: mental health, social context and physical health.

2. Diagnosing the cause(s) of breathlessness is often not easy. Start with the story and then use clinical examination to guide your reasoning.

   There may be more than one contributing cause.

3. Because there are many clinical causes of breathlessness don't make assumptions. Common things occur commonly but there may be an alternative explanation.
The Breathless Patient

If you can meet with Triumph and Disaster,
And treat those two impostors just the same....
The Disaster

- Alice: a 65 year old woman
- She lives alone, widowed
- She has anxiety and depression (fluoxetine)
- She is overweight
- She is hypertensive (CCB)
- She stopped smoking 9 yrs ago
When we first met….

• She joins us from another practice
• February: persistent chesty cough
• No wheeze or SOB
• Has been treated for asthma in past
• PEFR 370/450: examination chest clear
• Rx inhaled terbutaline/budesonide commenced
• Asked to return for spirometry
March

- Spirometry is normal
- She still has a persistent tickly cough
- Now reports an increase in exertional SOB
- Is referred for CXR
April

- CXR normal
- Shift in emphasis to breathlessness although cough persists
- No response to inhaled Rx
- She acknowledges she needs to lose weight and that she is generally unfit
- Referred to P/N for support
July

- An ECG is done routinely to assess Framingham risk with HTN
- This is normal apart from a left axis deviation: SR no LVH
September

• A couple of new symptoms appear:
• 1. Palpitations (“fast regular thumping in her ears and chest”)
• 2. Dizziness- provoked by movement
• On examination: heart sounds dual and clear, no carotid bruits, chest clear, positive Rhomberg, other tests coordination normal
Later this month….

• The predominant symptom is breathlessness on mild exertion (walking on the level)
• This is associated with a tightness in her chest
• Patient is worried: her younger (52 yrs) sister has angina
• Could this be angina all along??
24 hour ECG monitoring

- This shows runs of sinus tachycardia (max rate 150/min) and a few (non pathological) ventricular ectopics
- No abnormalities recorded when event buttons pressed
- A trial of ISMN, but…
- “not very convincing” result
October

- Could there be anxiety component?
- Trial of low dose propranolol
- This is not tolerated (tight chest)
- BP higher than usual 190/90
- Alice is tired as well as breathless
- Bloods are requested (FBC TFT bioprofile/RBS)
November

- BFZ is added to CCB for HTN
- Blood tests all normal
- Alice wants to come off her fluoxetine
- The need for an echocardiogram is raised to detect any LVF, but doesn’t really fit criteria
- She is better: much less breathless!!!
Two weeks later…

- The breathlessness returns
- She is examined by GP registrar and no abnormality detected
- Alice is reassured but asked to return to see usual Dr
26\textsuperscript{th} November

• She enters my room acutely breathless
• Unable to speak complete sentences
• No cyanosis
• Responds well to reassurance and calm
• Does not have any nocturnal sx, no PND or orthopnoea
• Examination: BP 160/100 HS 1+2+0
• HR 110, chest clear. PEFR 360
And finally….

• Alice is prescribed frusemide
• I refer her to a cardiologist with “unexplained breathlessness” to determine whether there is a cardiac cause for the symptoms and suggesting an echocardiogram, as well as expert opinion.
The Cardiology Opinion

• He sees her a few days later…
• On examination: resting tachycardia (114/min), HS dual and clear, apex not displaced, chest clear, BP 172/90, JVP not raised, “trace of pedal oedema”
• “I understand her ECG shows…”
• Working Dx of angina: orders ETT echo and sublingual GTN
6th December

• Alice is found dead in bed at home, on her own

What is the cause of death?
The Post-Mortem

• Bilateral (saddle) Pulmonary Embolus
• Secondary to DVT
Lessons Learnt

• Listen to the patient
• When in doubt ask someone else to see the patient, or try to see the patient as if from first time
• Keep good records
• Repeat tests: Once May Not Be Enough

As the PC is dynamic and evolves (9/12)
Hindsight is a Wonderful Thing...
4. Ask all chronically breathless patients about their current and past smoking and calculate pack years/joint years. Always promote smoking cessation.

5. Ask about the impact of breathlessness – identify what a patient can’t do that they value and whether their breathlessness has been frightening.

6. 2/3 of breathlessness is cardiac or pulmonary and 1/3 multifactorial.

7. Start with diagnosing/excluding common causes – asthma, COPD, heart failure, obesity and anaemia.

8. But be alert to unusual causes
Aids to diagnosing The breathless patient

Spirometry & Lung function tests

ECG

BNP

Urodilatin

ANP

Spirography & Lung function tests

Echo
Serum natriuretic peptide [NICE CG108]

If normal: consider another diagnosis
If raised: refer non-urgently, within 6 weeks
If very raised: refer urgently

Note that there are several things that will put up a BNP including left ventricular hypertrophy, renal failure, or age. Also, it can be lowered by ACE inhibitors (eg used for diagnosis) and obesity.

As the BNP gets very high it does become more specific and therefore becomes prognostic as well: patients with a very high BNP are at high risk of hospitalisation and have higher mortality rates. This is why NICE suggests urgent referral of patients with very raised BNP.
Carole

- Is a 47 year old woman
- Married
- No children
- Never smoked
- Mo PMH of any note
- Describes herself as fit and well
She is hypertensive

- Normal HTN screen
- Normal ECG
- Comes my way to start Rx
- Auscultation: a soft systolic murmur is detected
- Could be “flow” murmur but on direct questioning Carole admits…
Well I can’t do hills of any sort..

I do get a bit out of breath, but that’s me… I’ve always been like that as long as I can remember…
The Echocardiogram

- Large Patent Ductus Arteriosus
- Large ASD
- Significant Lt>Rt shunt
- A grossly dilated heart
The anatomical defects are corrected surgically.

Carole survives her “open heart surgery.”
And now…. 

• She has forgiven me
• She has made a full recovery
• She is still breathless on hills but has a personal trainer and goes to gym x3/week, is not breathless on the level
• Her heart is now a normal size!!
So the Message Is...

• If you don’t look you don’t find!

• But: the history is most important thing: Listen to the patient and then be “deductive”

• Breathlessness is what the patient says it is..
8. It is OK to be unsure of the diagnosis and to use more than one assessment to make the right diagnosis (e.g. asthma (Karnani 2005))
- it is better to be unsure than make the wrong diagnosis.

9. If you are using electronic records consider using a high level breathlessness symptom code (e.g. the ‘Read’ parent code 173) until a diagnosis is made and maintain the symptom code as ‘active’ and ‘significant’ to encourage future review of breathlessness status and revisiting of the cause.
At the 1st consultation ask the patient what they want out of the consultation, listen to the patient's story and their breathing, examine the patient and take measurements.

If they smoke, ask if they have thought about stopping, if they have, ask if they would like some advice to support this.

Assess their mental health (presence of anxiety or depression).

Explain what will happen at the next consultation including how they will hear about any test results.

Make sure you have established the patient’s (and carers’) ideas, concerns and expectations about the consultation and their condition.
Remember:

**Anginal equivalent**: breathlessness due to reversible myocardial ischaemia. This is distinct from heart failure due to established heart muscle damage, but both can be due to coronary artery disease. The difference is that the reversible ischaemia resolves completely at rest and so resting tests will be normal.

This sort of breathlessness occurs only on exercise and may present with breathlessness only or with angina as well (when it is easier to recognise). Suitable tests include exercise ECG (though NICE have rejected exercise tests in their guideline on chest pain of recent onset), stress echo, myocardial perfusion imaging, CT coronary calcium scoring, CT angiography and coronary angiography.
Screening for Atherosclerosis
Risk Factors vs Disease

Numerous Risk Factors
- High LDL
- Low HDL
- High BP
- Diabetes
- Smoking
- CRP
- Metabolic Syn
- Lp(a)
- Homocysteine
- Dense LDL
- Lp-PLA2
- ApoB/ApoA
- Family History
- Sedentary Life
- Obesity
- Stress
...
Over 200 risk factors have been reported.

Carotid IMT and Plaque Measured by Ultrasound

Aortic and Carotid Plaque Detected by MRI

Coronary Calcium Score Measured by CT

Ankle Brachial Index

Brachial Vasoreactivity Measured by Ultrasound

Vascular Compliance Measured by Radial Tonometry

Microvascular Reactivity Measured by Fingertip Tonometry

Examples of Arterial Structure Tests

Examples of Arterial Function Tests
Coronary Calcium and Atherosclerosis: Pathology Evidence

- Coronary calcium invariably indicates the presence of atherosclerosis, but atherosclerotic lesions do not always contain calcium (1-3).
- Calcium deposition may occur early in life, as early as the second decade, and in lesions that are not advanced (4-5).
- Correlates with plaque burden; highly sensitive for angiographic disease

Coronary Artery Calcium Imaging (EBCT) Predicts All Cause Mortality: Observational Study

Shaw et al, Radiology 2003; 228: 826-33
Raggi et al, JACC 2004; 43: 1663-69
Cumulative Incidence of Any Coronary Event: MESA Study (Detrano et al., NEJM 2008)
Net Reclassification of CHD Risk by Coronary Calcium: MESA Study (Polonsky et al., JAMA 2010)

The addition of CAC to models with age, gender, ethnicity and risk factors alone resulted in net reclassification of 0.25 (p<0.001); 23% of those with events were reclassified as high risk and 13% without events were reclassified as low risk.
Recommendations for Calcium Scoring Methods

Measurement of CAC is reasonable for cardiovascular risk assessment in asymptomatic adults at intermediate risk (10% to 20% 10-year risk).

Measurement of CAC may be reasonable for cardiovascular risk assessment persons at low to intermediate risk (6% to 10% 10-year risk).

Persons at low risk (<6% 10-year risk) should not undergo CAC measurement for cardiovascular risk assessment.

• CV risk assessment in asymptomatic adults with diabetes (Class IIa-B)
Consider measures of physical activity (GPPAQ) and BMI/waist. If GPPAQ – inactive and BMI high then think about ‘deconditioned’ and focus on lifestyle measures.
EXERCISE CAPACITY AND MORTALITY AMONG MEN REFERRED FOR EXERCISE TESTING

JONATHAN MYERS, PH.D., MANISH PRAKASH, M.D., VICTOR FROELICHER, M.D., DAT DO, M.D., SARA PARTINGTON, B.SC., AND J. EDWIN ATWOOD, M.D.
6213 subjects
F/Up : 9 yrs

Each 1-MET increase in Exercise Capacity Conferred a 12% improvement in survival
Protective Effect of Fitness in Different Conditions

Myers J et al. NEJM 2002;346:793
Refer to the appropriate specialist clinic or service (may be respiratory, cardiologist or other physician with breathlessness expertise or a specific breathlessness clinic)

- if you cannot establish the underlying cause for the patient’s breathlessness
- if the symptoms are disproportionate to the severity of their disease
- if diagnostic procedures are required eg lung biopsy, cardiac catheterization
- if there is an unexpected response to therapy, including no response to treatment despite maximum therapy.

- Gauge urgency by your assessment of the patient’s risk of premature mortality with particular focus on dependent smokers, those with mental illness and those with learning disabilities and those post-MI.
Promote the value of rehabilitation programmes to your breathless patients with COPD and/or heart failure and refer them to the local rehabilitation service because it is a high value intervention in both heart failure and COPD [NICE 2010 CG101 and CG108].

**Optimise not maximise prescribing before referral.**

There is insufficient pulmonary rehabilitation (PR) but an even more significant lack of cardiac rehabilitation (CR) for people with heart failure. In the national audit of cardiac rehabilitation, only 1% of patients recorded in the audit had a diagnosis of heart failure. [British Heart Foundation 2010].
Population-level interventions

1. Consider holding a local meeting of stakeholders with patients and healthcare professionals involved in breathlessness care to map what local resources exist to consider a breathlessness one stop clinic and help people learn to breathe better: swimming, yoga, pilates, tai-chi, choirs as well as NHS and local authority pulmonary and cardiac rehabilitation, exercise classes.

Rationale

Population health gain will require population-level interventions as well as individual ones. Personalisation, including the use of personal budgets and personal health budgets will enable people with long term conditions to devise and carry out their own care plans, in consultation with their professional advisers. There is evidence that practice teams can be taught and engaged in population diagnosis and intervention design to improve population health.