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Assessment of breathlessness

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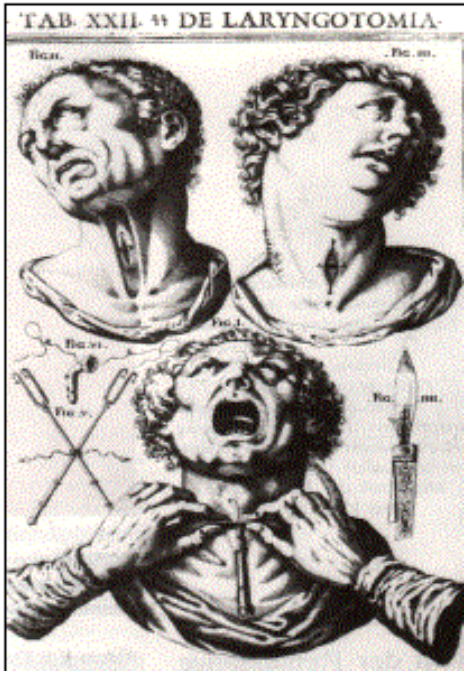
Breathlessness

- A subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity. The experience of dyspnea derives from interactions among multiple physiological, psychological, social, and environmental factors, and may induce secondary physiological and behavioral responses.

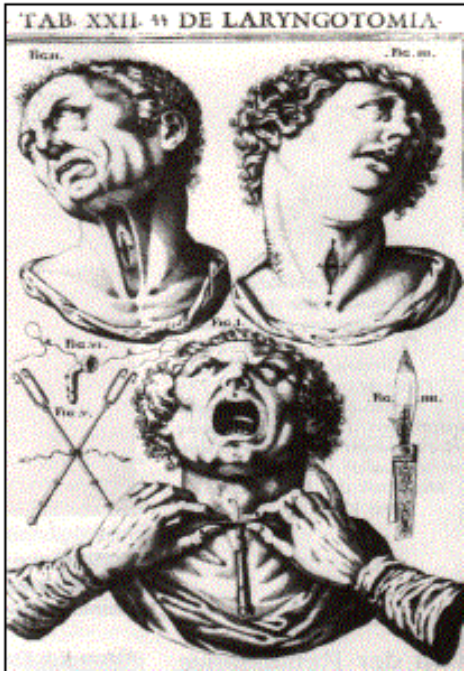


- Dyspnea per se can only be perceived by the person experiencing it.

American Thoracic Society 1999, 2012

Dyspnea versus breathlessness

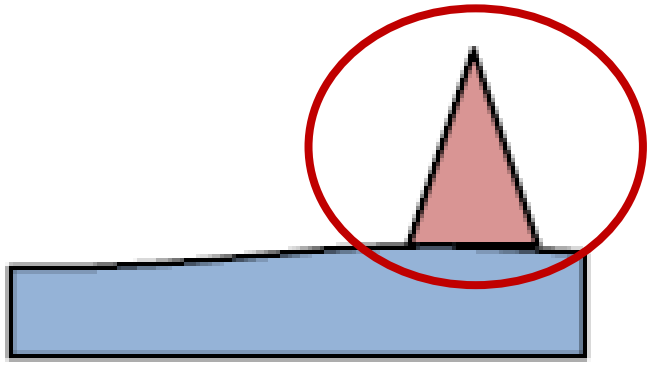
- dyspnoea
  - biomedical description
  - mistaken as clinical sign (visible laboured breathing, abnormal respiratory rate, abnormal physiological measures)
- breathlessness
  - lay term
  - reflecting patients‘s views and daily experience
- refractory breathlessness
  - persists despite optimal treatment for underlying condition and after any potentially reversible complications have been addressed



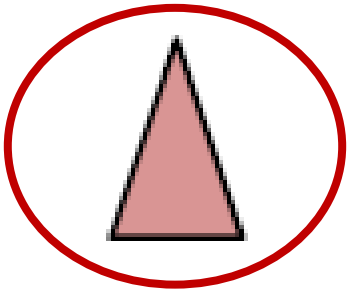
Johnson et al Expert Rev 2014

Breathlessness

- common symptom in advanced disease (cancer, COPD, chronic heart failure, lung fibrosis, MND)
- continuous and episodic breathlessness



continuous



episodic breathlessness

- short (75% < 10 min)
- several times a day
- mostly self-limiting

Weingärtner et al. J Pall Med 2013

Assessment – clinical history

- pattern of breathlessness (onset, aggravating factors, characteristics)
- presence of other symptoms and their importance compared to breathlessness
- impact on a person's quality of life including physical activities (e.g. walking), ability to self-care, social life and psychological status
- current symptomatic treatments for breathlessness (e.g. handheld fan) and their efficacy for that person
- adverse effects of any treatments used currently or in the past
- all comorbidities
- the person's understanding and interpretation of the symptom
- carers!

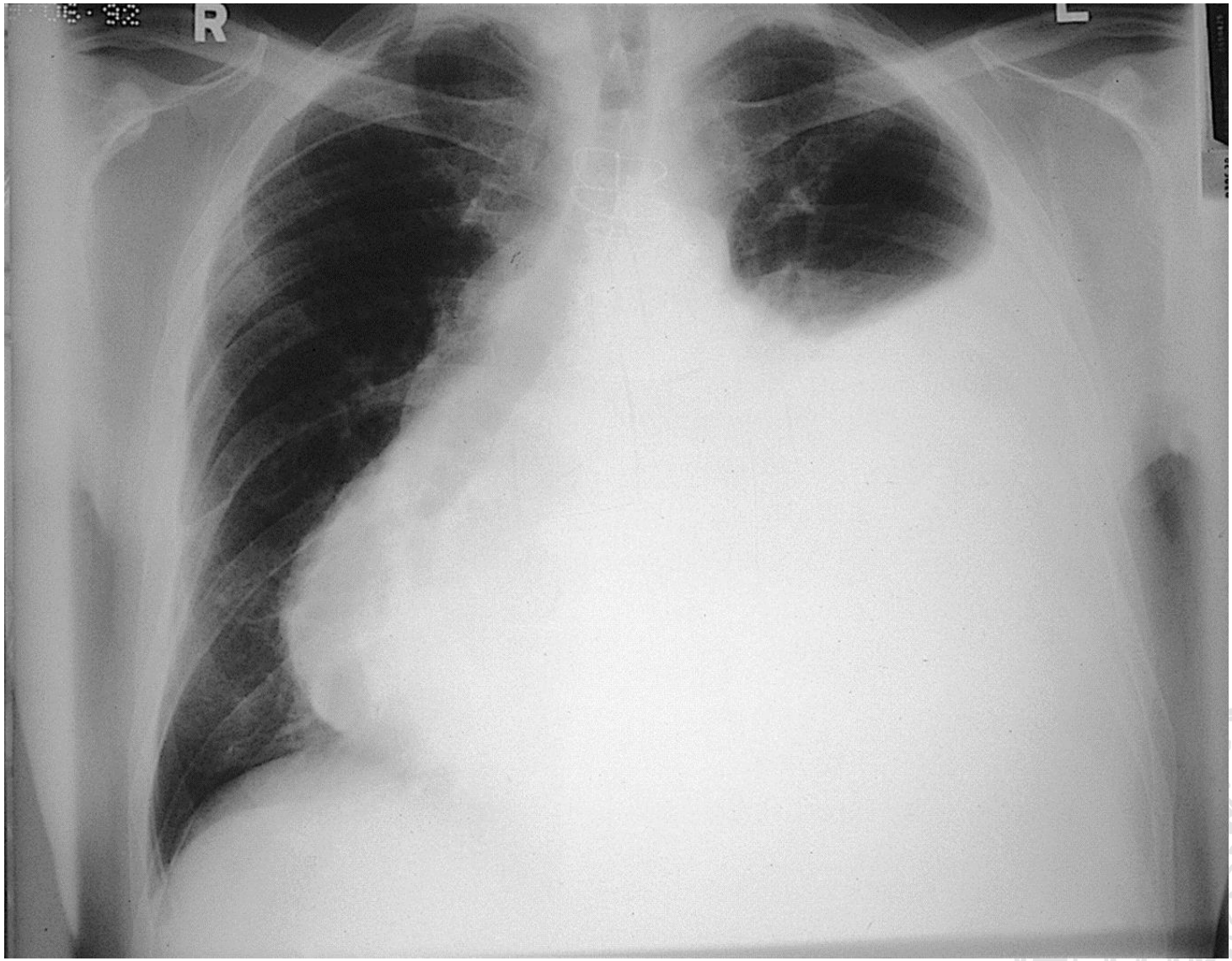
Physiological tests

No correlation between the sensation of breathlessness and lung function tests.

Eakin 1993

Potentially reversible causes of breathlessness

Cause of breathlessness	Causal treatment
anaemia	transfusion
airway obstruction, COPD as comorbidity	anti-obstructive therapy, corticosteroids
haemoptysis	antifibrinolytic agents, bronchoscopy or operative interventions (stent, laser, argon beamer), radiotherapy
infections, e.g. pneumonia	antibiotics, Antimycotics
superior vena cava syndrome	anticoagulants, vena cava stent, corticosteroids, radiotherapy
airway obstruction due to tumour	bronchoscopy or operative interventions (stent, laser, argon beamer), radiotherapy
pericardial effusion	pericardiocentesis, pericardiodesis
pleural effusion	thoracentesis, chest tube, pleurodesis
pulmonary edema	diuretics, other appropriate, drug-based treatments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Aims of breathlessness assessment

- make a clear diagnosis of the causes(s) of the symptom
- understanding the impact of the symptom on the individual
- establishing an appropriate management plan

Bausewein et al Curr Op Pall Care 2008

Domains of breathlessness measurement

TABLE 4. DOMAINS OF DYSPNEA MEASUREMENT

Domain	Definition	Examples*
Sensory–perceptual experience	Measures of what breathing feels like to the patient or research subject.	Single item ratings of intensity (e.g., Borg scale, VAS) Descriptors of specific sensations/clusters of related sensations
Affective distress	Measures of how distressing breathing feels. Focus can be either immediate (e.g. unpleasantness) or evaluative (e.g., judgments of meaning or consequences).	Single-item ratings of severity of distress or unpleasantness Multi-item scales of emotional responses such as anxiety
Symptom impact or burden	Measures of how dyspnea/breathlessness affects functional ability, employment (disability), quality of life, or health status.	Unidimensional rating of disability or activity limitation (e.g., MRC scale) Unidimensional or multidimensional ratings of functional ability Multidimensional scales of quality of life/health status

Definition of abbreviations: MRC = Medical Research Council; VAS = visual analog scale.
*Specific measures cataloged in Table E1.

American Thoracic Society 2012

Unidimensional scales

- as tool to identify and trigger a more comprehensive assessment
- simple to use in daily practice
- be tailored to varying timescales depending on the question (breathlessness ‘now’, over the past 24 h)

Johnson et al Expert Rev 2014

Intensity of breathlessness – VAS and NRS

Visual analogue scale (VAS)

Numerical scale (NRS)

not breathless at all

no respiratory discomfort

extremely breathless

maximum respiratory discomfort

Intensity of breathlessness - Modified Borg scale

Mod. Borg SCALE	SEVERITY
0	No Breathlessness at All
0.5	Very Very Slight (Just Noticeable)
1	Very Slight
2	Slight Breathlessness
3	Moderate
4	Some What Severe
5	Severe Breathlessness
6	
7	Very Severe Breathlessness
8	
9	Very Very Severe (almost max.)
10	Maximum

Minimal clinically important difference (MCID)

- 0–100 mm VAS (and by extrapolation, the NRS)
  - moderate effect size: 11.3 mm change
  - 9 mm change was sufficient to allow patients to make a choice between two treatment options

- mBorg
  - one-point change in global impression of change
  - MCID as a range: 0.2–2.0 ($p < 0.001$) for average mBorg in previous 24 h; 0.3–1.9 ($p < 0.001$) for worst mBorg in previous 24 h

Johnson et al Expert Rev 2014

Dyspnoea 12

- global score of breathlessness severity
- good psychometric properties
- incorporates both “physical” and “affective” aspects

APPENDIX: DYSPNOEA-12 QUESTIONNAIRE

This questionnaire is designed to help us learn more about how your breathing is troubling you.
Please read each item and then tick in the box that best matches your breathing ***these days***. If you do not experience an item tick the “none” box. Please respond to all items.

Item		None	Mild	Moderate	Severe
1.	My breath does not go in all the way				
2.	My breathing requires more work				
3.	I feel short of breath				
4.	I have difficulty catching my breath				
5.	I cannot get enough air				
6.	My breathing is uncomfortable				
7.	My breathing is exhausting				
8.	My breathing makes me feel depressed				
9.	My breathing makes me feel miserable				
10.	My breathing is distressing				
11.	My breathing makes me agitated				
12.	My breathing is irritating				

Yorke et al Thorax 2010

Multidimensional Dyspnea Profile

- for clinical and laboratory research
- developed in the emergency care setting
- not linked to activity, not disease specific
- 12-item scale using 0–10 NRS scores.
- 2 items: overall intensity, unpleasantness
- 5 items: sensory descriptions of breathlessness (increased muscle work of breathing, tight chest, air hunger, breathing a lot, requires mental effort)
- 5 items: emotional responses to breathlessness (depressed, anxious, afraid, angry, frustrated)

Meek et al Chest 2012, Banzett et al ERJ 2015

Multidimensional Dyspnea Profile

Use this scale to rate the **intensity** or **strength** of your breathing sensations, how **much** sensation you have now.
Please focus on how your breathing feels now

0	1	2	3	4	5	6	7	8	9	10
NO SENSATION	SLIGHT SENSATION			MODERATE SENSATION						MAXIMUM SENSATION

Use this scale to rate the **unpleasantness** of your breathing sensations, how **good** or **bad** your breathing feels
Please focus on how your breathing feels now

←	←	0	1	2	3	4	5	6	7	8	9	10
PLEASANT	NEUTRAL		SLIGHT SENSATION			ANNOYING			DISTRESSING			UNBEARABLE

SQ -- Sensory Qualities -Rate the intensity of the breathing sensations you feel (like the loudness of sound, regardless of whether the sensation is pleasant or unpleasant; for example a sensation could be intense without being unpleasant.)

- SQ1-My breathing requires muscle work or effort .
- SQ2-I am not getting enough air, I feel hunger for air, or I am smothering.
- SQ3-My breathing requires mental effort or concentration.
- SQ4-My chest and lungs feel tight or constricted.
- SQ5-I am breathing a lot. (breathing rapidly, deeply or heavily)

E – Emotional Response-Please tell us about how your breathing sensations made you feel – rate zero for any emotion you did not feel.

- E1-Depression
- E2-Anxiety
- E3-Frustration
- E4-Anger
- E5-Fear

Meek et al Chest 2012, Banzett et al ERJ 2015

Functional status

- impact of breathlessness on activity
- breathlessness on exertion to breathlessness at rest
- assessment during exercise
- often not possible for severely ill patients

Functional status

- Shuttle walking test (Booth Thorax 2001)
  - validated for patients with COPD, heart failure
  - patient walks for 6 mins at a speed provided by an external pacemaker, measurement of total distance walked
  - reproducible for functional capacity in ambulant patients with advanced cancer
  - breathlessness only limitation of walking distance?

- Reading numbers aloud Test (Wilcock, Thorax 1999)
  - patient reads numbers aloud as quickly as they can for 60 s, 5x
  - dyspnoea rated by max. number of numbers read and the numbers read per breath
  - practical, good repeatability, sensitive to change
  - for patients who are limited in talking or low levels of exertion

47	43	73	86
48	36	96	47
49	36	61	97
50	74	24	67
51	62	42	81

Breathlessness & disease specific scales

- indirect measurements of breathlessness during activities of daily living
- focus on level of activity, not on intensity of sensation
- not all patients relate to activities

Breathlessness specific scales

- Medical Research Council breathlessness scale
  - 5-point scale ranging from "no breathlessness on exertion" to "breathless during dressing"
  - useful in defining or characterizing a patient population
  - most commonly used to assess physical tasks

- Baseline Dyspnoea Index (BDI)
  - measurement of functional impairment, magnitude of effort, magnitude of task
  - Transition Dyspnoea Index (TDI): shows changes in comparison to BDI on 7-point scale

Disease-specific questionnaires

- Chronic Respiratory Disease Questionnaire (CRQ)
  - breathlessness, fatigue, patients feeling of control and emotional function
- St. Georges Respiratory Questionnaire
  - symptoms, activity, impact of breathlessness on daily life (including social and emotional disturbances but not anxiety and depression)
- Cancer Dyspnoea Scale
  - easy in/exhalation, slow/difficult breathing, feeling as panting, breathing may stop, narrow airway…
  - three factors: sense of effort, sense of anxiety, sense of discomfort

Challenges in assessing breathlessness

- Reluctance of patients reporting it
  - ‘invisibility’ of breathlessness, expected consequence of the disease and little or nothing could be done to alleviate it (Gysels & Higginson JPSM 2008)
  - concerns of stigma, or self blame, if they believe their breathlessness to be smoking related (Todd Nurs Stand 2010)
- plethora of uni-dimensional and multi-dimensional generic and disease-specific tools
- absence of universally accepted outcome measures fit for purpose in the clinical and research setting >> obvious barrier to routine clinical assessment and monitoring of breathlessness (Johnson et al Expert Rev 2014)

Conclusion

- assessing dyspnoea is the first step in managing it (Banzett Eur Resp J 2014)
- establishing reversible causes
- assessment should include severity/ intensity, unpleasantness, emotional reaction to it
- unidimensional scales (VAS, NRS, Borg Scale)
- multi-dimensional scales (Dyspnea 12, Multidimensional Dyspnea Profile)
- impact on function important

Thank you!