Of respiratory and other sensations...

Breathlessness is not love, it is not excitement, it is not the promulgation of promises of eternal passion.

From “Captain Corelli’s Mandolin” by Louis de Bernières.

The most common symptom of patients with cardio-respiratory disease is “dyspnea,” which is a term used to characterize a subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity. The experience derives from interactions between multiple physiological, psychological, social, and environmental factors, and may induce secondary physiological and behavioral responses. This definition includes important concepts such as quality and intensity of sensation that are measurable and may vary depending on the patient, the underlying disease, and other circumstances.

The relationship between the sensation of dyspnea and emotion is crucial to the evaluation and treatment of symptoms in chronic obstructive pulmonary disease (COPD). In this issue of Chronic Respiratory Disease, Michaels and Meek describe the relationship between the levels of everyday breathing intensity and the natural language word categories used in describing breathing, including a negative emotion category. These authors found significant associations between level of breathing intensity and negative emotion, anger, cause, insight, time and body words. Several significant correlations were reported with the psychosocial measures, including negative emotion and anxiety words, and negative emotion words with the inverse of typical breathing (i.e., atypical breathing).

The relationship between dyspnea, emotions, and words has been studied. Although different diseases may share the same verbal descriptors, different pathophysiological abnormalities may result in different qualities of respiratory discomfort, as defined by specific descriptors related to a specific diagnosis. There is no clear relationship between the qualitative descriptors of dyspnea and the quantitative intensity among the patient groups. Different diseases may be distinguished by quality but not the intensity of sensation, which can in turn be influenced by differences in languages, in race, culture, gender, and in the manner in which concepts or symptoms are held.

Healthy subjects, performing exhaustive exercise, complain of a perception of increased effort/work, whereas in patients with advanced COPD, increased sense of effort (or work), and unsatisfied inspiration are the dominant qualitative descriptors. These are selected when they are at the peak of exercise when their dyspnea is usually severe. During exercise, patients with COPD also complain of “unsatisfied” or “unrewarded” inspiration, “shallow breathing,” “air hunger,” “work/effort,” “chest tightness,” and “inspiratory difficulty.” These distinct sensations are related to different pathophysiological stimuli such as dynamic hyperinflation, the uncoupling of the normal association between respiratory effort and ventilatory output, or the presence of sputum. Banzett, et al. have recently shown that the sensation of air hunger is far more unpleasant than the sensation of excessive respiratory work giving the strongest evidence that multiple dimensions of dyspnea exist and can be measured.

The neurophysiological basis of dyspnea relies on receptors in the airways, lung parenchyma, respiratory muscles together with chemoreceptors that provide sensory feedback via vagal, phrenic, and intercostal nerves to the spinal cord, medulla, and higher centers. Recent functional imaging studies have shown that dyspnea activates many of the same limbic brain structures involved in the affective dimension of pain, providing biological evidence that the perceptual model of pain may also be appropriate for dyspnea. Furthermore, another recent brain-imaging study suggests that the unpleasantness, but not the intensity, of dyspnea is processed in the human anterior insula and...
amygdala. These findings underline the importance of a differentiation between the affective and sensory dimensions of perceived dyspnea by suggesting different neuronal pathways for the processing of these dimensions.

The importance of taking into account the influence of psychological factors on symptom perception in COPD is reinforced by the recent finding that the presence of panic attacks or panic disorder in COPD is associated with increased sensitivity to increasing inspiratory resistive loads. Determining whether a change in dyspnea primarily reflects a change in the primary sensation or the affective response may inform us about the role of the psychological state of the patient in ratings of respiratory discomfort and guide therapies such as psychological intervention or psychoactive drugs. Psychological complaints or mental disorders in patients with COPD are often overlooked and rarely treated because they are regarded as complications of the pulmonary disease. Patients with severe COPD experience a greater prevalence of depression compared with patients with mild or moderate disease. The recent finding that the sensory and affective components of dyspnea can be manipulated independently, like pain, may have considerable relevance for therapeutic interventions.

By reporting significant associations between key word categories, in particular negative emotion, anger word use, levels of breathing intensity, and selected psychosocial measures, the study by Michaels and Meek contributes to the knowledge of the influence of levels of breathing intensity on natural word use in everyday life. If the global rating of dyspnea comprises both sensory and affective components, a multidimensional measurement might help the clinician more.

References


N Ambrosino
Respiratory Intensive Care and Pulmonary Diseases Unit, Cardio-Thoracic Department, Pisa University Hospital, Pisa, Italy
Pulmonary Rehabilitation and Weaning Unit, Auxilium Vitae, Volterra, Italy