



PALLIATIVE CARE CASE OF THE MONTH

“Refractory Dyspnea: Oxygen and Opioids”

by

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Case: Ms. E. is a 64-year-old woman with advanced NSCLC transferred to UPMC Shadyside from an outside hospital for increasing shortness of breath and hypoxia. She was hospitalized the month prior for similar symptoms and had undergone a pleurx catheter placement for her malignant right-sided pleural effusion. She was discharged to home and continued draining the pleurx every other day. She also required supplemental oxygen at the time of discharge for hypoxia to 86% on room air.

On this admission, repeat imaging showed recurrent pleural effusion on the right with septal thickening concerning for lymphangitic spread of the tumor. There was also a significant parenchymal progression of tumor burden on the left as well as empyema. The patient successfully underwent tPA of the pleurx catheter, which allowed for substantial drainage and temporary improvement of her symptoms. However, her dyspnea eventually worsened again and became present even at rest. Palliative Care was consulted for symptom management.

Ms. E. endorsed that her shortness of breath improved temporarily after the manipulation of her pleurx catheter, but then worsened again. She felt dyspneic just sitting in bed. When her vital signs were checked, her O₂ saturation was noted to be 88% and her oxygen was increased up to 4L NC; however, she did not notice any improvement in her symptoms.

Discussion: Dyspnea is a complex, uncomfortable sensation that includes air hunger, increased effort, and chest tightness. Sensory signals from the respiratory system are relayed to higher brain centers where they are processed and influenced by behavioral, cognitive, contextual, and environmental factors before the shaping of the final sensation of breathlessness.¹ A 2011 neuroimaging study suggests that neural structures involved in pain and dyspnea might be shared; consequently, the neurophysiological and psychophysical approaches used to understand pain might be applied to dyspnea research.² Like pain, dyspnea is a subjective sensation that is influenced by physical, psychological, social, and spiritual factors.

Dyspnea has been reported to be the fourth most common reason for emergency department visits in the palliative care patient population and is the reason for consultation in over 10% of inpatient palliative care consultations.³⁻⁴ Dyspnea often increases as patients approach death and is often used as a poor prognostic finding.⁵

The etiology of dyspnea can be divided into three general categories:⁶ the work of breathing, chemical causes, and neuromuscular dissociation. Increased work of breathing is an increase in respiratory effort induced by either an obstructive or a restrictive process.⁷ In the case of Ms. E, both her pleural effusion and empyema contributed to restrictive physiology.

Chemical causes of dyspnea include hypoxia and hypercapnia. Neuromuscular dissociation occurs when the brain detects a discrepancy between the tension in the respiratory muscle and the resulting expansion of the lung parenchyma.⁸

For example; a pleural effusion may prevent a lung from expanding fully, even as a patient exerts an effort commensurate with the larger lung volume.

Treatment: The treatment of dyspnea is multifactorial. Reversible triggers should be considered and treated when feasible. The mnemonic “BREATH AIR” can be a useful tool for identifying triggers (see addendum).⁹ General measures should always be considered in the treatment of dyspnea, no matter what the suspected etiology. These include repositioning, improving air circulation, and management of anxiety (see addendum).

The use of a handheld fan for the symptomatic relief of chronic breathlessness has been shown to be effective.¹⁰ This should be strongly considered given that is easily accessible, portable, inexpensive, and enhances self-efficacy.

The most commonly used treatment modalities, however, are supplemental oxygen and opioids. Supplemental oxygen is an expected treatment by both patients and families. The data to support its use is strong in hypoxemic patients with COPD. In these patients, there is little doubt that supplemental oxygen reduces dyspnea, increases quality of life, and increases survival.¹¹⁻¹² In non-hypoxemic COPD patients and patients without COPD, however, there is no solid evidence to support the use of supplemental oxygen therapy.¹³ In a large, double-blinded, randomized controlled trial conducted by Abernethy and colleagues,¹⁴ over 200 non-hypoxemic patients with refractory dyspnea due to a life-limiting illness received either oxygen or medical air (room air with ambient partial pressure of oxygen) via nasal cannula for more than 15 hours per day for 7 days. There was no difference in dyspnea between the two groups; both oxygen and medical air improved dyspnea ratings and quality-of-life ratings, indicating that the main benefit may be from the sensation of moving air.

Additionally, a double-blind, n-of-1 trial looked at the routine use of oxygen in patients nearing death. In this study, 100 patients who were either enrolled in hospice or were being evaluated by an inpatient palliative care service were observed for respiratory distress as medical air, oxygen, and no flow were randomly alternated every 10 minutes via nasal cannula over the period of an hour. The range of hypoxemia varied greatly in the study; however, there was no significant change in the respiratory distress based on the use of oxygen.¹⁵

In light of this current evidence, the British Thoracic Society recently revised their guidelines for the use of oxygen therapy, stating that patients with cancer or end-stage cardiorespiratory disease who are non-hypoxemic should be assessed for opioid or fan therapy before palliative oxygen therapy.¹⁶

Similarly, The American Thoracic Society recommends the use of supplemental oxygen for palliative care patients in the context of pulmonary rehabilitation for those with moderate-severe dyspnea, but confirms that there is no firm evidence for its use in the absence of hypoxemia.¹⁷

Personal details in the case published have been altered to protect patient privacy.

For palliative care consultations please contact the Supportive and Palliative Care programs at PUH/MUH, 647-7243, pager # 8511, Shadyside, 647-7243, pager # 8513, Perioperative/Trauma Pain, 647-7243, pager # 7246, UPCI Cancer Pain Service, pager 644-1724, Interventional Pain 784-4000, Magee Women's Hospital, pager 412-647-7243 pager # 8510, VA Palliative Care Program, 688-6178, pager # 296. Hillman Outpatient: 412-692-4724. For ethics consultations at UPMC Presbyterian-Montefiore and Children's pager 958-3844.

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(Discussion Continued)

Opioids are considered first-line pharmacologic agents for managing nonspecific dyspnea in patients with advanced disease.¹⁸ Although their mechanisms for relieving dyspnea are not well understood, they may decrease the chemoreceptor response to hypercapnia, increase peripheral vasodilatation with a decrease in cardiac preload, and decrease anxiety with the result of altering the perception of dyspnea.¹⁹⁻²¹ Opioids have also been shown to increase exercise tolerance for patients with COPD,²² improve dyspnea for patients with chronic congestive heart failure,²³ and mitigate dyspnea for patients with terminal cancer.²⁴ A Cochrane Database meta-analysis found that opioids have a small but statistically significant positive effect on breathlessness.²⁵

A wide variety of opioids have been demonstrated to mitigate dyspnea. Conventional wisdom holds that morphine is a better agent than other opioids for dyspnea relief; however, no studies demonstrate one opioid as having clear benefits over others.

Resolution of the Case: Ms. E. was started on Oxycodone 5-10mg po q3 hour's prn dyspnea. This helped significantly with her symptoms, and she tolerated the medication well. She was able to get out of the bed to the chair and work with physical therapy. Her oxygen requirement remained stable.

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