

Management of dyspnea in patients with advanced lung or heart disease

Practical guidance from the American College of Chest Physicians Consensus Statement

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KEY WORDS

ethical issues, opioid medications, oxygen therapy, patient-reported dyspnea

ABSTRACT

INTRODUCTION Patients with advanced lung or heart disease are not generally being treated consistently and effectively for relief of dyspnea.

OBJECTIVES The aim of the paper was to review available literature and to provide consensus statements using the Delphi method relevant to the topic condition.

PATIENTS AND METHODS A panel of experts of the American College of Chest Physicians (ACCP) defined the topic condition as “dyspnea that persists at rest or with minimal activity and is distressful despite optimal therapy of advanced lung or heart disease.” After a literature review, the panel developed 23 statements that were assessed for agreement/disagreement on a 5-point Likert scale using 2 rounds of the Delphi method.

RESULTS For the first round of the Delphi method, the survey was sent to the 15 expert panel members. Some statements were modified if deemed appropriate. For the second round of the Delphi method, 23 statements were sent to 56 clinicians from 5 relevant specialty NetWork steering committees of the ACCP. Agreement of at least 70% was achieved for 20 of the 23 statements.

CONCLUSIONS There was consensus that: patients with advanced lung or heart disease should be asked about the intensity and distress of their breathlessness; pursed-lips breathing, relaxation, oxygen for those with hypoxemia, noninvasive positive pressure ventilation, and oral/parental opioids can provide relief of dyspnea; therapies should be started with the understanding that the patient and clinician will reassess whether the specific treatments are relieving dyspnea without causing adverse effects; and it is important to communicate about palliative and end-of-life care.

INTRODUCTION Dyspnea is the primary complaint of patients with advanced lung or heart disease. For example, 94% of patients with chronic lung disease experience dyspnea in the last year of life.¹ In SUPPORT (Study to Understand Patient Preferences and Outcomes of Treatment), investigators found that dyspnea was the overriding complaint of patients who died of their chronic obstructive pulmonary disease (COPD), and that “serious dyspnea” was far more common (66%) than “serious pain” (25%).² These investigators reported that patients with COPD were

more likely to die with poor control of dyspnea than patients who had lung cancer.³

The experience of dyspnea includes sensory (how severe is it?) and affective (how unpleasant is it?) components. Based on a neurophysiological model, breathlessness is thought to be similar to the perception of pain.⁴ Clearly, both symptoms can result in human suffering, and dying patients fear breathlessness and pain. Anxiety, depression, and other psychological factors occur frequently in patients with advanced disease, and influence breathlessness.⁵ Dyspnea is a distressing symp-

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tom that requires attention, consideration, and treatment by healthcare providers.

The American College of Chest Physicians (ACCP) proposed a comprehensive literature review and the development of consensus statements to address the problem that patients with advanced lung or heart disease are not being treated consistently and effectively for the relief of dyspnea.⁶ The intent of the consensus statement was to increase awareness of the situation, to influence clinical practice, and to summarize management strategies that relieve dyspnea in patients with advanced disease. The panel agreed that this information was intended for the care of individual patients in whom medical therapy has been optimized, and the focus of treatment is on symptom management, relief of suffering, and maintenance of quality of life. After discussion and consideration, the target patient population was defined as “dyspnea that persists at rest or with minimal activity and is distressful despite optimal therapy of advanced lung or heart disease.” “Advanced” refers to progressive disease with a limited prognosis.

PATIENTS AND METHODS Literature search

A MEDLINE literature search was performed of English language articles on human subjects for the period of 1966 to 2008 to evaluate published studies on the topic condition, and to identify topic domains that would form the basis of the consensus survey. The following key terms were used to capture relevant studies:

- 1 patient population: advanced, severe, end-stage, end-of-life lung or heart disease
- 2 condition: dyspnea or breathlessness
- 3 intervention: treatment, therapy, palliation or palliative care, pharmacological, drug, opioids, nonpharmacological
- 4 other: measurement and ethics.

Patients with cancer were not included in this review because high-quality evidence is available on end-of-life care in this population.

The initial literature search focused on randomized controlled trials. Due to the paucity of data, the search was expanded to include prospective studies, case series, and systematic reviews. After the initial literature review was completed, a primary author for each of the 5 domains reviewed the articles, and critically added or removed references or review articles that he/she considered relevant. These materials were reviewed for inclusion/exclusion by a secondary author of the domain and the first 3 authors of the Consensus Statement. This information was then provided to the expert panel for review.

ACCP consensus development process and panel members

The consensus development process was organized following ACCP policy. Participation was obtained by open nomination from the ACCP membership through the ACCP NetWork system. NetWork committees consist of members of the ACCP who are physicians, nurses,

or other healthcare professionals with a specific interest in a particular topic. The expert panel members consisted of cardiopulmonary physicians and nurses who were selected based on their clinical and/or research expertise in evaluating and/or providing care to the patient population. A primary and a secondary author of the expert panel reviewed the results of the literature search and generated statements for each of the 5 domains. Each statement was then reviewed and, if deemed appropriate, revised by the panel members. Panel members also participated in the development and initial round of the Delphi survey.

Delphi method Agreement or disagreement of the consensus statements on the management of dyspnea in patients with advanced lung or heart disease was accomplished using a modified Delphi method,⁷ which is an established method for determining levels of agreement. The survey was distributed online, and participants responded independently to the questionnaire. Levels of agreement or disagreement were assessed for each statement on a 5-point Likert scale (TABLE 1).

For the first round, the survey was sent to 15 expert panel members, who independently rated agreement or disagreement for each of the 23 statements. Based on these responses, each statement was reviewed and modified, if deemed appropriate, to enhance clarity. For the second round, the 23 statements were sent to 56 clinicians from 5 relevant ACCP specialty NetWork steering committees.

Statistical analysis The results of the data analysis derived from the Delphi method are expressed as the percentage of respondents scoring an item either 4 (“somewhat agree”) or 5 (“agree”) on the 1–5 Likert scale (total agreement). Total agreement $\geq 70\%$ among the respondents was considered *a priori* to represent consensus for each statement.

RESULTS AND DISCUSSION Literature search

The literature search retrieved a total of 13 randomized controlled trials, 10 systematic reviews, 10 prospective studies, 7 retrospective studies, 7 case studies, and 2 topic reviews considered relevant to the management of dyspnea in the patient population. Studies that measured the effectiveness of an intervention for the relief of

TABLE 1 Likert scale used by respondents to report the level of agreement or disagreement for each statement

Level	Response
1	disagree
2	somewhat disagree
3	neither agree nor disagree
4	somewhat agree
5	agree

TABLE 2 Five domains identified from the literature search that related to the management of dyspnea in patients with advanced lung or heart disease

1	measurement of patient-reported dyspnea
2	oxygen therapy
3	other nonpharmacological treatment
4	opioid medications
5	ethical issues

dyspnea *during exercise* were excluded because the expert panel believed the target patient population would have difficulty performing exercise testing because of dyspnea at rest or during minimum activity. Five domains were identified that relate to the management of dyspnea in patients with advanced lung or heart disease (TABLE 2).

Delphi method For the first round of evaluation, 12 of the 15 panel members (80%) completed the survey. For the second round of evaluation, 34 of 56 individuals (61%) completed the survey. The 20 statements that achieved at least 70% agreement are reported below. Three statements did not achieve agreement (TABLE 3).

Domain: measurement of patient-reported dyspnea

- 1 Patients should be asked to routinely and regularly rate the intensity of their breathlessness as part of a comprehensive care plan (agreement 94%).
- 2 The patient-reported rating of breathlessness should be routinely documented in the medical record to guide management and interdisciplinary care (agreement 91%).
- 3 The assessment of dyspnea should include inquiry into the distress, meaning, and unmet needs that accompany breathlessness (agreement 100%).
- 4 The use of any particular instrument over another for the measurement of dyspnea is not suggested at the present time (agreement 74%).
- 5 Healthcare professionals are ethically obligated to treat dyspnea, and that patients and their

families should be reassured that they will be provided the means to effectively treat this symptom (agreement 97%).

6 Therapies should generally be started with the understanding that the patient and clinician will reassess whether specific treatments are serving the goal of palliating dyspnea without causing adverse effects (agreement 100%).

Asking patients to report the severity and/or distress of their breathlessness is recommended in order to assess its impact on an individual's health status and to provide a baseline value in order to evaluate the response to therapy.⁸⁻¹² This approach is analogous to the assessment of pain that is mandated in healthcare encounters to guide pain awareness and management.

Although dyspnea is multidimensional and includes both sensory and affective components, an initial strategy is to ask the patient to report the intensity or severity of breathlessness.¹⁰⁻¹³ The 0–10 scale,¹⁴ the visual analog scale,^{15,16} and the numerical rating scale¹⁷ have all been used to assess breathlessness in patients with advanced disease. However, none of these instruments has been shown to be superior in managing dyspnea in this patient population.¹⁷⁻²⁰

Domain: oxygen therapy

7 Supplemental oxygen can provide relief of dyspnea for patients who are hypoxemic at rest (agreement 76%).

8 Supplemental oxygen can provide relief of dyspnea for patients who are hypoxemic during minimal activity (agreement 74%).

Oxygen therapy is standard of care for the treatment of patients with hypoxemia. However, only limited information is available about the short-term effects of supplemental oxygen therapy on breathlessness at rest in patients with advanced lung disease. Two studies reported significant improvement in dyspnea with oxygen therapy,^{21,22} while 2 other studies found no benefit.^{23,24} No randomized controlled trials were identified that evaluated the effects of oxygen in reducing breathlessness in patients with advanced heart disease. For patients with advanced lung or heart disease who were not hypoxemic at rest, the literature search did not identify any studies evaluating the effects of supplemental oxygen for the relief of dyspnea.

Domain: other nonpharmacological therapies

9 Pursed-lips breathing (PLB) can be an effective strategy for relief of dyspnea (agreement 76%).

10 Relaxation can be an effective strategy for relief of dyspnea (agreement 85%).

11 Noninvasive positive pressure ventilation can provide relief of dyspnea (agreement 82%).

PLB is a breathing strategy often employed spontaneously by patients with COPD to relieve breathlessness. By promoting a slower and deeper breathing pattern, PLB improves physiological parameters – increases oxygen saturation and decreases carbon dioxide levels – that may affect

TABLE 3 Statements that did not achieve consensus

Number	Consensus statement	Agreement (%)	Range of responses
21	For patients with advanced lung or heart disease who are nonhypoxemic at rest or with minimal activity, supplemental oxygen can provide relief of dyspnea and improve exercise endurance.	47	1–5
22	For patients with advanced lung or heart disease, nebulized opioids do not provide equivocal or additional relief of dyspnea beyond that achieved with parenteral or oral opioids.	59	1–5
23	For patients with advanced lung or heart disease, fresh air or cool air movement with a fan directed toward the face can be an effective strategy for relief of dyspnea.	61	1–5

the perception of dyspnea.²⁵⁻²⁷ In addition, PLB may provide the patient with a sense of control over her/his breathing.

Patients with respiratory disease often describe that movement of cool air with a fan or fresh air reduces breathlessness.²⁸ Laboratory studies have shown that cold air directed on the cheek decreases dyspnea induced in healthy individuals.²⁹ However, there are no randomized controlled studies that have examined the use of a fan and/or cool air for the relief of dyspnea in patients with advanced lung or heart disease.

Two studies measured the effects of relaxation on perceived dyspnea at rest in patients with COPD.^{30,31} Gift et al.³⁰ found that patients reported less dyspnea after listening to a tape-recorded relaxation message compared with sitting quietly. Renfro³¹ reported that progressive muscle relaxation was effective in reducing dyspnea in patients with COPD after each of 4 weekly sessions ($P = 0.04$), but not at the end of the 4-week period.

The rationale for noninvasive positive pressure ventilation (NPPV) is that by unloading the respiratory muscles, the decreased work of breathing might provide relief of dyspnea. In 3 systematic reviews the authors concluded that use of NPPV improved patients' perception of dyspnea in those with advanced COPD or acute respiratory failure.³²⁻³⁴ In 4 randomized controlled trials, there was a modest to significant improvement in patient-reported dyspnea with NPPV.³⁵⁻³⁸ As relief of dyspnea with NPPV may not relate to changes in arterial blood gases, it is appropriate to reassess the breathlessness experienced by patients receiving such ventilatory support at frequent intervals.

The literature review did not find sufficient information on anxiolytic medications, antidepressants, phenothiazines, inhaled furosemide, inhaled lidocaine, music therapy, and acupuncture for relief of dyspnea in the target patient population.

Domain: opioid medications

12 Oral and/or parenteral opioids can provide relief of dyspnea (agreement 78%).

13 Opioids should be dosed and titrated for the individual patient with consideration of multiple factors (e.g., renal, hepatic, pulmonary function, and current and past opioid use) for relief of dyspnea (agreement 94%).

14 Respiratory depression is a widely held concern with the use of opioids for the relief of dyspnea (agreement 100%).

Opioids are the primary pharmacologic treatment for relief of dyspnea in patients with advanced disease.³⁹⁻⁴¹ Although oral morphine is the most commonly prescribed opioid for the relief of dyspnea, other medications include diamorphine, dihydrocodeine, fentanyl, hydromorphone, and oxycodone. Although there is anecdotal support for the use of nebulized opioids, data from 2 randomized controlled trials found that nebulized

morphine was no better than nebulized saline for relieving dyspnea.^{42,43} Furthermore, Jennings et al.³⁹ concluded that nebulized opioids did not relieve breathlessness.

Fear of "overdosing" and the development of respiratory depression are common concerns in caring for patients with advanced lung or heart disease who experience severe dyspnea. However, Chan et al.⁴⁴ reported that higher doses of opioids and benzodiazepines used in the withdrawal of life-sustaining treatment were not associated with a decreased time from withdrawal of life support to death. Of 11 studies that provided information on arterial blood gases or oxygen saturation, only 1 study reported any significant changes in oxygenation after opioid administration.⁴⁵ Although the arterial carbon dioxide partial pressure increased with opioid use, the value did not exceed 40 mmHg.⁴⁶ Other adverse effects that may occur with opioids include constipation, confusion, drowsiness, hallucinations, nausea/vomiting, and psychosis.

Domain: ethical issues for relief of dyspnea at end-of-life

15 Concerns about contributing to addiction and/or physical dependence should never limit effective treatment or palliation of dyspnea (agreement 81%).

16 The "principle of double effect" provides a rationale for using opioids or sedatives that might hasten death, provided that the purpose of increasing doses is to relieve dyspnea (agreement 72%).

17 Anxiety and depression frequently accompany dyspnea and require evaluation (agreement 97%).

18 Clinicians should understand that family members from some cultures may have different perspectives on the role of the family and who should be involved in decisions about treating dyspnea at the end of life (agreement 97%).

19 The clinician should anticipate differences in family perspectives and/or spiritual beliefs on the value of maintaining consciousness at the end of life and the value of suffering, and be prepared to apply principles of culturally effective end-of-life care to these situations (agreement 97%).

20 It is important for clinicians to communicate about palliative and end-of-life care with their patients (agreement 100%).

Major ethical issues include the obligation to treat or palliate dyspnea, appropriate opioid dosing, as well as associated concerns of addiction, cultural sensitivity, and effective communication. Many patients with advanced lung or heart disease have a tremendous concern about the experience of dying, and fear breathlessness and a "suffocating" feeling.⁴⁷⁻⁴⁹ Recent statements and guidelines have emphasized the obligation of physicians and nurses to use available treatments to relieve dyspnea in this patient population.^{12,40,41} The "principle of double effect"

provides a justification for using opioids and/or sedatives that might hasten death, as long as the purpose of titrating doses is to control or relieve symptoms.⁵⁰

There may be conflict among clinicians, patients, and family members about treating symptoms when clinicians and family members have different cultural perspectives on end-of-life care. Blackhall et al.^{51,52} noted that clinicians should understand that family members from some cultures may have different views on the role of the family and who should be involved in decisions about treating symptoms at the end of life. Patients and families may also vary on the value of maintaining consciousness at the end of life and whether there may be "value" in suffering. It is important to be prepared to apply principles of culturally effective end-of-life care in these situations.

There are reports that patients with advanced lung or heart disease receive poor quality palliative and end-of-life care compared with patients who have cancer.^{3,53-55} One reason for this is that patient-physician communication about end-of-life care is unlikely to occur.⁵⁶⁻⁵⁸ Understanding any barriers to this communication may be an important step to improving end-of-life care.⁵⁹ Although most patients with advanced disease would like to discuss end-of-life care with their physicians, few physicians actually discuss such issues with their patients.⁵⁶⁻⁵⁸

Summary Dyspnea is highly prevalent in patients with advanced lung or heart disease. Unfortunately, there is a paucity of scientific information on the management of this symptom in the medical literature.^{40,41,60-62} The majority of randomized controlled trials on this topic have focused on patients with advanced COPD, whereas information addressing dyspnea management in patients with advanced heart disease is very limited. After 2 rounds of the Delphi method, agreement among respondents was achieved for 20 of 23 statements that were generated based on review of the medical literature. It is important to remember that a high level of agreement among experienced clinicians does not necessarily reflect clinical practice.

Patients with advanced lung or heart disease should be asked to routinely and regularly rate the intensity of breathlessness, and that these ratings should be documented in the medical record. There was clear agreement on the use of oxygen to relieve dyspnea in hypoxemic patients even though the results of 4 randomized controlled trials do not demonstrate a consistent benefit. Although there was agreement for titrating doses of oral or parenteral opioids to relieve dyspnea in individual patients, there was uncertainty among respondents whether nebulized opioids provide equivocal or additional relief of dyspnea compared with systemic delivery.

Agreement was high that healthcare professionals are ethically obligated to treat dyspnea, and

that the effectiveness of specific treatments and possible side effects should be reassessed by both patients/families and the clinician. Seventy-two percent of respondents agreed with the statement that the "principle of double effect" provides justification for using opioids or sedatives to relieve dyspnea even though these medications might hasten death. This principle, along with other ethical issues, emphasizes the importance of communication among the patient, family members, and the clinician.

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Postępowanie w duszności u chorych z zaawansowanymi schorzeniami płuc lub serca

Praktyczne wskazówki z uzgodnionego stanowiska American College of Physicians

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SŁOWA KLUCZOWE

duszność w ocenie chorego, leki opioidowe, tlenoterapia, zagadnienia etyczne

STRESZCZENIE

WPROWADZENIE Chorzy na zaawansowane choroby płuc i serca najczęściej nie otrzymują spójnego i skutecznego leczenia zmniejszającego duszność.

CELE Celem pracy był przegląd dostępnego piśmiennictwa i uzgodnienie metodą delficką stanowiska dotyczącego omawianego tematu.

PACJENCI I METODY Zespół ekspertów American College of Chest Physicians (ACCP) zdefiniował omawiany stan chorobowy jako „duszność utrzymującą się w spoczynku lub przy minimalnym wysiłku, która jest uciążliwa mimo optymalnego leczenia zaawansowanych chorób płuc lub serca”. Po dokonaniu przeglądu piśmiennictwa zespół ekspertów opracował 23 stwierdzenia, które następnie poddano analizie zgody/niezgody za pomocą 5-stopniowej skali Likerta z uwzględnieniem 2 rund metody delfickiej.

WYNIKI W 1. rundzie metody delfickiej ankietę wysłano 15 członkom zespołu ekspertów. Niektóre stwierdzenia zmodyfikowano, jeśli uznano to za właściwe. W 2. rundzie 23 stwierdzenia wysłano do 56 lekarzy zasiadających w komitetach sterujących 5 specjalistycznych grup (NetWork) ACCP. Zgodę na poziomie $\geq 70\%$ osiągnięto dla 20 z 23 stwierdzeń.

WNIOSKI Uzgodniono, że: chorych z zaawansowaną chorobą płuc lub serca należy pytać o nasilenie i uciążliwość duszności; oddychanie przez „zasnurowane usta”, relaksacja, tlen u chorych z hipokseią, nieinwazyjna wentylacja mechaniczna dodatnim ciśnieniem oraz opioidy doustnie lub pozajelitowo mogą przynieść ulgę w duszności; leczenie należy wdrażać rozumiejąc, że pacjent i lekarz oceniają, czy dana metoda przynosi ulgę w duszności bez powodowania działań niepożądanych; ważne jest mówienie o opiece paliatywnej i opiece u schyłku życia.

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