Practice Guidelines

High-Flow Nasal Oxygen for Acute Respiratory Failure: Guidelines From the American College of Physicians

Key Points for Practice

- HFNO use reduces all-cause mortality compared with NIV in hypoxemic respiratory failure.
- When respiratory failure occurs after extubation, positive airway pressure or face mask oxygen may be equal to or more effective than HFNO at reducing symptoms.
- Aerosol generation is a significant risk of using HFNO.

From the *AFP* Editors

High-flow nasal oxygen (HFNO) is commonly used in acute respiratory failure. Acute hypoxemic respiratory failure is defined as an oxygen saturation below 88% or a baseline partial pressure of arterial oxygen to fractional inspired oxygen concentration ratio of less than 200 mm Hg. In HFNO, warm and humidified oxygen is supplied by nasal cannula at a flow rate up to 60 L per minute. Other options for treating respiratory failure include noninvasive ventilation (NIV) with continuous or bilevel positive airway pressure ventilation and conventional oxygen therapy with low-flow nasal oxygen or oxygen delivered by face mask. The American College of Physicians published guidelines for use of HFNO in adults based on a systematic review focusing on all-cause mortality, hospital length of stay, hospital-acquired pneumonia, intubation/reintubation, intensive care unit admissions, and patient comfort.

Initial Management of Acute Respiratory Failure

Evidence for HFNO in initial management of acute respiratory failure is limited. In one small study of hypoxemic respiratory failure, HFNO use reduced all-cause mortality with a number needed to treat (NNT) of 6 (95% CI, 5 to 17) compared with NIV. In hypoxemic or hypercapnic respiratory failure, HFNO appears to reduce the need for intubation while increasing patient comfort without reducing dyspnea or length of stay. Evidence is insufficient to determine the impact on intensive care admissions or length of stay.

Compared with conventional oxygen by nasal cannula or face mask, the benefits of HFNO are less certain. Use of HFNO resulted in similar mortality, hospitalization, intubation, and hospital length of stay vs. conventional oxygen. HFNO does appear to reduce dyspnea and improve patient comfort compared with conventional oxygen. A separate review demonstrated that NIV leads to better outcomes than conventional oxygen in respiratory failure.

Respiratory Failure After Extubation

When respiratory failure occurs after extubation, use of HFNO does not improve all-cause mortality or reduce reintubations compared with NIV, and data suggest that outcomes might be worse with HFNO. Use of HFNO does not improve any outcome, including dyspnea, patient comfort, or length of stay in the intensive care unit. Outcomes were similar with HFNO and conventional oxygen, with a suggestion of reduced intubations with HFNO.

Review Limitations

Few studies specified the type of respiratory failure. Studies of HFNO excluded patients with pulmonary embolism, pulmonary arterial hypertension, asthma, or a history of lung transplant.

Coverage of guidelines from other organizations does not imply endorsement by *AFP* or the AAFP.

This series is coordinated by Michael J. Arnold, MD, contributing editor.

A collection of Practice Guidelines published in *AFP* is available at https://www.aafp.org/afp/practguide.

CME This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 18.

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HFNO Implementation

HFNO is generally well tolerated and has few contraindications. As an aerosol-generating procedure, HFNO requires higher grades of personal protective equipment. HFNO is generally more expensive than conventional oxygen but less expensive than NIV.

The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the U.S. Army, Department of Defense, or the U.S. government.

Editor's Note: The NNT was calculated by the authors using data provided in the guidelines.

Although the evidence base is limited, the American College of Physicians makes a strong case for the use of HFNO in respiratory failure. HFNO use reduces mortality, intubations, and pneumonia rates compared with continuous or bilevel positive airway pressure as long as respiratory failure does not occur after extubation. Data limitations are demonstrated by the conundrum that HFNO is superior to NIV but not to conventional oxygen, even though another review found that NIV is superior to conventional oxygen. More study should help resolve this paradox.—Michael J. Arnold, MD, Contributing Editor

Guideline source: American College of Physicians

Evidence rating system used? Yes

Systematic literature search described? Yes

Guideline developed by participants without relevant financial ties to industry? Yes

Recommendations based on patient-oriented outcomes? Yes

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Answers to This Issue's CME Quiz

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