

Newer method of oxygen delivery for patients at risk of respiratory failure after surgery

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A relatively new, easier to implement, and better-tolerated method to provide supplemental oxygen to patients at risk of respiratory failure after surgery did not result in a worse rate of treatment failure compared to a more commonly used method, according to a study appearing in *JAMA*. The study is being released to coincide with its presentation at the American Thoracic Society 2015 International Conference.

After [cardiothoracic surgery](#), acute respiratory failure is common and associated with an increased risk of illness and death. When low-flow [oxygen therapy](#) is insufficient to correct hypoxemia (abnormally low level of oxygen in the blood), [noninvasive ventilation](#) is often used to avoid reintubation (reinsertion of a breathing tube) and improve outcomes. A moderate level of evidence supports noninvasive ventilation to treat postoperative respiratory failure. However, this technique is difficult to implement, requires substantial resources, and may cause patient discomfort. High-flow nasal oxygen therapy is continuous oxygen delivery through a nasal cannula (a device that consists of a tube that splits into two prongs placed in the nostrils). High flow nasal oxygen therapy is increasingly used because of ease of application, tolerability for [patients](#), and other theoretical clinical benefits and may constitute an important alternative to noninvasive ventilation, according to background information in the article.

Francois Stephan, M.D., Ph.D., of the Centre Chirurgical Marie Lannelongue, Le Plessis Robinson, France, and colleagues randomly assigned 830 patients who had undergone cardiothoracic surgery (such as

coronary artery bypass grafting or heart valve repair) to receive high-flow nasal oxygen therapy delivered continuously through a nasal cannula (flow, 50 L/min; n = 414) or bilevel positive airway pressure (BiPAP) delivered with a full-face mask for at least 4 hours per day (n = 416). Patients were included when they developed acute respiratory failure or were deemed at risk for respiratory failure after extubation (removal of a breathing tube) due to preexisting risk factors. The study was conducted at 6 French intensive care units. The primary outcome for the trial was treatment failure, defined as reintubation, switch to the other study treatment, or premature treatment discontinuation (patient request or adverse effects).

The researchers found that high-flow nasal oxygen therapy was not inferior (not worse than) to BiPAP: with BiPAP, treatment failure occurred in 91 of 416 patients (21.9 percent) compared with 87 of 414 (21.0 percent) with high-flow nasal oxygen. No significant differences were found for intensive care unit mortality (23 patients with BiPAP [5.5 percent] and 28 patients with high-flow nasal oxygen therapy [6.8 percent]) or for any of the other secondary outcomes, including number of nurse interventions for unplanned device readjustment and respiratory complications.

Dyspnea (labored breathing) and comfort scores during the first 3 days were similar in both groups.

"Among patients undergoing cardiothoracic surgery with or at risk for [respiratory failure](#), the use of high-flow nasal oxygen compared with intermittent BiPAP did not result in a worse rate of [treatment failure](#). The findings support the use of high flow nasal oxygen therapy in this patient population," the authors write.

In an accompanying editorial, Lorenzo Del Sorbo, M.D., and Niall D. Ferguson, M.D., M.Sc., of the University of Toronto, comment on

findings of this trial.

"How should clinicians apply the results of the trial by Stephan et al in clinical practice? The answer is, as usual, it depends. In centers with considerable expertise with noninvasive ventilation (NIV) and for patients who are hypercapnic [an excess of carbon dioxide in the blood], a reasonable approach would be to favor NIV in this setting.

Alternatively, based on these data and others, for many postoperative patients high-flow nasal cannulae appear to be a viable alternative that is better tolerated and may lead to noninferior clinical outcomes."

More information: [DOI: 10.1001/jama.2015.5213](https://doi.org/10.1001/jama.2015.5213)
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