F&P Optiflow

Flow Matters

EDITION 2

25 May 2021

Clinical practice guidelines

"This clinical practice guideline synthesizes current best-evidence into four recommendations for [NHF] use..."

- Rochwerg et al. Intensive Care Med. 2020.[1]

Nasal High Flow (NHF) therapy is recommended for use in several applications by published guidelines. A clinical practice guideline for NHF use as a respiratory strategy in adult patients requiring respiratory support was recently published in Intensive Care Medicine,[1] the official journal of The European Society of Intensive Care Medicine (ESICM).

Summary

A multinational panel of experts examined the body of NHF evidence and made these recommendations for its use compared to conventional oxygen therapy (COT)[1]:

Strong recommendation
for primary respiratory support in acute hypoxemic respiratory failure.

Conditional recommendation
for primary respiratory support in post-cardiothoracic surgery patients with obesity and/or high risk of postoperative respiratory complication.

No recommendation
for pre-oxygenation of patients being intubated in the ICU (with a suggestion to continue NHF to pre-oxygenate those already receiving it).

Conditional recommendation
for post-extubation respiratory support following extubation in those intubated for more than 24 hours and with any one or more feature of high risk of post-extubation failure.

Recommendations

Figure 1. These recommendations were made for NHF therapy as a strategy for adult patients requiring respiratory support:

Acute hypoxemic respiratory failure

For primary respiratory support compared to COT.

Recommendation made with moderate certainty.

Post-operative

For primary respiratory support compared to COT in high risk and/or obese patients following cardiac or thoracic surgery.

Recommendation made with moderate certainty.

Peri-intubation

For pre-oxygenation prior to in-ICU intubation no recommendation is made compared to COT.

NHF during intubation should be continued for patients who are already receiving NHF.*

Post-extubation respiratory failure

For post-extubation respiratory support compared to COT following extubation.

Recommendation made with moderate certainty.

Strong Recommendation	Conditional Recommendation	Continue NHF*	Conditional Recommendation

* For patients who are already receiving NHF, guideline authors suggest continuing NHF during intubation (conditional recommendation, moderate certainty).

www.fphcare.com

Fisher & Paykel HEALTHCARE

Interpreting the strength of recommendations

Interpretation of the strength of the recommendations was provided for clinicians:

Strong recommendation	Conditional recommendation
Most individuals should receive the recommended course of action. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator. Formal decision aids are not likely to be needed to help individuals make decisions consistent with their values and preferences.	Different choices are likely to be appropriate for different patients and therapy should be tailored to the individual patient's circumstances. Those circumstances may include the patient or family's values and preferences.

Implementation

"There is broad evidence that there is a substantial gap between the healthcare that patients receive and the practice that is recommended - also known as the research-practice gap, evidence-practice gap or knowing-doing gap. Evidence suggests that it sometimes takes more than a decade to implement research results in clinical practice..."
Kristensen et al. BMC Health Services Research. 2016.[2]

It is important that awareness of the guidelines and adoption of the recommendations are advocated amongst the clinical community so that clinical practice continues improving and patients receive recommended care.

The clinical practice guideline highlights the cost effectiveness of NHF compared to COT for acute hypoxemic respiratory failure:

"Cost-effectiveness data suggests a net cost savings with [NHF] compared to COT in the range of 500–1000 British Pounds per patient (600–1200 US Dollars or Euros [equivalent currency]). This cost-effectiveness considers both the cost of the equipment but also the cost savings in intubations avoided. Consequently, [NHF] was judged by the panel to be associated with at least moderate cost savings."

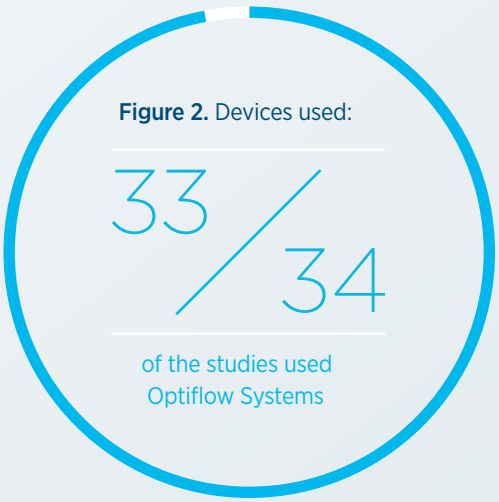

Figure 2. Devices used:

The systematic reviews with meta analyses supporting the clinical practice guidelines[3-6] analyzed data from 34 published studies (mostly RCTs)[7-40] and one study abstract.[41] A review by Fisher & Paykel Healthcare showed that of the 34 published and analyzed studies, 33 used F&P Optiflow Systems, including a F&P Optiflow patient interface and a F&P humidity delivery system with humidity setting of 37 °C. See Figure 2.

When selecting a NHF system, it is important to ensure the entire system, including device capabilities such as flow rate and humidity delivery, can provide the therapy to deliver the expected outcomes proven in the clinical body of evidence.

Definitions

F&P Optiflow System: A F&P purpose-built system for NHF – either an Airvo™ Optiflow System or a non-Airvo Optiflow System.

Airvo Optiflow System: A F&P Airvo with integrated flow source, humidifier and humidity delivery kit (F&P heated breathing tube and F&P auto-fill chamber). Used with a F&P Optiflow patient interface and able to accompany the patient throughout the hospital independent of medical air supply. Note that Airvo 2's intended use is for spontaneously breathing patients only.

Non-Airvo Optiflow System: A F&P humidifier (e.g. MR850 system) and humidity delivery system (F&P heated breathing tube and F&P auto-fill chamber). Used with a F&P Optiflow patient interface and an independent flow generator such as a HFNC-capable ventilator.

For further information, please visit www.fphcare.com/optiflow or click on the hyperlinked reference below.

1. Rochwerg B, Einav S, Chaudhuri D, et al. The role for high flow nasal cannula as a respiratory support strategy in adults: a clinical practice guideline. Intensive Care Med. 2020 Dec;46(12):2226-2237.
2. Kristensen N, Nymann C, Konradsen H. Implementing research results in clinical practice- the experiences of healthcare professionals. BMC Health Serv Res. 2016;16:48.
3. Rochwerg B, Granton D, Wang DX, et al. High flow nasal cannula compared with conventional oxygen therapy for acute hypoxemic respiratory failure: a systematic review and meta-analysis. Intensive Care Med. 2019 May;45(5):563-572.
4. Granton D, Chaudhuri D, Wang D, et al. High-Flow Nasal Cannula Compared With Conventional Oxygen Therapy or Noninvasive Ventilation Immediately Postextubation: A Systematic Review and Meta-Analysis. Crit Care Med. 2020 Nov;48(11):e1129-e1136.
5. Chaudhuri D, Granton D, Wang DX, et al. Moderate Certainty Evidence Suggests the Use of High-Flow Nasal Cannula Does Not Decrease Hypoxia When Compared With Conventional Oxygen Therapy in the Peri-Intubation Period: Results of a Systematic Review and Meta-Analysis. Crit Care Med. 2020 Apr;48(4):571-578.
6. Chaudhuri D, Granton D, Wang DX, et al. High-Flow Nasal Cannula in the Immediate Postoperative Period: A Systematic Review and Meta-analysis. Chest. 2020 Nov;158(5):1934-1946.
7. Rittayamai N, Tscheikuna J, Praphruetkit N, Kijpinyochai S. Use of High-Flow Nasal Cannula for Acute Dyspnea and Hypoxemia in the Emergency Department. Respir Care. 2015 Oct;60(10):1377-82.
8. Bell N, Hutchinson C, Green T, et al. Randomised Control Trial of Humidified High Flow Nasal Cannulae Versus Standard Oxygen in the Emergency Department. Emerg Med Australas. 2015 Dec;27(6):537-541.
9. Jones PG, Kamona S, Doran O, et al. Randomized Controlled Trial of Humidified High-Flow Nasal Oxygen for Acute Respiratory Distress in the Emergency Department: The HOT-ER Study. Respir Care. 2016 Mar;61(3):291-9.
10. Makdee O, Monsomboon A, Surabenjawong U, et al. High-Flow Nasal Cannula Versus Conventional Oxygen Therapy in Emergency Department Patients With Cardiogenic Pulmonary Edema: A Randomized Controlled Trial. Ann Emerg Med. 2017 Oct;70(4):465-472.e2.
11. Parke RL, McGuinness SP, Eccleston ML. A preliminary randomized controlled trial to assess effectiveness of nasal high-flow oxygen in intensive care patients. Respir Care. 2011;56(3):265-270.
12. Frat JP, Thille AW, Mercat A, et al. High-flow Oxygen Through Nasal Cannula in Acute Hypoxemic Respiratory Failure. N Engl J Med. 2015 Jun 4;372(23):2185-96.
13. Lemiale V, Mokart D, Mayaux J, et al. The Effects of a 2-h Trial of High-Flow Oxygen by Nasal Cannula Versus Venturi Mask in Immunocompromised Patients With Hypoxemic Acute Respiratory Failure: A Multicenter Randomized Trial. Crit Care. 2015 Nov 2;19:380.
14. Azoulay E, Lemiale V, Mokart D, et al. Effect of High-Flow Nasal Oxygen vs Standard Oxygen on 28-Day Mortality in Immunocompromised Patients With Acute Respiratory Failure: The HIGH Randomized Clinical Trial. JAMA. 2018 Nov 27;320(20):2099-2107.
15. Parke R, McGuinness S, Dixon R, Jull A. Open-label, Phase II Study of Routine High-Flow Nasal Oxygen Therapy in Cardiac Surgical Patients. Br J Anaesth. 2013 Dec;111(6):925-31.
16. Corley A, Bull T, Spooner A, et al. Direct Extubation Onto High-Flow Nasal Cannulae Post-Cardiac Surgery Versus Standard Treatment in Patients With a BMI ≥30: A Randomised Controlled Trial. Intensive Care Med. 2015 May;41(5):887-94.
17. Stéphan F, Barrucand B, Petit P, et al. High-Flow Nasal Oxygen vs Noninvasive Positive Airway Pressure in Hypoxemic Patients After Cardiothoracic Surgery: A Randomized Clinical Trial. JAMA. 2015 Jun 16;313(23):2331-9.
18. Ansari BM, Hogan MP, Collier TJ, et al. A Randomized Controlled Trial of High-Flow Nasal Oxygen (Optiflow) as Part of an Enhanced Recovery Program After Lung Resection Surgery. Ann Thorac Surg. 2016;101(2):459-464.
19. Futier E, Paugam-Burtz C, Godet T, et al. Effect of early postextubation high-flow nasal cannula vs conventional oxygen therapy on hypoxaemia in patients after major abdominal surgery: a French multicentre randomised controlled trial (OPERA). Intensive Care Med. 2016;42(12):1888-1898.
20. Brainard J, Scott BK, Sullivan BL, et al. Heated humidified high-flow nasal cannula oxygen after thoracic surgery - A randomized prospective clinical pilot trial. J Crit Care. 2017;40:225-228.
21. Yu Y, Qian X, Liu C, Zhu C. Effect of High-Flow Nasal Cannula versus Conventional Oxygen Therapy for Patients with Thoracoscopic Lobectomy after Extubation. Can Respir J. 2017;2017:7894631.
22. Sahin M, El H, Akkoç I. Comparison of Mask Oxygen Therapy and High-Flow Oxygen Therapy after Cardiopulmonary Bypass in Obese Patients. Can Respir J. 2018 Jan 28;2018:1039635.
23. Zochios V, Collier T, Blaudszun G, et al. The effect of high-flow nasal oxygen on hospital length of stay in cardiac surgical patients at high risk for respiratory complications: a randomised controlled trial. Anaesthesia. 2018;73(12):1478-1488.
24. Pennisi MA, Bello G, Congedo MT, et al. Early nasal high-flow versus Venturi mask oxygen therapy after lung resection: a randomized trial. Crit Care. 2019;23(1):68. Published 2019 Feb 28.
25. Tatsuishi W, Sato T, Kataoka G, Sato A, Asano R, Nakano K. High-Flow Nasal Cannula Therapy With Early Extubation for Subjects Undergoing Off-Pump Coronary Artery Bypass Graft Surgery. Respir Care. 2020;65(2):183-190.
26. Vourc'h M, Asfar P, Volteau C, et al. High-flow nasal cannula oxygen during endotracheal intubation in hypoxemic patients: a randomized controlled clinical trial. Intensive Care Med. 2015;41(9):1538-1548.
27. Simon M, Wachs C, Braune S, de Heer G, Frings D, Kluge S. High-Flow Nasal Cannula Versus Bag-Valve-Mask for Preoxygenation Before Intubation in Subjects With Hypoxemic Respiratory Failure. Respir Care. 2016;61(9):1160-1167.
28. Jaber S, Monnin M, Girard M, et al. Apnoeic oxygenation via high-flow nasal cannula oxygen combined with non-invasive ventilation preoxygenation for intubation in hypoxaemic patients in the intensive care unit: the single-centre, blinded, randomised controlled OPTINIV trial. Intensive Care Med. 2016;42(12):1877-1887.
29. Guitton C, Ehrmann S, Volteau C, et al. Nasal high-flow preoxygenation for endotracheal intubation in the critically ill patient: a randomized clinical trial. Intensive Care Med. 2019;45(4):447-458.
30. Frat JP, Ricard JD, Quenot JP, et al. Non-invasive ventilation versus high-flow nasal cannula oxygen therapy with apnoeic oxygenation for preoxygenation before intubation of patients with acute hypoxaemic respiratory failure: a randomised, multicentre, open-label trial. Lancet Respir Med. 2019;7(4):303-312.
31. Maggiore SM, Idone FA, Vaschetto R, et al. Nasal High-Flow Versus Venturi Mask Oxygen Therapy After Extubation. Effects on Oxygenation, Comfort, and Clinical Outcome. Am J Respir Crit Care Med. 2014 Aug 1;190(3):282-8.
32. Hernández G, Vaquero C, González P, et al. Effect of Postextubation High-Flow Nasal Cannula vs Conventional Oxygen Therapy on Reintubation in Low-Risk Patients: A Randomized Clinical Trial. JAMA. 2016 Apr 5;315(13):1354-61.
33. Hernández G, Vaquero C, Colinas L, et al. Effect of Postextubation High-Flow Nasal Cannula vs Noninvasive Ventilation on Reintubation and Postextubation Respiratory Failure in High-Risk Patients: A Randomized Clinical Trial. JAMA. 2016 Oct 18;316(15):1565-1574.
34. Song HZ, Gu JX, Xiu HQ, Cui W, Zhang GS. The value of high-flow nasal cannula oxygen therapy after extubation in patients with acute respiratory failure. Clinics (Sao Paulo). 2017;72(9):562-567.
35. Fernandez R, Subira C, Frutos-Vivar F, et al. High-flow nasal cannula to prevent postextubation respiratory failure in high-risk non-hypercapnic patients: a randomized multicenter trial. Ann Intensive Care. 2017;7(1):47.
36. Jing G, Li J, Hao D, et al. Comparison of high flow nasal cannula with noninvasive ventilation in chronic obstructive pulmonary disease patients with hypercapnia in preventing postextubation respiratory failure: A pilot randomized controlled trial. Res Nurs Health. 2019;42(3):217-225.
37. Schwabbauer N, Berg B, Blumenstock G, et al.. Nasal high-flow oxygen therapy in patients with hypoxic respiratory failure: effect on functional and subjective respiratory parameters compared to conventional oxygen therapy and non-invasive ventilation (NIV). BMC Anesthesiol. 2014 Aug 7;14:66.
38. Ng I, Krieser R, Mezzavia P, Let al. The use of Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE) for pre-oxygenation in neurosurgical patients: a randomised controlled trial. Anaesth Intensive Care. 2018 Jul;46(4):360-367.
39. Vourc'h M, Baud G, Feuillet F, et al. High-flow Nasal Cannulae Versus Non-invasive Ventilation for Preoxygenation of Obese Patients: The PREOPTIPOP Randomized Trial. EClinicalMedicine. 2019 Jun 5;13:112-119.
40. Rittayamai N, Tscheikuna J, Rujiwit P. High-flow nasal cannula versus conventional oxygen therapy after endotracheal extubation: a randomized crossover physiologic study. Respir Care. 2014 Apr;59(4):485-90.
41. Theerawit P, Natpobsuk N, Sutherasan Y: The efficacy of the WhisperFlow CPAP. system versus high flow nasal cannula in patients at risk for postextubation failure: Int Care Med. 2017:206.

www.fphcare.com

Fisher & Paykel HEALTHCARE