High-Flow Nasal Cannula

PURPOSE: To outline the use of the high-flow nasal cannula (HFNC) for spontaneously breathing patients.

SUPPORTIVE DATA:

HFNC is a high flow device that can deliver 21-100% FiO2 at 2-60 L/min. The HFNC device allows the Respiratory Care Practitioner (RCP) to set the FiO2, the flowrate, and the temperature of the gas.

Wall outlet oxygen is delivered through a flowmeter to the HFNC device. The HFNC device blends the incoming oxygen with room air to deliver a a specific FiO2 at a high flow rate. Water is added to a heater in order to deliver moisture with gas delivery. This moisture increases patient comfort, enhances mucociliary activity in secretion removal, and decreases the work of breathing.

The high flow rate delivered may wash out CO2 thus improving oxygenation. A positive end expiratory pressure (PEEP) effect may occur which prevents the alveoli from completely closing. The PEEP effect enhances oxygenation and decreases the work of breathing.

HFNC may benefit patients with disease processes that cause severe hypoxemic respiratory failure such as pneumonia, COPD, and acute lung injury. Contraindications include hypercapnic patients, and those with maxillary facial trauma, unstabilized head or neck injury, active hemorrhage with hemodynamic instability, and suspected pneumothorax.

RCP initiates set up per provider order, monitors, and adjusts parameters of the HFNC.
Flowrate adjustments:
10 to 60 L/min (in increments of 5 L/min) (default)
2 to 25 L/min (in increments of 1 L/min) (Junior Mode)

ASSESSMENT:

1. Assess provider order for flow rate, FiO2 and SpO2 range
2. Assess the respiratory system a minimum of every 4 hours (ICU/PCU/ Telemetry), every 8 hours (wards), and as indicated including:
    - Breath sounds
    - Cough
    - Sputum
    - Signs of respiratory distress (see table 1)
    - Skin under nasal cannula and tubing
3. Monitor and record vital signs a minimum of every 2 hours (ICU/PCU) and every 4 hours (wards, Telemetry), including:
    - SpO2 monitoring- (see table 2)
4. Ensure the following on the equipment
    - Water is at the correct level in the humidifier
    - Tubing connected securely from patient to point of origin
5. Document HFNC settings with vital signs
    - FiO2
    - Flow rate
6. Assess nares and head for skin breakdown every 4 hours

DISCONTINUATION:

7. When HFNC is discontinued by a provider's order, discard all disposable plastic equipment, place a bag or other covering for the unit, and call RCP
    - If used on COVID positive patient, clean equipment with SaniCloth and place notification outside of bag "COVID Isolation"

SAFETY:

8. Apply Padding or hydrocolloid (Mepilex) dressing under devices pressure areas. (Usually Mepilex to the cheeks and padding to the top of ears).
9. Verify with RCP appropriate size and placement of the cannula prongs (to reduce the risk of nares pressure injury)

REPORTABLE CONDITIONS:

10. Notify RCP if problem with HFNC noted
11. If patient condition deteriorates (e.g. has respiratory distress, or decrease in oxygen saturation per provider order) and **is not** a DNR/DNI, contact Rapid Response Team and provider

PATIENT/FAMILY TEACHING:

12. Instruct the following:
    - Purpose of the HFNC
    - To inform the nurse of any difficulty breathing
    - Prone positioning for the conscious patient with COVID-19
      - For 2 hours, three times per day

TRANSPORTING:

13. Assess if patient can tolerate a non-rebreather mask:
    - If yes, transfer with non-rebreather mask
    - If no, transfer with transport HFNC
14. Notify RCP for assistance

DOCUMENTATION:

15. Document the following in electronic health record:
    - SpO2
    - SpO2 location (if continuous)
    - Oxygen therapy (High-Flow)
    - FiO2
    - Oxygen flow rate

Table 1
Signs of Respiratory Distress

Early	Late
Restlessness	Shortness of breath
Dyspnea	Tachycardia
Confusion	Labored and rapid breathing
Tiredness	Thick frothy sputum
Low blood pressure	Abnormal breath sounds (Crackles)
Change in patient behavior	Cyanosis (Blue skin, nails, and lips)
• Disorientation	
• Mood swings	
• Altered level of consciousness	

	Normal	Respiratory Distress
General appearance	Calm, quiet, not anxious	Distressed, anxious, obviously fighting for breath. Exhausted, decreased LOC
Speech	Normal conversation, with no difficulty	Progresses from short sentences to phrases to words only to non-verbal
Chest auscultation	Quiet, no wheezes or crackles	Wheezes, crackles, silent chest, inspiratory stridor
Respiratory rate	Adults 12-16 breaths per/minute	Tachypnea greater than 24/breaths per min
Respiratory effort	Minimal apparent effort	Marked chest/abdominal movement of accessory muscles, intercostal retraction. Sternal retraction
Pulse rate	60-80/beats per min	Tachycardia greater than 100/min
Skin	Pink, Normal	Sweaty, pale, may be flushed Cyanosis is a late sign
Conscious state	Alert and oriented	altered
SpO2	96% or greater on room air	

Table 2
High Flow Nasal Canula Usage

High flow oxygen delivery requires pulse oximetry as follows:

Environment	FiO_2 Range	SPO_2 Monitoring	Code Status
ICU/ER	Any	Continuous	Any
PCU	#40-60%	Continuous	Any
Telemetry	≤ 40 %	Continuous	Any
Med-Surg Units	>/= 90%	Every 4 hours with vital sign checks*	DNR/DNI

*Med-Surg Units
Pulse oximetry monitoring is not required for patients who are on comfort measures, or for patients who are DNR/DNI ***and*** are at the highest levels of FiO2 (>/= 90%) whereby there is no further intervention (i.e.: respiratory escalation) to treat a patient in severe respiratory failure.

#PCU
1. If the patient has a set FiO2 60% or higher **AND** has had a stable SpO2 without upward titration for 2 hours they can go to the PCU
2. If the patient has required upward titration to achieve a decent SpO2 within the two-hour window preceding transport to ICU; they should go to the ICU

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