Guideline for the use of High Flow Nasal Cannula (HFNC)

INTRODUCTION:

Oxygen Therapy is a treatment used when patients need extra oxygen to breathe. There are different devices through which oxygen can be delivered with “low flow systems (nasal cannula or simple face masks) or high flow systems (venturi mask, non rebreathers)”. Oxygen therapy is the first line treatment in management of hypoxaemic acute respiratory failure. The choice of specific device is based on the severity of the hypoxaemia.

HFNC is considered relatively safe for patients under airborne or droplet precautions but a face-mask should still be placed over the HFNC to minimize risk of dispersing infectious droplets or particles.

The HFNC system allows for the provision of increased oxygen concentration at higher flow rates, while at the same time providing optimal heated humidity via nasal interface or direct tracheostomy connection. HFNC may also improve patient comfort and compliance with the therapy.

Studies have shown beneficial effects in adult patients in terms of reduction of respiratory rate and dyspnea, greater comfort and improved oxygenation.

STARTING THERAPY (AIRVO)

High flow nasal cannulation therapy may be beneficial in the following situations:

- Hypoxaemic acute respiratory failure
- Post-extubation respiratory failure
- Acute cardiogenic pulmonary edema
- Post-surgical hypoxaemia
- Hypothermic core body temperature
- Poor tolerance with conventional high flow oxygen delivery devices
- High oxygen requirements
- Pre-oxygenation and airway management in operation theater
- Pre-oxygenation and rapid sequence of intubation in Intensive Care Units
- Oxygen administration during invasive procedures

EQUIPMENT:

- Personal Protective Equipment
- HFNC breathing circuit with humidifier chamber
- HFNC machine
- Sterile water for injection
- HFNC nasal cannula (small, medium, or large chosen to fit the patient)
- Oxygen Supply

✓ The HFNC machine should be fixed on a pole mounting tray below the head of the patient. Install water chamber and breathing circuit. Connect oxygen to the specific flowmeter of the HFNC machine.

✓ When commencing therapy on a new patient, ensure that the disinfection cycle was completed. During device start up, a green traffic light confirms that the HFNC is safe for use on a new patient. An orange traffic light confirms that the equipment has not been cleaned and disinfected since last use and is not safe for use on a new patient.

FLOWCHART FOR INITIATION OF HFNC:

Before turning on the HFNC, connect the water chamber and breathing tube. Make sure to connect the appropriate flow meter for the HFNC.

Press and hold the on/off button to turn the equipment on.

After the equipment is turned on it will show summary screen which includes settings such as temperature, flow and Fio2

To change the settings, press the mode button to open the menu

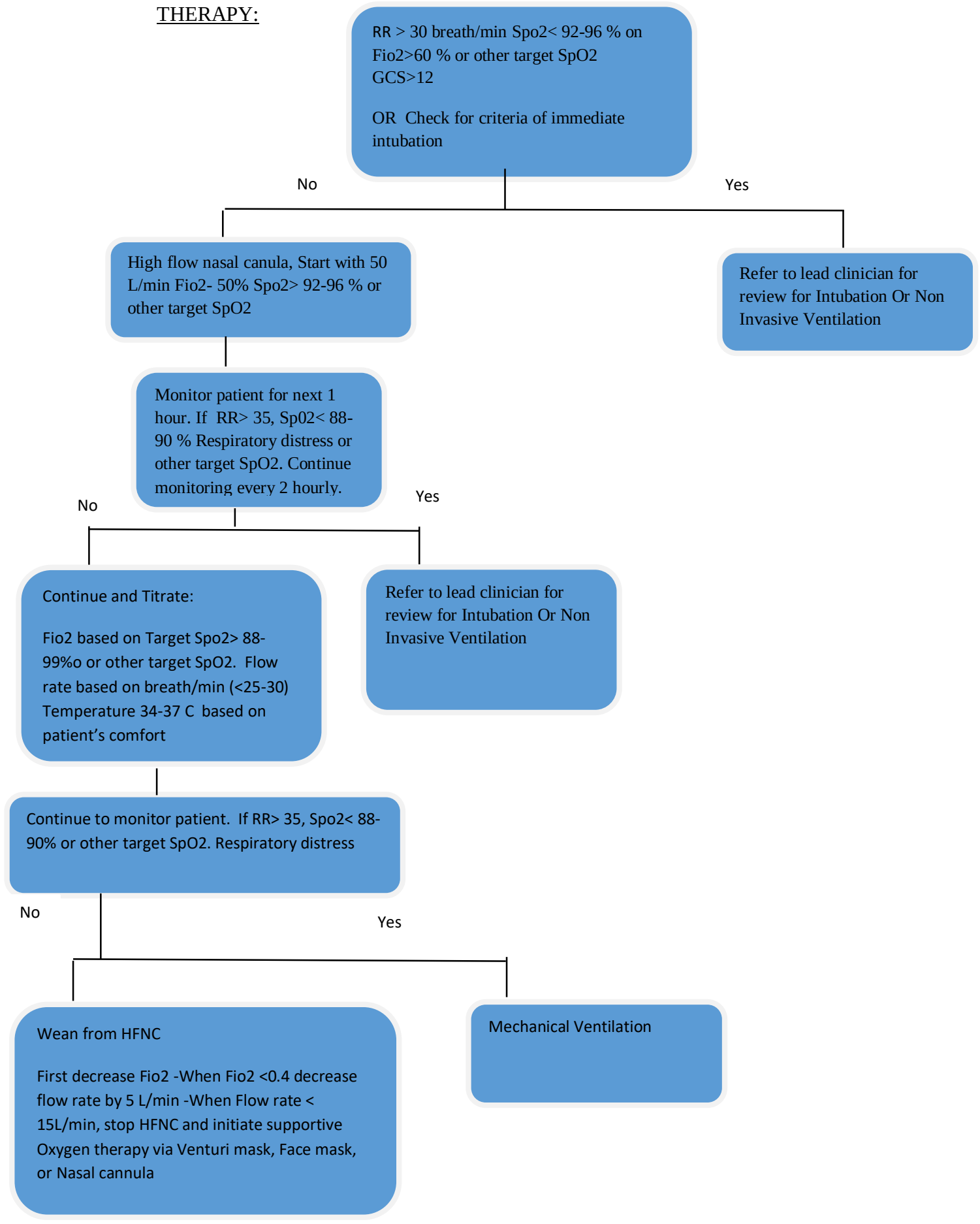
The equipment needs to be unlocked to change the settings. Hold down both the up and down buttons for 3 seconds to remove the lock.

Now each setting can be changed and the therapy can be started.

When the HFNC is no longer in use, disconnect the water chamber and breathing tube. Press and hold the on/off button to turn the equipment off.

Clean and disinfect the equipment.

ALGORITHM FOR INITIATION, TITRATION AND STOPPING HFNC THERAPY:



TROUBLESHOOTING:

Equipment Related:

- The unit must be placed below the head height of the patient so that condensate will drain towards the water chamber away from the patient.
- If excess condensate accumulates in the breathing tube, disconnect the patient interface and allow the condensate to drain into the water chamber by lifting the patient end of the tube
- At higher target flow rates, it may be necessary to first reduce the target flow rate to 30 litres/minute or below, to ensure that the condensate drains into the water chamber.
- Minimize local sources of cooling action on the heated breathing tube i.e. fan to cool the patient or AC/Vent
- Check for kinks of nasal cannula and breathing circuit
- The HFNC circuit and interface should be changed if it is visibly soiled or worn out.
- Do not clean the left hand chamber port of the machine as this can damage the non-return valve located at this port.
- Do not block or insert anything inside the ventilation port of the machine.
- Disinfection of the equipment must be done after use with each patient.
- Power supply to the equipment should not be interrupted during the therapy.

Patient related:

- Select the appropriate size nasal prong for patient's age and size. Ensure proper placement of the nasal cannula because poor placement can cause blockage of the cannula and also explain to patients regarding complications like bleeding or an alarm signal.
- Secure the straps of the nasal cannula behind the patient's head. Ensure that straps and tubing are away from the patient's neck to prevent risk of airway obstruction.
- Do not place the patient on HFNC therapy immediately after switching on the device. Wait for a few minutes until the device has reached the programmed temperature (34 to 37 degree Centigrade) and humidification. Immediate use may cause discomfort to the patient.

- Ensure that there is continuous supply of sterile water for the humidification chamber to ensure patients comfort.
- For Titration of HFNC therapy please follow the given algorithm above.
- HFNC may cause vasodilation of nasal mucosa and may lead to abundant mucus which can compromise the effectiveness and tolerance of the therapy. It is essential to maintain adequate nasal hygiene and support with expectoration (e.g. sterile water nebulization or hypertonic saline nebulization) in these patients.

CONTRAINDICATIONS:

Abnormalities or surgery of face, nose or airway that preclude an appropriate fitting nasal cannula

COMPLICATIONS:

Abdominal distention

Aspiration and rarely barotrauma (pneumothorax)

Bleeding/Epistaxis

Trauma

Dry or inflamed sclera, ocular mucosal pemphigoid oedema

REFERENCES:

Hyzy, R. C. (2018). Heated and humidified high-flow nasal oxygen in adults: Practical considerations and potential applications. *UpToDate. Waltham (MA): UpToDate*.

Renda, T., Corrado, A., Iskandar, G., Pelaia, G., Abdalla, K., & Navalesi, P. (2018). High-flow nasal oxygen therapy in intensive care and anaesthesia. *British journal of anaesthesia*, *120*(1), 18-27.

https://www.fphcare.com/us/hospital/adult-respiratory/optiflow/airvo-2-system/ Retrieved on 2020/11/03

Ischaki, E., & Pantazopoulos, I. (2019). Blow with the high flow" an updated algorithm. *J Emerg Crit Care Med*, *3*, 61-61.

Vianello, A., Arcaro, G., Molena, B., Turato, C., Sukthi, A., Guarnieri, G., ... & Navalesi, P. (2020). High-flow nasal cannula oxygen therapy to treat patients with

hypoxemic acute respiratory failure consequent to SARS-CoV-2 infection. *Thorax*, *75*(11), 998-1000.

Drake, M. G. (2018). High-flow nasal cannula oxygen in adults: an evidence-based assessment. *Annals of the American Thoracic Society*, *15*(2), 145-155.

Díaz-Lobato, S., Perales, J. M. C., Íñigo, J. M. A., Alises, S. M., & Segovia, B. (2018). Things to Keep in Mind in High Flow Therapy: As Usual the Devil is in the Detail. *Int J Crit Care Emerg Med*, *4*, 048.

Suffredini DA, Allison MG. A Rationale for Use of High Flow Nasal Cannula for Select Patients With Suspected or Confirmed Severe Acute Respiratory Syndrome Coronavirus-2 Infection. J Intensive Care Med. 2021 Jan;36(1):9-17. doi: 10.1177/0885066620956630. Epub 2020 Sep 10. PMID: 32912049.

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* 46, 2226–2237 (2020).