Effective May 2020

Guideline for Initiation of HFJV for ELBW's (Preferred mode during COVID-19 pandemic)

Rationale for Current Approach. With a current shortage of mechanical ventilators in many hospitals during the COVID-19 pandemic, we must be strategically utilize our resources to conserve respiratory support equipment as much as possible. Early placement of ELBWs on HFJV (High Frequency Jet Ventilator) may decrease duration of mechanical ventilation, is a gentle type of pulmonary support, and has the ability for us to ventilate safely with a lower MAP (Mean Airway Pressure).

Indications for Preferential Use of Jet Ventilation

- Gestation <=28w or birth weight <= 1000g
- Any ELBW requiring surfactant and or participating in "The Golden Hour CPG"
- Any ELBW who fails a trial of Bubble CPAP (CPAP 6 cm H20 and FiO2 greater than 30%)

Method

- Judicious use of sedation is preferred for initiation of ventilation among ELBWs.
- Options for analgesia (fentanyl or morphine per our current DAGs):
  - **Fentanyl**

    - 1 mcg/kg/dose q1hrs prn OR 1 mcg/kg/hr IV for pain
    Titrate as needed

  - **Morphine**

    - 0.05-0.1 mg/kg/dose IV q2hr prn
    Continuous infusion: 0.01 mg/kg/hr

- Intubate with appropriate size ETT and secure to proper depth (estimated at 6+weight in kg)

- Confirm placement with auscultation of equal bilateral breath sounds and +EtCO2 color change and obtain CXR.
- Trim ETT with sterile scissors and replace with inline suction adapter and catheter. Confirm depth of catheter for suctioning and administration of surfactant.

- Continue to provide manual PPV as needed
- Suction via ETT as needed before administration of surfactant.

- Swap out suction catheter for MAC and advance to set depth. Keeping patient supine and flat, administer surfactant in 1 aliquot over 1 minute carefully providing manual PPV throughout.
  - Patient may require increased PIP, rate, and fio2 during this procedure.
  - Vital signs, chest rise, compliance, and resistance must be monitored closely for adverse effects.
  -Close monitoring for rapid improvement in compliance after surfactant administration to avoid overventilation and lung injury
- Withdraw catheter and continue PPV
- When patient has recovered from administration (vital signs stable, fio2 weaned), place patient on HFJV.

Initial Settings

- HFJV Rate: 300 (for sicker babies, 360)
- HFJV I-time: 0.02
- HFJV PIP: 18-22 (want to achieve visible chest wall movement)
- HFJV PEEP: 6
- No backup rate
- Goal is to minimize settings and decrease settings to minimize volutrauma especially during rapid improvement in compliance following surfactant administration.

<u>Monitoring</u>

- Initiate TCOM (Transcutaneous Monitoring) ASAP, before surfactant is given if possible.
- Check a blood gas (CBG) 15 minutes after starting HFJV and no longer than 1 hour later. Do not wait for the central line to be placed to obtain your first gas. Rapid improvement in compliance may occur with surfactant administration and this can lead to a precipitous drop in PCO2, especially when the baby is on HFJV.

- Be prepared to rapidly wean HFJV settings according to blood gas and TCOM readings.
  - Increases in Servo Pressure readings provide a good indication of increased lung compliance and ability to wean.
- Obtain a CXR no later than an hour after initiating the HFJV.

Weaning

- Wean per blood gas or TCOM reading (acceptable blood gas values for ELBW's with pH 7.25-7.35, PCO2 50-65)
- Reduce Jet PIP **(delta P)** at least 1-2 cm H2O per change whenever PCO2 decreases below threshold and check frequent blood gases and further modify until target blood gas results are achieved.
- If PCO2 is still too low **(< 35 mm Hg)** on minimal PIP and minimal delta P, and if the infant is not ready for extubation, decrease frequency to 300 bpm and then to 240 bpm to decrease alveolar ventilation.
- If CXR is over expanded, consider decreasing HFJV rate or PEEP.

Extubation

- Patients are usually ready for a trial of extubation to Bubble CPAP when they meet the following respiratory support criteria:

  - **RDS:** PEEP or MAP ≤ 7 - 8 cm H2O with FiO2 ≤ 0.35 and Jet PIP <= 15. Extubate to a Bubble CPAP of 7 or 8 cm H2O.
  - **BPD:** PEEP or MAP ≤ 10 - 12 cm H2O with FiO2 ≤ 0.45 and Jet PIP 18-20. Extubate to a Bubble CPAP of 8 - 10 cm H2O.