Acute Respiratory Distress Treatment Plan (synonyms in EMR: neuromuscular blockade, cisatracurium, NMBA, ARDS)

VENTILATION ORDERS

- Ardsnet protocol must be followed
- Ardsnet link

NURSING ORDERS

- PRIOR TO STARTING COTINUOUS NEUROMUSCULAR BLOCKING AGENT (NMBA):
  - Orders for continuous analgesia (opioid infusion) and sedation (midazolam or propofol) must be ordered.
  - Disregard previous analgesia and sedative goals, as continuous NMBA requires deeper analgesia and sedation to prevent awareness while NMBA is in use.
  - Ensure Richmond Agitation Sedation Scale (RASS) score is -5 and Bispectral index score (BIS) is < 60 prior to achieving TOF baseline and starting continuous NMBA.
  - Obtain baseline train-of-four (TOF).
  - The **same** TOF device should be used for all TOF assessments at the **same** voltage used for the baseline assessment.
  - TOF technique
    - Placement: ulnar or posterior tibial nerve
    - Pattern: impulses will be seen on the thumb or great toe
      - If four twitches are not observed, increase the milliamps (mA) until four twitches are observed. Increase until the largest repose is seen e.g. – if 50 mA was selected, and the thumb twitch is largely pronounced, increase to 60 mA, and observe again – if the response is the same as at 50 mA, decrease back to the 50 mA - **this is supramaximal stimulation point or baseline**

- THROUGHOUT DURATION OF CONTINUOUS NMBA:
  - Patients must be maintained on both an analgesic and sedative medication (i.e. need both fentanyl plus Propofol and/or midazolam regardless of BIS). Dexmedetomidine is not a suitable sedative while on NMBA.
  - Do not decrease dosage of sedation or analgesia while patient is receiving a continuous NMBA.
  - Goal BIS < 60. Alert MD if patient BIS is outside of goal range for > 5 minutes during use of continuous neuromuscular blockade.
  - Do not titrate TOF voltage. The same voltage must be used for all TOF assessments. If you cannot obtain the desired level of twitches, contact covering MD or PharmD for assistance.
  - Tube feeds should be started and continued while patient is on continuous NMBA.

- TRAIN OF FOUR (TOF) MONITORING:
  - Whichever TOF monitoring device is selected, use same device and voltage throughout entirety of patient's TOF assessments
  - For help with trouble shooting, see Procedure Manual
  - If at any point, the TOF assessment is 0, go through trouble shooting first, then contact MD/PharmD to determine if cisatracurium infusion rate should be decreased
  - Frequency of Clinical Endpoint and TOF monitoring
    - Prior to initiation of NMBA
    - Hourly after initiation or titration of NMBA until clinical endpoints are achieved then every 4 hours thereafter
    - Every 4 hours as long as clinical endpoint is achieved
    - Hourly after NMBA discontinuation until TOF is 4/4

MEDICATION ORDERS

- ANALGESIA - discontinue previous analgesia orders, as use of continuous NMBA requires more analgesia and sedation to prevent awareness.
    - Fentanyl bolus, drip, prn
        - Fentanyl 50 mcg/mL: 100 mcg, Intravenous, ONCE
        - Fentanyl 50 mcg/mL (tot vol 50 mL) infusion: 0.2 mcg/kg/min x Ideal Body Weight, Intravenous, CONTINUOUS
            - Titration: 0.2 mcg/kg/hr every 15 minutes to a goal RASS of – 5 and BIS of < 60. Do not titrate down during continuous NMBA infusion. For rates greater than 3 mcg/kg/hr, contact covering provider.

- SEDATION – discontinue previous sedative orders, as use of continuous neuromuscular blockade requires more analgesia and sedation to prevent awareness while blocked.
    - Propofol (DIPRIVAN) continuous infusion
        - Propofol (DIPRIVAN) 10 mg/mL premix infusion: 5 mcg/kg/min x Ideal Body Weight, Intravenous, continuous
            - Maintain a RASS of -5 and BIS of < 60. Do not titrate down while patient is on continuous NMBA.
            - Titration: 5 mcg/kg/min every 5 minutes.
            - Maximum rate: 50 mcg/kg/min.
            - Reduce infusion rate by 1/2 for SBP less than 90 mm Hg. Notify physician if patient has hemodynamic instability or if target sedation score not achieved at maximum dosages.
            - Bottles (vials) once spiked should be used within 12 hours.

    - Midazolam (VERSED) continuous infusion
        - Midazolam (VERSED) 100 mg in NS 100 mL premix infusion: 0.5 mg/hr, Intravenous, CONTINUOUS
            - Select indication for midazolam: Sedation. Maintain a RASS of -5 and BIS of < 60. Do not titrate down while patient is on continuous NMBA.
            - Titration: 0.5 mg/hr every 30 minutes.
            - Maximum rate: 10 mg/hr.
            - Notify physician if patient has hemodynamic instability or if target sedation score not achieved at maximum dosages.

- NEUROMUSCULAR BLOCKING AGENT
    - Cisatracurium bolus & drip – Preferred Continuous NMBA
        - Assess trial of cessation at 48 hours and then reassess every 24 hours
        - Required: Independent double check
        - All paralytics must have an order for sedation and analgesia
        - GOAL: Titrate infusion to meet the following clinical parameters.
            - Patient is not breathing over the vent
            - Patient is not coughing with suctioning
            - Patient does not have a gag reflex
        - Titrate up or down to above goal. Use the Titration Chart to determine appropriate rate changes based on clinical parameters and train of four (TOF).
        - Notify physician if patient has hemodynamic instability or if desired paralysis is not achieved.
        - Titration: Follow chart link
        - Maximum rate: 10 mcg/kg/min.

Recommend initial infusion rates of: Cisatracurium 2 mcg/kg/min		
Goal: Clinical parameters achieved Titration Chart		
Clinical Endpoint/ Goal Achieved?	**TOF**	**Recommended Titration**
Yes	1-4/4	Continue current dose
No	1-4/4	Increase paralytic dose by 0.5 mcg/kg/min
Yes	0/4	Troubleshoot* and decrease paralytic dose by 0.5 mcg/kg/min
No	0/4	Troubleshoot* and increase paralytic dose by 0.5 mcg/kg/min

*Check placement of TOF, ensure paralytic is running correctly, try alternate TOF monitoring device

NUTRITION ORDERS

- Select tube feed
- Rate @ 10hr (trickle)
- Hold tube feeds 1 hour prior to the prone turn, resume at previous rate once patient is placed in prone position.

PROPHYLACTIC MEDICATIONS

- Eye care
  - LACRILUBE (artificial tear with lanolin ophthalmic ointment): both eyes, EVERY 8 HOURS (SCHEDULED)
    - Apply scheduled ointment while patient is paralyzed. Discontinue once patient no longer on continuous neuromuscular blockade.
- Ventilator associated pneumonia (VAP) prophylaxis – if not already ordered
  - Chlorhexidine gluconate (PERIDEX) 0.12% mouthwash: 15 mL, Topical, 2 TIMES DAILY
    - Apply topically to oral mucosa while intubated. Discontinue once patient no longer intubated
- Stress ulcer prophylaxis - if not already ordered
  - Famotidine (PEPCID) 10 mg/mL injection – adjust for impaired renal function
    - 20 mg, INTRAVENOUS, EVERY 12 HOURS
  - Famotidine (PEPCID) 20 mg tablet – adjust for impaired renal function
    - 20 mg, NG/OG/PEG/GT , EVERY 12 HOURS
- VTE Prophylaxis – if not already ordered
  - Patients on continuous NMBA are considered high VTE risk
    - Insert drop-down menu similar to high-risk VTE orders: MICU order-set.
  - Sequential compression devices are not recommended for use alone unless meds are contraindicated. Consider ordering along with one of the below drug choices.
  - Please select only one chemoprophylaxis order. Medications are the preferred prophylaxis for this level of risk. Adding sequential compression devices and selecting no medication are additional considerations. If you order no medication for this patient for VTE prophylaxis, please select the "No med ordered at this time" and indicate rationale.
  - Sequential compression device panel (must keep both orders)
  - Heparin 5,000 units/mL SubQ injection
    - 5,000 Units, Subcutaneous, EVERY 8 HOURS (SCHEDULED)
  - Enoxaparin (LOVENOX) 40 mg/0.4 mL SubQ injection (recommended that CrCl should be greater than 30mL/min)
    - 40 mg, Subcutaneous, EVERY 24 HOURS
  - VTE PROPHYLAXIS MEDICATION/MECHANICAL DEVICE NOT ORDERED AT THIS TIME
  - PATIENT REFUSED PROPOSED VTE PROPHYLAXIS MEDICATION