PEDIATRIC NEWBORN MEDICINE CLINICAL PRACTICE GUIDELINES

Guideline for Early Management of Respiratory Distress Among Infants Born Before 37 Weeks of Gestation

Points of emphasis/Primary changes in practice:

Initial approach depends on gestational age:

- **<26 weeks: low threshold for intubation and surfactant administration followed by volume targeted ventilation**
- **27-33 weeks: trial of CPAP preferred approach**
- **>33 weeks: CPAP or INSURE**

Clinical Guideline	Early Management of Respiratory Distress Among Infants Born Before 37 Weeks of Gestation
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Contact Person	Medical Director of Respiratory Therapy Director of Respiratory Therapy
Approved By	Pediatric Newborn Medicine Clinical Practice Council __10/19/17___ CWN PPG _12/10/2017___ BWH SPP Steering _12/17/2017____ Nurse Executive Board/CNO _01/08/2018___

This is a clinical practice guideline. While the guideline is useful in approaching the Early Management of Respiratory Distress Among Infants Born Before 37 Weeks of Gestation, clinical judgement and / or new evidence may favor an alternative plan of care, the rationale for which should be documented in the medical record. It is expected that clinicians will use these guidelines in conjunction with frequent clinical assessments that incorporate close serial physical examinations as well as radiographic and laboratory data.

I. Purpose:

The purpose of these guidelines is to establish a framework of optimal management of respiratory distress and failure among infants born preterm to support normal lung development and avoid complications such as pneumothorax or other air leaks and Bronchopulmonary Dysplasia (BPD).

IIa. Nursing PPG's

All CPGs reflect the NICU Nursing Standards of Care. All relevant nursing PPGs are listed below.

NICU/SCN Standards of Care
NICU/SCN B.1 Arterial and Venous Blood Drawing
NICU/SCN B.6 Blood Gas Sampling
NICU/SCN N.4 Placement and Use of Nasal/Oral Feeding Tube
NICU/SCN O.1 Use of Vented Oral Gastric Feeding Tube (OGT) with Continuous Positive Airway Pressure (CPAP) in the NICU
NICU/SCN O.4 High and Low Flow O2 Administration via Nasal Cannula
NICU N.1 Neutral Head Positioning Guidelines
NICU S.2 Endotrachial Tube Suctioning

IIb. Respiratory Care Policies and Procedures

All CPGs reflect the relevant respiratory care policies and procedures. The specific policies and procedures pertaining to this CPG will be updated and linked to this document as soon as possible.

III. Clinical Management of Respiratory Distress, stratified by gestational age.

There are significant differences in the clinical course of respiratory distress and failure among infants born at different gestational ages. We therefore propose individualized approaches to care for three major gestational age groups: i) at or before 26 weeks, ii) 27-33 weeks and iii) beyond 33 weeks.

A. Infants born at or before 26 weeks of gestation

We strongly encourage consideration of **early intubation and surfactant administration** in this most vulnerable population.

- We recommend that, if clinically indicated, infants in this group undergo intubation in the delivery room and be brought to the NICU on gentle NeoPuff ventilation. In the NICU, the following interventions will be promptly administered: chest x-ray confirmation of optimal endotracheal tube placement, surfactant administration ideally within 1 hour of birth, and initiation of volume targeted ventilation.

- If these infants do not receive surfactant and are on CPAP in the early stages of their disease course, noninvasive support should be limited to CPAP 6 cm and FiO2 0.30 before opting to intubate and administer surfactant. This should preferably be administered via mask and bubble, rather than prongs and ventilator CPAP.

- If these infants are on mechanical ventilation, we propose the use of the Drager ventilator with a volume-targeted ventilation strategy, beginning at 4 ml/kg to permit the infants to self-wean.

- When on minimal settings, we encourage extubation to CPAP with the use of caffeine to increase respiratory drive and enhance extubation success. This will require close clinical vigilance to identify early signs of failure and need for re-intubation.

B. Infants born at 27-33 weeks of gestation

These babies may be more robust than the <27 week babies and nasal CPAP is the preferred mode of respiratory support beginning in the delivery room and delivered by nasal mask and bubble. This approach is worth trying even for the baby who requires brief PPV for perinatal resuscitation, provided their work of breathing and saturations are acceptable.

- In order for CPAP to be effective, CPAP should be initiated as soon as possible after the baby is born. Once the CPAP device is on, it should not be removed for pictures, baths and lengthy exams. As always the bedside team will assess whether mask or prongs need to be interchanged based on the baby's nasal condition and overall respiratory circumstances.
- Similar thresholds for intubation and surfactant are recommended, as follows: 27-30 weeks (CPAP 6 and FiO2 > 0.30) and 30-33 weeks (CPAP 7 and FiO2 > 0.30).
- Caffeine treatment is recommended within the first 12 postnatal hours in all babies <30 weeks and as indicated among those born >30 weeks of gestation.

Additional points of emphasis include:

- frequent clinical assessments should be done to recognize early failure of CPAP
- blood gas analysis showing adequate gas exchange should not preclude intubation and surfactant administration if the amount of support and work of breathing are high. Specific guidelines for the amount of support considered high are provided for each gestational age group.

C. Infants born beyond >33 weeks of gestation

These infants often compensate very well until they become fatigued and rapidly decompensate. They rapidly become hypoxic and may develop complications such as pneumothoraces, hypotension and apnea. In addition, their initial chest x-rays often are not typical of surfactant deficiency, even when the disorder is present. The clinical progression with a failure to improve rapidly and increasing work of breathing, often is the hallmark of early subclinical surfactant deficiency and assists in separating the disorder from the more benign condition, retained fetal lung fluid.

- Bubble CPAP is preferred as initial therapy for infants in this category who do not show immediate respiratory failure. The same thresholds for intubation and surfactant administration are recommended (CPAP 7 and FiO2 >30%).
- Increased work of breathing often is a more helpful determinant in making the decision to intubate than a blood gas that shows adequate gas exchange among this population of infants to avoid progressive atelectasis and differential aeration among lung segments, both of which predispose to pneumothorax.

IV. Additional Considerations

A. Managing Discomfort

We advocate non-emergent intubation occur with the benefit of sedation, even recognizing that this might preclude the strict application of the INSURE (INtubate, SURfactant, Extubate) approach. Please see the Clinical Practice Policy for Premedication for Non-Emergent Endotracheal Intubation in the Neonate referenced here.

Options for analgesia:

- Fentanyl 1-2 mcg/kg x1 (lowest dose recommended for infants born before 26 weeks of gestation or with known or suspected airway compromise). This is the preferred option due to its rapid onset and shorter duration of action.
- MSO4 0.05-0.1 mg/kg x1 (lowest dose recommended for infants born before 26 weeks of gestation or with known or suspected airway compromise)

Option for sedation:

- Among infants >33 weeks, the addition of Midazolam 0.1 mg/kg x1 may be considered.

The plan for sedation and analgesia while intubated are beyond the scope of this guideline. However, this is an important consideration.

Subsequent Surfactant Doses

- There should be close ongoing clinical assessment and consideration of a second dose of surfactant 12 hours after the first dose with the goal of decreasing the risk of pneumothorax and shortening the course of the disease.
- The baby might especially benefit if he/she has received the initial dose of surfactant beyond one hour of age
- Additional doses of surfactant may be administered beyond 12 hours of age, as long as the infant is still <48 hours old.

B. INSURE Approach

Until we gain additional experience with this approach in older infants, we do not recommend the INSURE approach for infants born <32 weeks gestation

C. Guidelines for NIPPV

NIPPV has no role in the management of early stages of RDS, rather it is a modality that has been used to avoid re-intubation in the later stages of evolving lung disease. Specific guidelines for the use of NIPPV will be included in the "Care of the ELBW" imperative.

References

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