Respiratory Support Protocol for Extremely Low-GA (< 28 weeks) & Extremely Low-Birth-Weight (< 1kg) Newborns in the First 72 hrs

In the Delivery Room

- Min # of personnel: 2 RNs, 1RT per newborn
- Delivery room temp: 74°F
- 8/10Fr deep-suction catheter size
- Place infant in poly-ethylene wrap
- Do not stimulate
- CPAP 5cmH2O upon arrival to radiant warmer
- PPV at 20/5 cmH2O
- Starting FiO2 30%
- Call pharmacy re: D5AA/D10AA, Caffeine, Abx
- *Consider bringing proper-size mask, surfactant, and Fisher/Paykel nasal prong*

≤ 23 6/7 weeks | **≥ 24 0/7 weeks**

Intubation with 2.5mm ETT (2.0mm only if 2.5mm does not fit)

Non-invasive (Fisher/Paykel nasal prong)

HR < 100, and/or Significant work of breathing

Yes | No

HR < 100, and/or Significant work of breathing

Yes | No

Consider:
Surfactant
Increase pressure
Comfort care

TO NICU

In the NICU: maintain FRC with adequate pressure to minimize FiO2

Invasive support

Surfactant (1st dose)
for all within 2 hrs of life

Curosurf: 2.5mL/kg via ETT
Verify ETT tip position with x-ray first
administer with infant supine, in 2-4 aliquots, before HFOV

High-frequency oscillator ventilation
as the primary mode of ventilation

MAP: start with 10; adjust based on daily x-ray (goal of 9-10 rib expansion)
Hz: 15, consider decreasing by 1 if ΔP > MAP x3
ΔP: start at MAP x2 + 2, increase until chest wiggle visible

Respiratory status monitoring
for HFOV adjustment

Chest x-ray: daily + PRN
Blood gas: daily + PRN
TCM: continuous as able
PDA screening: if clinically/radiographically indicated (FiO2 > 30%, pulmonary edema, etc.)

HFOV settings: Hz 15, ΔP < MAP x2
Chest x-ray: Good expansion
Blood gas: pCO2 in reasonable range

Yes | No

Inavise NAVA for up to 24 hrs to assess respiratory drive and diaphragmatic strength

Size-appropriate Edi catheter by RT (not for feeding)
Set PEEP (5-7 to meet Edi-min goal 0.5-1),
FiO2 (per HFOV setting), PS (12), apnea time (3-5)
Set level (1-6) to meet Edi-peak goal of 5-15, start at 2
Set backup: PIP (20), PEEP (5-7), Rate (30), PS (12), i-Time (0.35)

PEEP > 7 with FiO2 > 21% after 24 hrs → Yes

No

Chest x-ray: Good expansion
Blood gas: pCO2 in reasonable range

PEEP 5-7 with FiO2 21%
NAVA Level ≥ 2: unreliable diaphragmatic strength
NAVA Level < 2: reliable diaphragmatic strength
Backup mode: > 10% unreliable/no drive

Non-invasive support

Surfactant (1st dose)
for all within 2 hrs of life

Curosurf: 2.5mL/kg via LISA
Premedication (atropine) per physician preference
Slow push over 5-10 min while on CPAP

reliable drive | strong diaphragm

bubble CPAP
(follow protocol)

PEEP level equivalent to MAP of other mode: 5-10 cmH2O (min of 5)
(Kidman et al. 2023: Extubating to CPAP 8-10cmH2O is safe & more likely to be successful

Fisher/Paykel nasal interface
FiO2 goal 21-25% | SpO2 goal 88-95%

unreliable/no drive | weak diaphragm

non-invasive NAVA

Initial settings
PEEP: 6, adjust based on chest x-ray & FiO2
Level: 4, adjust to meet Edi-peak goal of 5-15
Trigger Edi: 0.5, Apnea time: 3-5 sec
Backup: PIP 20, Rate 30, PS 12, i-Time 0.35

Fisher/Paykel nasal interface
FiO2 goal 21% | SpO2 goal 88-95%

Level ≤ 1 with normal work of breathing and pCO2 in reasonable range

Yes | No

Neurally-adjusted ventilatory assist (NAVA)

PIP = level x (Edi-peak - Edi-min) + PEEP
PEEP, NAVA level, and apnea time should only be adjusted with a physician order

Edi-peak goal: 5-15
increase level to decrease Edi-peak

Edi-min goal: 0.5-1
increase PEEP to decrease Edi-min

Apnea time = guaranteed respiratory rate
3 sec = 60/3 = 20 breaths/min; 5 sec = 60/5 = 12 breaths/min

Example:
PEEP = 6, level = 4, Edi-min = 1, Edi-peak = 4
Esimated PIP = 4 x (4-1) + 6 = 18
Action: consider weaning level to 2 for an anticipated Edi-peak = 7, because 2 x (7-1) + 6 = 18

Note:
Except for FiO2, respiratory support settings, whether escalating, weaning, or mode change, should be guided by a neonatologist's order during this period.

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