**MUSC**
Children's Hospital

*PHYSORDER*

Neonatal Ventilator Management Order for
Conventional Pressure-Limited Ventilation
Page 2 of 4

Form Origination Date: 7/05
Version: 1                                    Version Date: 3/08

**Patient Name** _____
**MRN**
**PATIENT IDENTIFICATION LABEL**

**Tidal Volume (TV) (cc/kg/breath)**: Adjust with change in $\Delta P$ (PIP – PEEP), typically, **but not always**, by altering PIP.

Avoid reduction of PEEP below 4 – 5 cm $H_2O$ in an effort to avoid "atelectrauma". Note: PIP refers to the total inspiratory pressure (PEEP plus incremental pressure over PEEP)

| **Tidal Volume (TV) (cc/kg/breath)** | < 3 | 3 | 4 | 5 | 6 | > 6 |
|---|---|---|---|---|---|---|
| | IE | T | No need to wean | W | W | IE |
| Alternate Interpretation | | | | | | |

**Minute Ventilation (MV) (usually 240 – 360 cc/kg/min)**: Adjust with $\Delta P$ or ventilator rate, with goal of reducing TV first, then rate.

| **Minute Ventilation (MV) (usually 240 – 360 cc/kg/min)** | < 160 | 160 - 240 | 240 - 360 | 361 - 400 | > 400 |
|---|---|---|---|---|---|
| | IE | T | W | W | IE |
| Alternate Interpretation | | | | | |

**BLOOD GAS RESULTS: (Based on expectations for arterial samples; adjustments should be made for venous / capillary samples.)**

**pH**: Evaluate whether pH outside of desired range is of respiratory or metabolic origin before making ventilator change.

If of respiratory origin, adjust minute ventilation as outlined above. If $paO_2$ / $O_2$ saturation less than desired, wean rate rather than PIP.

| **pH** | < 7.25 | 7.25 – 7.27 | 7.28 – 7.35 | > 7.35 |
|---|---|---|---|---|
| | IE | T | W | IE |
| Alternate Interpretation | | | | |

**$PCO_2$**: Adjustment made by manipulating minute ventilation as outlined above. If $paO_2$ / $O_2$ sats less than desired, wean rate rather than PIP.

☐ Changes should be made based on $pCO_2$ rather than pH

| **$PCO_2$** | < 41 | 41 - 45 | 46 - 55 | 56 - 60 | > 60 |
|---|---|---|---|---|---|
| | IE | W | W | T | IE |
| Alternate Interpretation | | | | | |

*PHYSORDER*
Neonatal Ventilator Management Order for
Conventional Pressure-Limited Ventilation
Page 3 of 4

Form Origination Date: 7/05
Version: 1                                Version Date: 3/08

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**PaO$_2$**: Adjust by manipulating mean airway pressure (primarily by adjusting PEEP, but possibly PIP or inspiratory time) or FiO$_2$
Generally do not wean PEEP until FiO$_2$ < 0.40
Avoid reduction of PEEP below 4 – 5 cm H$_2$O to avoid "atelectrauma"

### For Infants of 23 – 31 weeks gestation:

| PaO$_2$ | < 41 | 41 - 50 | 51 - 60 | 61 - 65 | > 65 |
|---|---|---|---|---|---|
| | IE | T | W | W | IE |
| Alternate Interpretation | | | | | |

### For Infants of 32 – 36 weeks gestation:

| PaO$_2$ | < 50 | 51 - 55 | 56 - 70 | > 70 |
|---|---|---|---|---|
| | IE | T | W | IE |
| Alternate Interpretation | | | | |

☐ paO$_2$ is to override pulse oximeter saturations and nursery pulse oximeter protocol is to be suspended

**Pulse Oximeter Saturations**: wean FiO$_2$ per nursery protocol
☐ Pulse oximeter saturations are to override paO$_2$

**Minimum mechanical ventilator rate** for any baby unless specifically ordered: 15 breaths per minute

**Minimum Peak Inspiratory Pressure (PIP) and Pressure Support (PS)** unless specifically ordered:

| Weight (grams) | Minimum PIP (cm H$_2$O) | PS |
|---|---|---|
| < 750 | 13 | Initial = 50% of $\Delta$P |
| 750 - 1000 | 14 | Weaning = 30% of $\Delta$P |
| 1001 - 1500 | 15 | Minimum = 4 |
| > 1500 | 16 | * |

*$\Delta$P = PIP – PEEP; if unable to wean, discuss and consider increasing PS to 50% of $\Delta$P

*PHYSORDER*
Neonatal Ventilator Management Order for
Conventional Pressure-Limited Ventilation
Page 4 of 4
Form Origination Date: 7/05
Version: 1
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**General management approaches to consider with conventional pressure-limited ventilation:**
Incorporate findings of the physical exam, recent chest radiographs, and trends of minute ventilation and tidal volumes into the decision-making process.

**Blood Gases**:

| Blood Gas Results | Possible pathophysiology explanation | Possible responses with TCPL ventilator |
|---|---|---|
| $pCO_2$ OK / low; $paO_2$ low | Atelectasis with V/Q mismatch | Consider ↑ PEEP |
| $pCO_2$ OK / low; $paO_2$ OK / high | Overventilated | Consider ↓ PIP, **OR** ↓ PIP and PEEP (with ↓ ΔP), or ↓ rate |
| $pCO_2$ OK / high; $paO_2$ low | Atelectasis with resultant low TV | Consider ↑ PIP **OR** ↑ PIP and PEEP (with ↑ ΔP) |
| $pCO_2$ OK / high; $paO_2$ high | Inadequate minute ventilation with at least adequate FRC | Consider ↓ PEEP, ↑ rate, or ↑ PIP |

**Targeting Minute Ventilation (MV) to achieve desired $PaCO_2$**

Target MV = $paCO_2$ x current MV / desired $paCO_2$

(Example: Target MV = 40 x 160 / 50 = 240 cc/kg/min)

**If the tidal volumes are acceptable, change the rate (RR) to achieve the desired MV**

Target RR = paCO2 x current RR / desired paCO2

(Example: Target RR = 40 x 30 / 50 = 24 breaths per minute)

Physician/NNP Signature _____ Credentials _____ Pager ID _____ Date _____ Time _____ AM/PM

Signatures for sign off on orders:

Signature _____, RN Date _____ Time _____ AM/PM

Signature _____, RRT Date _____ Time _____ AM/PM