

Acute Respiratory Distress Syndrome Ventilator Management

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Holly Waller

POLICY PURPOSE: This policy specifically addresses ventilator management strategies that are recommended for patients with acute respiratory distress syndrome (ARDS). Additionally, this policy serves as a guide to provide specific recommendations on when to use various ventilator management strategies on patients with ARDS.

Overview of ARDS Ventilator Management

1. Use of Basic Lung Protective Strategy

1. Using VCV or PCV and targeting VT 4-6ml/kg IBW
2. Maintain Pplat \leq 30cm H₂O
3. PEEP/FiO₂ per ARDSnet table
 1. Standard is to use higher PEEP table. However, if the patient has low potential for lung recruitment (i.e. low compliance), use lower PEEP table.

Higher PEEP/Lower FiO₂

FiO2	.30	.40	.40	.50	.50	.60	.70	.70	.70	.80	.90	.90	.90
PEEP	5	8	10	12	14	14	16	16	18	20	22	22	22

Lower PEEP/Higher FiO2

FiO2	.30	.40	.40	.50	.50	.60	.70	.70	.70	.80	.90	.90	.90
PEEP	5	5	8	8	10	10	10	12	14	14	14	16	18

Patient ventilator Dyssynchrony

1. Step 1
 1. Assess the potential to increase sedation
 2. Consider minor ventilator adjustments to flow rate and pattern
 3. Consider 1x dose of neuromuscular blockade
2. Step 2
 1. Consider increasing VT 1ml/kg (max 8ml/kg), provided Pplat \leq 30cm H2O
 2. Consider a variable flow pressure breath mode of ventilation
 1. Volume control +
 2. Pressure control ventilation

Criteria of Failing Lung Protective Ventilation Strategy (LPVS)

1. Oxygen saturation $<88\%$ (or $\text{PaO}_2 < 55$ torr) on 1.00 FiO_2 and $\text{Pplat} >30\text{cm H}_2\text{O}$ ($\text{VT} = 4\text{ml/kg PBW}$)
2. If patient has failed LPVS, advance to Rescue from Hypoxia algorithm.

RESCUE from Hypoxia Algorithm

1. Neuromuscular Blockade (NMB)
 1. Per clinical situation, consider short course of neuromuscular blockade (48 hours).
 2. Short course of cisatracurium is associated with mortality benefit
2. Recruiting Maneuvers
 1. Per clinical situation, consider recruiting maneuvers
 2. Increase PEEP to 35-45cm H₂O x 20 secs (or if in PCV, 40/20 for 2 minutes)
3. Prone positioning
 1. Not performed in TBICU presently
4. Airway Pressure Release Ventilation
 1. Place Puritan Bennet Ventilator into "Bi-Level Mode"
 1. FiO_2 will likely be 1.00
 2. Increase High PEEP to 28-30 cm H₂O
 3. Place Low PEEP to 0 cm H₂O
 4. Set respiratory rate to 12
 5. Adjust I:E settings to obtain inspiration of approximately 5 sec and expiration of 0.8 sec.
 6. Pressure support should be set to 0 as PS works against the goals of APRV.
 7. See APRV Algorithm for advanced management
5. Inhaled Adjuncts

1. Requires Advance Lung Disease Consult (ECMO).
 2. Inhaled Epoprostenol
 1. Start dose at 0.05 mcg/kg/min IBW
 2. Assess for effectiveness after 30 minutes post initiation.
 1. Positive response if PaO₂/FiO₂ (P/F) increases > 10
 2. If negative response (P/F increase < 10), discontinue epoprostenol without weaning
 3. If positive response, titrate FiO₂ to 0.60. At this point, decrease dose by 0.01 mcg/kg/min and reassess every 2 hours until off.
 4. If patient deteriorates resume previous dose.
 3. Inhaled Nitric Oxide
 1. Test at 20-60 minute on 40ppm iNO
 2. Positive response if PaO₂/FiO₂ (P/F) increases > 10
 3. If negative test, discontinue.
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ECMO referral

1. Refer patient to ECMO intensivist when P/F ratio <100 for 12 hours when on maximum vent settings (FiO₂ >0.80 and Pplat ≥ 30cmH₂O).
2. Absolute contraindication to ECMO
 1. Irreversible pulmonary process