Physical Therapy Management of Acute Respiratory Distress Syndrome (ARDS) in an Acute Care Setting

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Objectives

• Define Pulmonary Edema

• Define ARDS
  – Goals for treatment
  – Interventions

• Current research for interventions of ARDS
What is Pulmonary Edema?

- **Classifications**
  - Cardiogenic
  - Non-cardiogenic

- **Pathophysiology**
  - \( \downarrow \) Lung compliance
  - \( \downarrow \) Lung volume
  - \( \uparrow \) Work of breathing
  - \( \uparrow \) Pressure in lung tissue
What is Pulmonary Edema cont.

• Diagnostic Tests
  – Chest x-rays
  – ↑ BNP levels (only in cardiogenic)
  – Pulmonary function test changes
    • ↓ Lung volumes
    • ↑ RR
    • No change in FEV1
    • Normal flow rate
  – Arterial blood gases
    • ↑ pH (respiratory alkalosis)
    • ↓ PaO2
    • ↓ PaCO2
What is Pulmonary Edema cont.

• Clinical Manifestations
  – Breath sounds
    • Wet Rales
    • Wheezing
  – Cardiovascular
    • Dysfunction
    • Arrhythmias
  – Symptoms
    • Respiratory distress
    • SOB
    • Cyanotic
    • Labored breathing
    • Pallor
    • Diaphoresis
    • Cough
ARDS

- Non-cardiogenetic form of pulmonary edema
- Characterized by bilateral pulmonary infiltrate and hypoxemia
- No cardiogenic problems
- Usually results from injury to the lungs
- Diagnosis defined by PaO2 to the fraction of oxygen in the inspired air is less than 200mmHg
PT Goals for the treatment of ARDS in the Acute Care Setting

• Improve Oxygenation

• Decrease incidence of ventilator induced pneumonia

• Initiate gradual mobilization
Mobilization
Continuous Rotational Therapy
Posture
Limb Exercise

NMES
Respiratory Muscle Training
Management of Airway Secretion
Mobilization

• Immobility contributes to patient decline in function
• Patient outcomes associated with early mobilization
• Holistic improvements with:
  – Overall Function
  – Muscular Strength
  – Cognition
  – Respiratory Function
Continuous Rotational Therapy

- Continually turning patient on longitudinal axis 60 degree
- Lack of sufficient evidence

https://images.dlf.org.uk/mee/products/full/0042431.jpg
Posture

• Improvements in V/Q mismatch & residual volume
• Prone ventilation improved survival of hypoxemic patients
• Techniques not widely used

http://accessphysiotherapy.mhmedical.com/data/books/detu2/detu2_c019f004.jpg
Limb Exercise

• PROM, AAROM, & AROM
  – ↑ ROM, prevent contracture, ↑ strength, & prevent DVT

• Effects of limb exercise of mechanical ventilation weaning time
NMES

• Low-intensity NMES applied to LE
• Outcomes improved without respiratory stress
• Patients suffering from COPD, SCI, or CHF may see greater benefits

http://www.kneeguru.co.uk/assets/images/Community_Hub/kokmeyer/IMG_1871.png
Respiratory Muscle Training

• Inspiratory muscle training safe with ventilated patients
• Outcomes dependent on case-by-case basis
• More research required before universal application to patients with ARDS
Management of Airway Secretion

- The relationship between mechanical ventilation and airway secretion
- Humidification
- Manual hyperinflation
- Percussion & vibration
- Intrapulmonary percussive ventilation
- Cough assist

http://downloads.lww.com/wolterskluwer_vitalstream_com/sample-content/9780781788786_Craven/samples/mod09/img/10a_2.jpg
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1. Ambrosino N, Makhabah D. *Comprehensive Physiotherapy Management in ARDS.* Vol 79 2013


