

**Handling  
Common Problems & Pitfalls  
During  
ACUTE SEVERE  
RESPIRATORY FAILURE**

Pravit Jetanachai, MD  
QSNICH

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**Oxygen desaturation in  
patients receiving mechanical  
ventilation**

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**Causes of oxygen desaturation**

1. Disorder of ventilation
  - 1.1 Decreased ventilatory drive
    - oversedation
    - CNS problems
  - 1.2 Obstructed ventilation
    - bronchospasm
    - dislodgement of ET tube
    - mucus plugging of airways or ET tube

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## Causes of oxygen desaturation

### 2. Disorder of oxygenation

#### 2.1 pulmonary causes

- ARDS
- pneumonia, atelectasis
- pneumothorax
- pulmonary embolus
- aspiration pneumonitis

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## Causes of oxygen desaturation

### 2. Disorder of oxygenation

#### 2.2 Non-pulmonary causes

- iatrogenic fluid overload
- heart failure

### 3. Effects on interventions, procedures

- chest physical therapy, endotracheal suctioning
- changes in body positioning
- peritoneal dialysis, hemodialysis
- thoracentesis

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## Causes of oxygen desaturation

### 5. Medication

- bronchodilators
- vasodilators
- $\beta$ -blockers

### 6. Ventilator-related problems

- ventilator circuit
- function of ventilator itself
- inappropriate ventilator settings

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## Management desaturation

1. Increased FiO<sub>2</sub> to 100%
2. Check ET tube (obstruction, dislodgement)
3. Briefly physical examination
  - unilateral decreased breath sounds suggest pneumothorax or right main stem bronchus intubation
  - distended neck vein with bilateral lung crackles suggest volume overload

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## Management desaturation

3. Briefly physical examination
  - wheezing represents bronchospasm (can be associated with cardiogenic problems)
  - decreased mental status suggests hypoventilation
4. If cause is not obvious, manually ventilate patient with 100% O<sub>2</sub> to exclude ventilator malfunction

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## Management desaturation

5. Treat underlying cause
6. Alter ventilator settings to improve oxygenation (increase PEEP)
7. CXR (if the cause is still not clear)

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## Patient fighting ventilator

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### **“Fighting ventilator” – acute respiratory distress**

Patient and ventilator are breathing out of synchrony (patient shows signs and symptoms of acute respiratory distress, multiple ventilator alarms eg. low tidal volume, high pressure alarm or low pressure alarm, hemodynamic instability, cardiac rhythm changes and abnormal gas exchange)

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### **\* Physiological effects of patient ventilator dyssynchrony**

1. Discomfort
2. Increased work of breathing
3. Increased oxygen consumption
4. Increased minute ventilation
5. Increased cardiac work
6. Respiratory muscle fatigue

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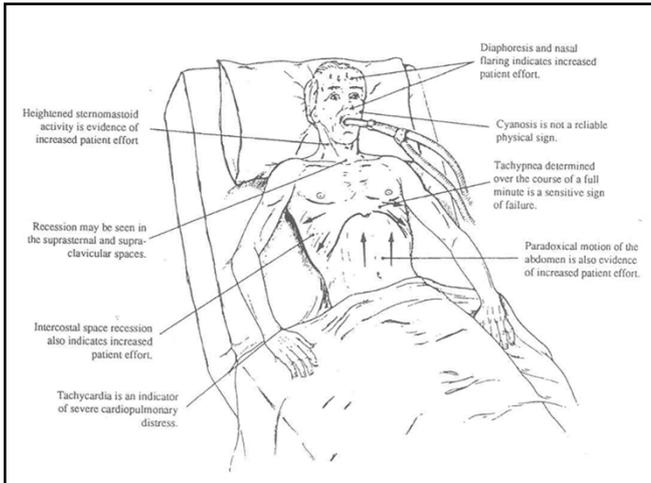
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**Box 15-2 Causes of Sudden Respiratory Distress in Patients Receiving Mechanical Ventilation**

**Patient-Related Causes**

- Artificial airway problems
- Pneumothorax
- Bronchospasm
- Secretions
- Pulmonary edema
- Pulmonary embolus
- Dynamic hyperinflation
- Abnormal respiratory drive
- Alteration in body posture
- Drug-induced problems
- Abdominal distention
- Anxiety
- Patient-ventilator asynchrony

**Ventilator-Related Causes**

- System leak
- Circuit malfunction or disconnection
- Inadequate fractional inspired O<sub>2</sub> (F<sub>I</sub>O<sub>2</sub>)
- Inadequate ventilatory support
- Inadequate trigger sensitivity
- Improper inspiratory flow setting
- Patient-ventilator asynchrony

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**Box 15-4 Causes of Airway Problems That Can Lead to Sudden Distress**

- Tube migration (flexion and extension of the head and neck can move the endotracheal tube an average of 2 cm down and up, respectively, in the airway)
- Migration of the endotracheal tube above the vocal cords
- Migration of the endotracheal tube into the right mainstem bronchus
- Cuff herniation over the end of the tube
- Cuff rupture or leakage
- Endotracheal tube kinking
- Development of a tracheoesophageal fistula
- Airway secretions
- Patient biting of the endotracheal tube
- Endotracheal tube impinging on the carina
- Innominate artery rupture (see Box 15-5)

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