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Acute respiratory distress syndrome

Ventilation Approach

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Acute respiratory distress syndrome

- ▶ In **ARDS**, the primary objective of mechanical ventilation is to accomplish adequate gas exchange while avoiding excessive inspired oxygen concentrations and alveolar over distention
- ▶ Patients with ARDS should be targeted to receive a tidal volume of 6 mL/kg.

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Acute respiratory distress syndrome

- ▶ It is important to remember that the set tidal volume should be based on ideal rather than actual body weight
- ▶ If the plateau pressure remains excessive (>30 cm water), further reductions in tidal volume may be necessary
- ▶ A lung-protective strategy in which the PaCO_2 is allowed to rise (permissive hypercapnia) may reduce barotrauma and enhance survival

The top of the slide features a decorative header. On the left, the number '42' is written in a large, bold, blue font. To the right of the number and extending across the top of the slide is a horizontal row of various light gray icons. These icons include a document, a tag, a gear, a magnifying glass, a smartphone, a document with lines, a tag, a gear, a magnifying glass, a smartphone, a document with lines, a target, a gear, a pie chart, an envelope, a speech bubble, a target, a gear, a pie chart, a checkmark, a presentation board, a thumbs up, a lightbulb, a clock, a checkmark, a presentation board, a thumbs up, a lightbulb, a clock, and a speech bubble.

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Obstructive airway diseases

Ventilation Approach

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Obstructive airway diseases

- ▶ In patients with COPD or asthma, initiation of mechanical ventilation may worsen dynamic hyperinflation (auto-PEEP or intrinsic PEEP)
- ▶ The goals of mechanical ventilation in obstructive airway diseases are:
 - ▷ to unload the respiratory muscles
 - ▷ achieve adequate oxygenation
 - ▷ minimize the development of dynamic hyperinflation and its associated adverse consequences

4+4

Obstructive
airway
diseases:

ASTHMA

- ▶ After the initiation of mechanical ventilation, patients with **status asthmaticus** frequently develop severe dynamic hyperinflation
- ▶ Can be minimized by delivering the lowest possible minute ventilation in the least possible time.
- ▶ **Initial ventilatory strategy**: delivery of relatively low tidal volumes (eg, 6 mL/kg) and lower respiratory rates (eg, 8-12 breaths/min) with a high inspiratory flow rate.

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Obstructive
airway
diseases:

COPD

- ▶ Patients with **COPD** have expiratory flow limitation and are prone to the development of dynamic hyperinflation
- ▶ The use of extrinsic PEEP may be considered in spontaneously breathing patients in order to reduce the work of breathing and to facilitate triggering of the ventilator
- ▶ Care must be exercised to avoid causing further hyperinflation, and the set level of PEEP should always be less than the level of auto-PEEP



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Noninvasive Ventilatory Support

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Noninvasive Ventilatory Support

- ▶ Ventilatory support via a **nasal** or **full-face mask** rather than via an endotracheal tube is increasingly being employed for patients with acute or chronic respiratory failure
- ▶ Noninvasive ventilation should be considered in patients with mild-to-moderate acute respiratory failure
- ▶ The patient should have an intact airway, airway-protective reflexes, and be alert enough to follow commands



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Respiratory Failure Medication

Pharmacotherapy for cardiogenic pulmonary edema and acute exacerbations of COPD

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Diuretics

- ▶ **First-line therapy** generally includes a loop diuretic such as furosemide, which inhibits sodium chloride reabsorption in the ascending loop of Henle
- ▶ Administer loop diuretics such as furosemide intravenously (IV) because this allows both superior potency and a higher peak concentration despite an increased incidence of adverse effects

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Nitrates

- ▶ Nitrates reduce myocardial oxygen demand by lowering preload and afterload
- ▶ Sublingual **nitroglycerin tablets** and spray are particularly useful in the patient who presents with acute pulmonary edema with a systolic blood pressure of at least 100 mm Hg

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Opioid Analgesics

- ▶ **Morphine IV** is an excellent adjunct in the management of acute pulmonary edema
- ▶ In addition to anxiolysis and analgesia, its most important effect is venodilation, which reduces preload
- ▶ It also causes arterial dilatation, which reduces systemic vascular resistance and may increase cardiac output

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Inotropic Agents

- ▶ The principal inotropic agents are dopamine, dobutamine, inamrinone (formerly amrinone), milrinone, dopexamine, and digoxin
- ▶ In patients with hypotension who present with CHF, dopamine and dobutamine usually are employed

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Beta2 Agonists

- ▶ **Bronchodilators** are an important component of treatment in respiratory failure caused by obstructive lung disease
- ▶ These agents act to decrease muscle tone in both small and large airways in the lungs
- ▶ This category includes beta-adrenergics, methylxanthines, and anticholinergics

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Xanthine Derivatives

- ▶ **Theophylline** has a number of physiologic effects, including increases in collateral ventilation, respiratory muscle function, mucociliary clearance, and central respiratory drive
- ▶ It partially acts by inhibiting phosphodiesterase, elevating cellular cAMP levels, or antagonizing adenosine receptors in the bronchi, resulting in relaxation of smooth muscle

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Cortico-steroids

- ▶ **Corticosteroids** have been shown to be effective in accelerating recovery from acute COPD exacerbations and are an important anti-inflammatory therapy in asthma
- ▶ Although they may not make a clinical difference in the emergency department, they have some effect 6-8 hours into therapy; therefore, early dosing is critical.



Thank
you