Acute Respiratory Distress Syndrome

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Clinical Presentation

Quick onset

Decrease in oxygenation

Trouble breathing
Prevalence

75 incidents per 100,000 people

Age increases risk factor
Outcomes

- High mortality
- Most deaths caused by "cascade"
- Low recovery rate after 1 week
Pulmonary Edema

Gaps appear between capillary cells

Fluids escape
Pulmonary Edema

Impaired gas exchange
Cannot drain fluids
Inflammatory Cascade

Inflammation at the alveoli causes diffuse alveolar damage
Inflammatory Cascade

Sepsis

Inflammation via the capillaries
Decrease in Lung Compliance

Compliance: the ability for lungs and thorax to expand

Decrease in surfactant makes it harder to breathe and results in alveolar collapse.
Pulmonary hypertension

Destruction of alveoli obstructs blood flow

Blood pressure increases

Scar tissue builds up

pulmonary fibrosis due to hypertension
Pulmonary Fibrosis

Thickening of the alveolar membrane

Decrease in compliance

Results in chronic hypoxia
Hypoxemia

Deprivation of oxygen in the bloodstream

Ventilation (inspired \(O_2\)) \(>>\) Perfusion (blood in the alveoli) = dead space

Dead Space: air trapped in the body

discoloration of extremities due to hypoxemia
Treatments: Ventilation

Cornerstone for successful treatment is proper mechanical ventilation

- support breathing and allow for healing
Ventilation Technique

Prone vs. Supine ventilation

- improves oxygenation by redistributing air flow
Preventing Injury

Pharmacologic paralytic agents
- neuromuscular blocking agents
- decrease injuries to lungs during ventilation

Lung volume protection strategy
Treatment Options for Hypoxemia

Extracorporeal membrane oxygenation (ECMO)
- intractable hypoxemia

Inhaled vasodilators therapy
- Nitric oxide helps oxygenation
- Immunomodulatory effect
Other Treatments: Non invasive Ventilation

- No invasive artificial airway
- No risk of ventilator associated pneumonia
- Added comfort for the patient

A patient using a mask style NIV
New Treatments: Preemptive Ventilation

- May be able to block the progression of lung injury
- Currently there is no other preventative technique
- The future of ARDS treatment
New Treatments: LASSBio596 with surfactant

- Exogenous Surfactant as a treatment for ARDS
- Used with LASSBio596
  - anti-inflammatory properties
  - anti-fibrogenic properties
- Dream team?
Complications

ARDS has many complications
- pulmonary, cardiac, gastrointestinal

Currently no great treatment option
- ~45% mortality in some studies

But, much progress has been made!
Sources used


