

SEPTEMBER NEWSLETTER

Saskatchewan Respiratory Therapy Education Committee Inc.



Ventilation Management for Acute Brain Injury

- For intubated patients with acute brain injury, lung-protective ventilation should generally be the initial strategy, with adjustments guided by intracranial pressure, cerebral perfusion pressure, cerebral oxygenation, and arterial carbon dioxide levels.
- PaCO_2 is a critical link between mechanical ventilation and cerebral physiology. Hypercapnia can cause cerebral vasodilation, increasing cerebral blood volume and intracranial pressure (ICP), whereas excessive hypocapnia can reduce cerebral blood flow and worsen cerebral ischemia. Mild hypercapnia may improve brain-tissue oxygenation in selected patients when ICP is controlled, but it should not be routinely targeted. A reasonable initial PaCO_2 target for patients with acute brain injury is 35–40 mmHg, followed by individualized adjustment based on ICP, cerebral perfusion pressure (CPP), and, when available, brain-tissue oxygen tension (PbtO_2).
- ARDS develops in approximately one-third of critically ill patients with acute brain injury and is associated with prolonged mechanical ventilation, higher mortality, and worse neurological outcomes. Standard lung-protective ventilation remains important, but it should be applied while considering its potential effects on intracranial pressure, cerebral perfusion, and brain oxygenation. A physiology-driven strategy that integrates respiratory mechanics, gas exchange, systemic hemodynamics, and multimodal neuromonitoring should therefore be used to individualize care.
- A balance must be achieved between the pulmonary benefits of ARDS ventilation strategies and their potential adverse effects on cerebral physiology.

WHAT IS THE LUNG'S FAVOURITE FOOD?

R-ALVEOLI

SOCIAL MEDIA HIGHLIGHT: [@DRCASEYALBIN](#)

ARDS Target	Pulmonary Benefit	Potential Cerebral Consequence
Low Tidal Volumes	Reduce volutrauma and ventilator induced lung injury	May increase PaCO_2 , producing cerebral vasodilation and elevated ICP
Permissive Hypercapnia	Allow lower tidal volumes and airway pressure	May increase cerebral blood volume and ICP
Higher PEEP	Improve recruitment and oxygenation	May impede cerebral venous drainage, reduce cardiac output/MAP, lower CPP, or increase ICP
Conservative Oxygen Targets	Limits unnecessary hyperoxia	May provide insufficient cerebral oxygen delivery
Conservative fluid management	Help pulmonary edema	Hypovolemia or hypotension may reduce cerebral perfusion
Deep Sedation or Paralysis	Prevents lung injury by inhibiting large pressure swings through spontaneous breathing	Loss of reliable neurological assessment

Educational Resources

VENTILATION MANAGEMENT FOR ACUTE BRAIN INJURY

ARTICLE RESOURCES

- [Mechanical ventilation in patients with acute brain injury: recommendations of the European Society of Intensive Care Medicine consensus](#)
- [Mechanical ventilation in patients with acute brain injury: a systematic review with meta-analysis](#)
- [Balancing lung and brain: physiological strategies for ARDS management in acute brain injury](#)

If you're having difficulty accessing the articles SHA Library Services is a great resource available to all SHA employees. Feel free to contact them to setup a library card number to obtain off site access.

WEBINARS

- [Ventilator weaning and extubation in patients with primary brain injury: evidence and uncertainties](#)
- [MASTERCLASS: Brain Protective Ventilation in Severe Acute Brain Injury](#)
- [When Lung-Protective Ventilation Isn't Brain-Protective? a Look at the Prolabi Trial](#)

VIDEO RESOURCES

- [Is PEEP Bad for Acute Brain Injury or Increased ICP?](#)
- [Dr. Casey Albin - PEEP and Increased ICP](#)
- [PulmToilet - Aim for What the Patient Needs Not What is "Normal"](#)
- [PEEP in Acute Brain Injury. High or Low?](#)
- [Is etCO2 an Appropriate Target for Increased ICP?](#)

PODCASTS

- [Neurocritical Care and Respiratory Failure with Dr. Thomas Bleck](#)
- [ARDS Guidelines and their use at the bedside with Dr. Stefano Spina](#)
- [Low-Tidal-Volume-Ventilation and Mortality in Patients With Acute Brain Injury: A Secondary Analysis of an International Observational Study](#)

SUMMARIES & GUIDELINES

- [NHLBI ARDS Network](#)



Stay tuned for more info on how SaskRTEC plans to celebrate Respiratory Therapy Week next month

As we continue to grow we are looking to add 2 more members to our Board of Directors to assist with committee initiatives and social media management. If you are interested in joining SaskRTEC please reach out via email at admin@saskrtec.ca