

ACUTE ON CHRONIC RESPIRATORY CARE IN THE IMC PATIENT

Jen Urbach, BS, RRT
Manager of RT/Sleep for Allina Health, East Region
Adjunct Instructor Saint Paul College

Mat Hannibal, BA, RRT – RT supervisor

April 17, 2024



1

OBJECTIVES

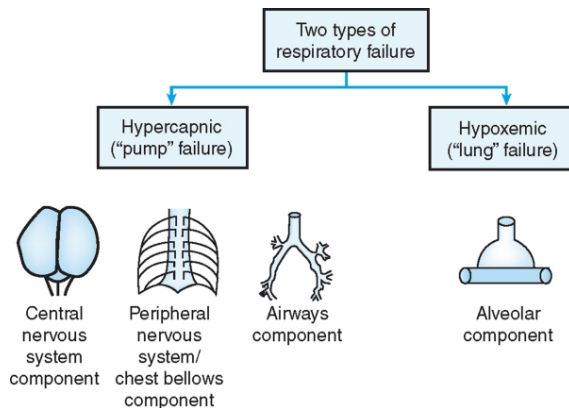
Upon completion of this lecture, participants should be able to:

1. List the key issues of acute on chronic respiratory patients and what that population includes.
2. Explain their medical issues and be an informed partner in their care plan

2

What is acute Respiratory Failure?

- Definition...the inability of the respiratory system to deliver O₂ and remove CO₂
- Oxygenation failure (hypoxemic)- PE, anemia, Cardiac, ARDS
 - low O₂, normal or elevated CO₂
- Ventilation failure (hypercapnic)- drugs, neuro, obesity
 - low to normal O₂, high CO₂
- Mixed – Hypoxemic and Hypercapnic



3

Terminology Review

- PaO₂: The partial pressure of oxygen dissolved in arterial blood.
 - Hypoxemia: decrease oxygen in blood
 - Hypoxia: a decrease of the amount of oxygen available to the body tissues
- PaCO₂: The partial pressure of carbon dioxide dissolved in the blood.
 - Hypercapnia: A state of CO₂ retention
- SaO₂: The saturation of oxygen onto Hemoglobin (%)
 - found on ABG results
- SpO₂: The indirect measurement of SaO₂ via pulse oximetry

4

ABGS – they’re not as hard as you think!

Quick Reference to Evaluate Compensation in ABG Results*









	Parameters	Compensated	Uncompensated
Respiratory Acidosis	pH	7.35 – 7.39	< 7.35
	PaCO ₂ (mmHg)	> 45	> 45
	HCO ₃ (mEq/L)	> 26	22 - 26
Respiratory Alkalosis	pH	7.41 – 7.45	> 7.45
	PaCO ₂ (mmHg)	< 35	< 35
	HCO ₃ (mEq/L)	22	22 - 26
Metabolic Acidosis	pH	7.35 – 7.39	< 7.35
	PaCO ₂ (mmHg)	35	35 – 45
	HCO ₃ (mEq/L)	22	22
Metabolic Alkalosis	pH	7.41 – 7.45	> 7.45
	PaCO ₂ (mmHg)	45	35 – 45
	HCO ₃ (mEq/L)	26	26

*These values are for guidelines only, as patient values will vary more depending on the underlying disease and any co-morbidities.

5

Also.....

ARTERIAL BLOOD GASES

	pH	PaCO2	HCO3
RESPIRATORY ALKALOSIS			NORMAL
RESPIRATORY ACIDOSIS			NORMAL
METABOLIC ALKALOSIS		NORMAL	
METABOLIC ACIDOSIS		NORMAL	

6

Invasive Mechanical Ventilation - Settings

- Respiratory Rate: Guaranteed number of breaths delivered per minute
- Tidal Volume: Size of breath delivered
- FiO₂: Fraction of inspired oxygen
- PEEP: Positive End-Expiratory Pressure – aids in oxygenation
- Pressure Support (spontaneous mode): Set amount of positive pressure to assist with breathing (usually 5-10 cmH₂O)
- Ensure orders are placed and match device settings***

7

Patient Owned Ventilator

- Some non-ICU units within Allina accept both patient owned and Allina's "ICU" ventilator
- Why would RT/Provider choose to leave patient on their ventilator?
 - Stable VS
 - Admitting diagnoses is non-respiratory related
 - Patient comfort
 - Prescription tailored settings

8

Allina Ventilator

- Why would RT/Provider choose to utilize Allina's "ICU" ventilator?
 - Unstable VS
 - Capability to manipulate ventilator settings
 - Requiring high amounts of O₂
 - Acute condition altering hemodynamic lab results

9

Nursing application and Goals in non-ICU setting

IMC/Progressive Care – Chronic patients

- Support chronic diagnoses of respiratory failure while treating acute issues with patient ventilator, or Allina's ventilator via tracheostomy
- Partnering with RT to optimize patient outcome
- Avoid VAP and ALI while hospitalized
- Avoid needing a higher level of care/prevent further complications
- Monitoring trends and alarms
- Positioning
- Decrease O₂ consumption
 - spacing ADLs and other nursing cares
- Treat underlying diagnoses with medications

10

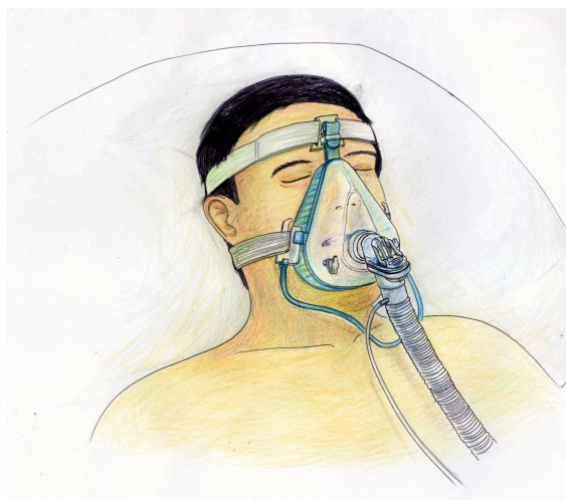
Trach Patients

- Trach cares
- Suctioning
- Back up supplies/appropriate signage
- Know why your patient has a trach!
- Identifying type and size
- What kind of emergencies should you anticipate? Obturator?

11

Acute Non-invasive Positive Pressure Ventilation IMC/PCU Bipap

- Devices provide bi-level positive pressure to assist with patient ventilation. A transducer senses whether the patient is inhaling or exhaling by constantly monitoring the air flow.



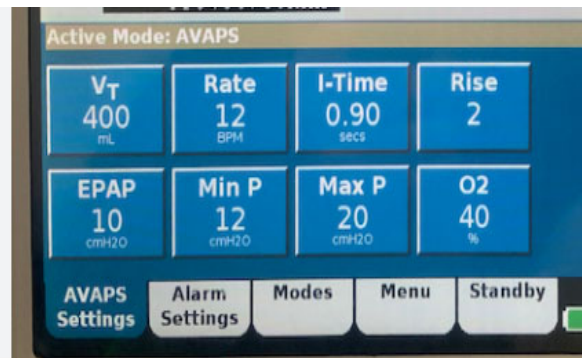
12

AVAPS – Average Volume Assured Pressure Support

Rather than having one fixed IPAP setting, the AVAPS mode has the capability to set a range of values for the IPAP, a maximum and a minimum IPAP.

The pressure-support is no longer fixed as the IPAP changes by itself within the set range.

The ventilator does this based on the targeted tidal volume, a pre-set value.



13

Importance of Oral Care Invasive and non-invasive ventilatic

- The oral flora of a critically ill patient can change within 48 hours of admission. The dental plaque builds up and provides a rough surface easy for microorganisms to adhere.
- Microorganisms that translocate to the lungs can result in a pneumonia.
- NPPV causes drying of the oral mucosa, affecting salivary flow and contributing to mucositis and gram-negative bacteria colonization.
- The saliva in the mouth provides as mechanical removal of debris and plaque, so optimal oral care should focus on the removal of plaque (soft bristle toothbrush) and stimulation of salivary flow (foam swabs).



14

Case Study

- A 65-year-old cerebral palsy patient with a trach and a home vent is admitted with fever and increased secretions. She's resting comfortably when suddenly the ventilator begins alarming 'High Pressure'.

What do you look for?

15

TO CONTACT ME

- Jen Urbach
- Jennifer.Urbach@allina.com



16