Titrating ASV and NIV

UNDERSTANDING VENTILATION

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Objectives

- Explain the difference between ASV and NIV
- Explain manufacturer differences
- Patient selection with volume or pressure support assisted PAP
- Successful titration strategies

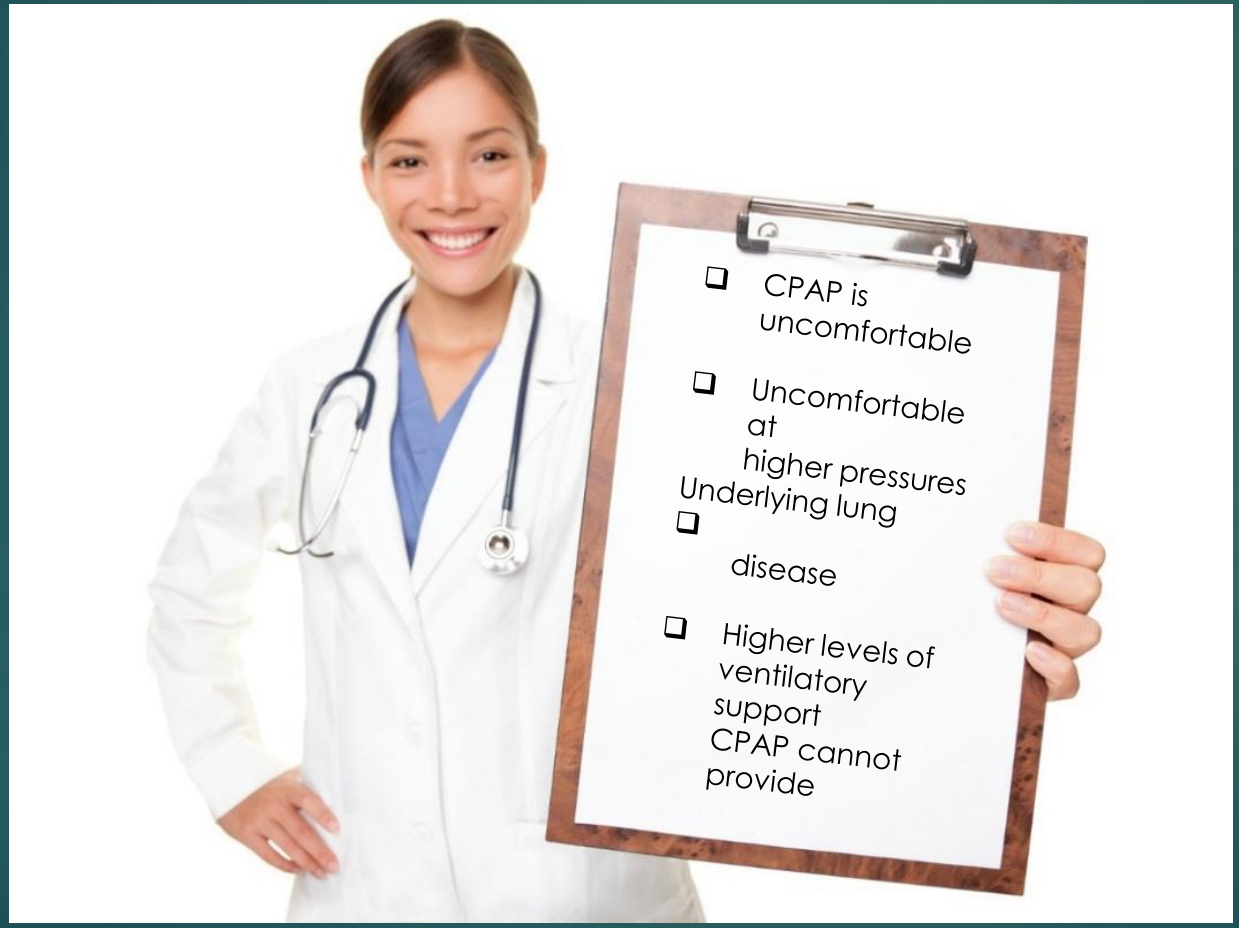
CPAP

- Continuous Positive Airway Pressure
- Used to treat obstructive sleep apnea
- Splints the airway open with air pressure

Bilevel

- Positive airway pressure
- Duel pressures
- Inhalation=IPAP
- Exhalation=EPAP

When to Use BiLevel



When CPAP is Uncomfortable/Pressure too high

- Standard guidelines for CPAP titration
- Switch to Bilevel once pressure beyond 15cmH20
- Higher pressures increase leaks
- Mask needs to be tighter at higher pressures

Underlying Lung Disease

- Restrictive disorder (neuromuscular disease)
- Obesity hypoventilation
- COPD

Using iVAPS/AVAPs

- Ensures appropriate ventilation for the patients needs
- Adjusts automatically to maintain a set tidal volume or alveolar ventilation

Manufacturer Types

- IVAPS=Resmed

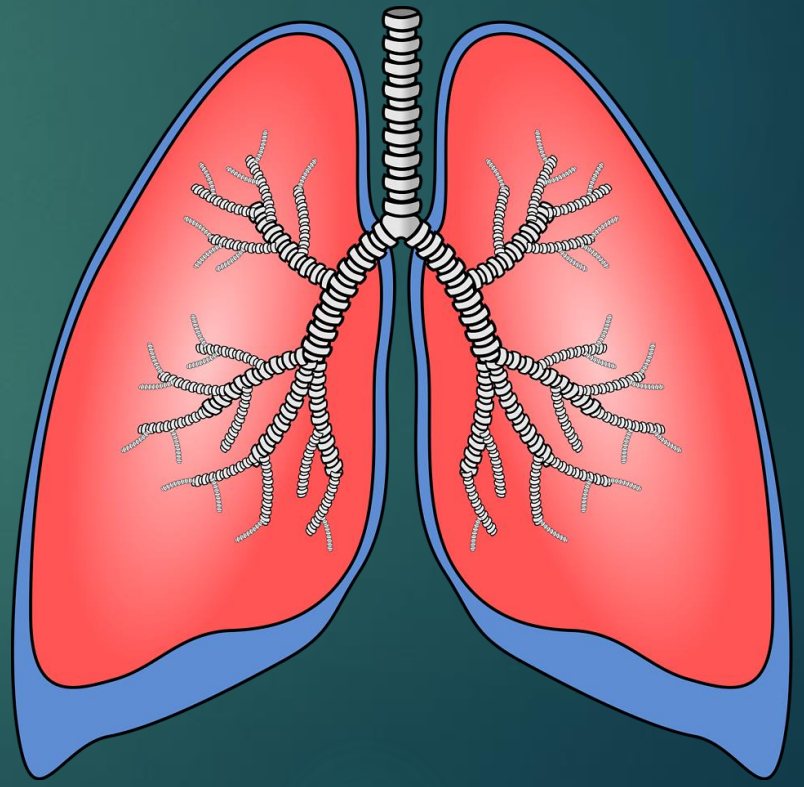
  Intelligent Volume Assisted Pressure Support
- AVAPS=Respironics

  Average Volume Assured Pressure Support

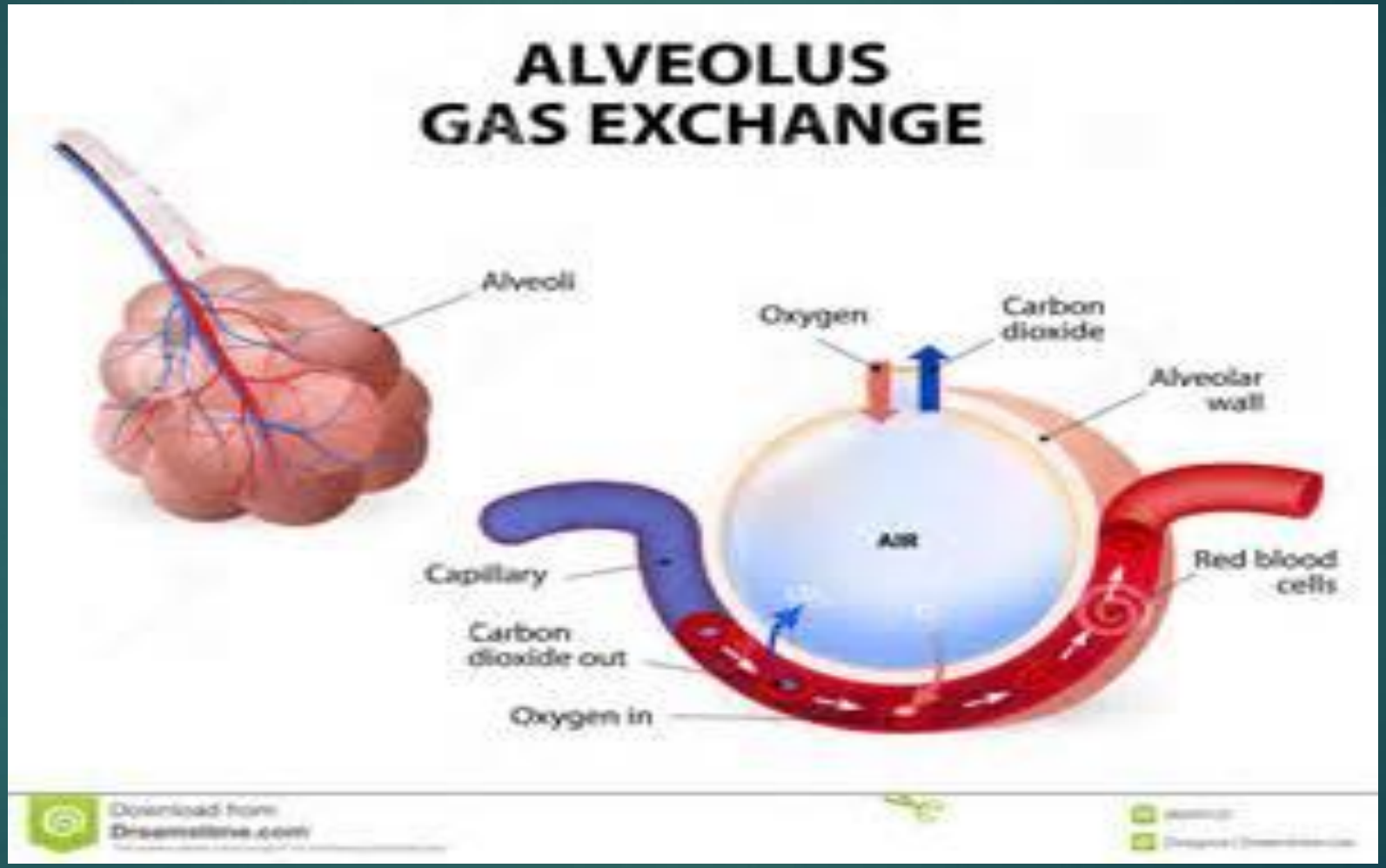
  Also called BiPAP AVAPS

Tidal Volume

- The amount of air inhaled or exhaled in a single breath
- Measured in CC or ML
- Abbreviation Vt



Gas Exchange



Alveolar Ventilation

- Targets alveolar ventilation which takes into account the anatomical deadspace.

Restrictive Lung Disease

- Difficult time maintaining the inhalation phase for adequate ventilation
- Caused by physical restriction of the lungs or neuromuscular weakness
- Use settings to make triggering a breathe easier
- Adjust cycle time to allow for a longer breath
- Slower Rise time
- Increases tidal volume and improves gas exchange

Obesity Hypoventilation

- Regular BiLevel may be enough
- Ventilation in insufficient to support adequate oxygenation
- Due to large BMI
- Increased weight on chest does not allow adequate chest expansion during sleep
- Especially true in REM
- Commonly also have OSA

Setting the Tidal Volume/Minute volume

- Set Vt or Minute Volume based on height and weight
- 6-8ml/kg
- Set for patient comfort
- Set according physician orders

Max/Min Pressure Support

- Max Pressure support should not need adjustment
- Min Pressure support: adjust for comfort or to maintain Vt
- Important to monitor Vt and leak

EPAP

- Increase by 1cm for obstructive events
- First and foremost maintain the airway
- Keep EPAP high enough to allow the pressure support to work

Back Up Rate

- Count the patient's resting RR set slightly behind
- Useful in neuromuscular patients who need to rest respiratory muscles

Examples of Restrictive Lung Disease

- ALS
- Muscular Dystrophy
- Kyphoscoliosis

Qualifying Guidelines

- Clinical documentation of Neuromuscular disease or thoracis cage abnormality
- PCO2 greater than 45
- Pulmonary Function test-FVC is less than 50% predicted or Maximal Inspiratory pressure is less than 60cmH2O

Qualifying Guidelines

- No diagnostic is needed if qualifying guidelines met
- Do all night titration with TcCO2

Qualifying-Hypoventilation

- Covered BIPAP is currently being used
- Spirometry shows FEV1/FVC equal to or greater than 70% and FEV1 greater than and equal to 50% of predicted
- Either O2 sat is equal to or greater than 88% for 5 minutes of recording time (not caused by OSA)
- Or ABGs worsens by 7mmHg compared to ABGs done to qualify for BiPAP

COPD

- Chronic Obstructive Pulmonary Disease
- Air sacs are damaged and lose their stretch
- Exhalation is prolonged

COPD

- Regular Bilevel may be enough
- Normal trigger sensitivity
- Shorten exhalation time (TI max)
- Let out of the exhalation phase sooner
- Bilevel assists ventilation and rests the muscles associated with breathing

Qualifying Guidelines-COPD

- OSA and treatment with CPAP has been considered and ruled out
- PCO2 greater than 52
- O2 sat less than or equal to 88% for at least five continuous minutes during the night that is not caused by OSA

ASV

- Adaptive Servo Ventilation
- VPAP adapt or Auto SV

Central Sleep Apnea

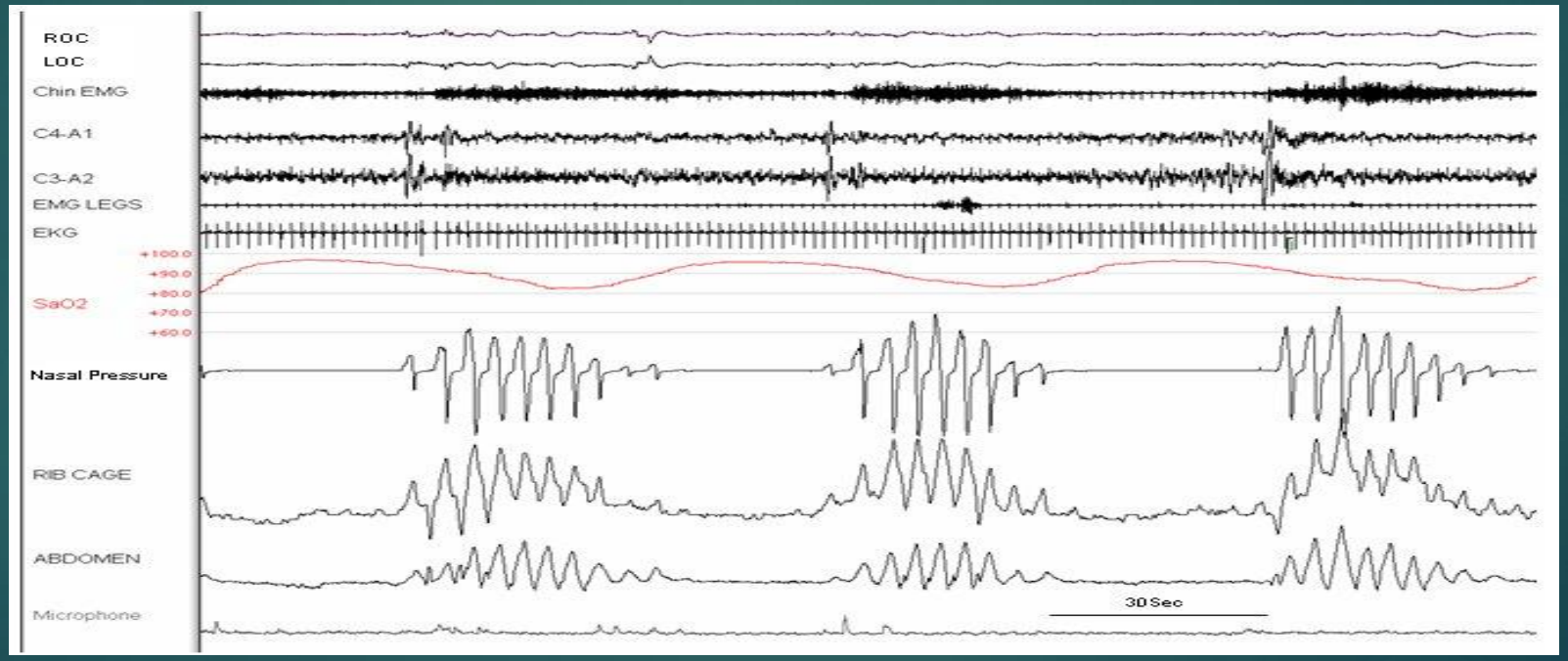
- Cheyne-stokes breathing
- Drug induced apnea
- High altitude breathing
- Complex sleep apnea

Patient Selection

- SERVE-HF
- LVEF must be greater than 45

Cheyne Stokes Breathing

- Consecutive central apneas and/or central hypopneas separated by crescendo/decrescendo change in breathing effort
- Cycle length 40 seconds



Leak

- Set mask to calculate appropriate leak value
- Make sure leak is acceptable
- Change mask or adjust to manage leak

Baseline settings

- Max and min pressure support 15/4
- EPAP 4-5

Adjusting ASV

- Increase EPAP by 1cm for OSA
- Don’t rush!!!! Wait 20 minutes between changes

Adjusting EPAP

- EPAP plus Max pressure support equal 25
- As you increase EPAP be aware that IPAP may automatically decrease

Qualifying for ASV

- Central sleep apnea
  - AHI greater than 5
  - Central apnea greater than 5
  - EDS
  - Central apneas are greater than 50% of total events
- Complex Sleep Apnea
  - AHI greater than 5
  - central apneas are greater than 50% of the total events once
  - CPAP/BiPAP has been applied

- Questions???
- Thank you!