Introduction to Mechanical Ventilation

Modes:
CMV (Controlled Mandatory Ventilation) aka many other names aka ACV (Assist Controlled Ventilation) – Sets a number of breaths to be delivered by the ventilator regardless of patient effort. Additionally, will give a patient a full tidal volume when they breathe over the vent. Common settings are CMV 8, TV 700. Brain Dead Initial Vent settings: CMV 8, TV 700, FiO2 100%

1) a person with no respiratory drive on CMV 8 TV 700 will receive 8 breaths a minute, each of which is 700 cc (for a minute ventilation of 5600 cc/minute)
2) a patient breathing 20 times on the vent on CMV 8 TV 700 will get 20 breaths a minute, each of which is 700 cc (minute ventilation of 14,000 cc/minute!)

SIMV aka IMV (Synchronized intermittent mandatory ventilation) – Vent delivers a set number of breaths to a patient at a set tidal volume. After that, the patient is on their own for breathing. Common settings are IMV 2-4, TV 700, PS 10 (see below)

1) a person with no resp drive on IMV 4 TV 700 will get 4 breaths/minute, each at 700cc
2) A patient with some resp drive will get 4 breaths of 700 cc as well as whatever the patient can breath on their own (eg 5 additional breaths at 500 cc each)

CPAP (continuous positive airway pressure) – the vent delivers no breaths, just continuous pressure applied over both inspiration and expiration. This is usually a final weaning step (also used for sleep apnea). Common setting CPAP 5

Extra Settings:
PS (Pressure Support) – provides extra pressure during inspiration only to “help” deliver a breath to the patient. Useless in CMV mode, used with IMV or sometimes CPAP. Common setting, PS 5-12.


BiPAP – A combination of PS and PEEP, kind of like CPAP but allows you to give a different inspiratory pressure and expiratory pressure. Used as noninvasive ventilation primarily for CO2 retention in COPD. Common setting BiPAP 10/5 (inspiration/expiration)

Weaning: (in general)
1) address underlying problem (ie pneumonia, COPD, CHF, Cardiogenic Shock)
2) wean off pressors (dopamine, levophed)
3) wean down FiO2 to 30% or so
4) taper off PEEP
5) Decrease sedation
6) Change mode to IMV 2-4 with PS 5-10 for a 2-4 hour trial, and check ABG after wean
7) Gradually increase wean times or frequency of weans, decrease PS, decrease IMV
8) Do a CPAP trial
9) Consider extubation when pt on CPAP, good O2 sats, good ABG