**EM Basic- Non-invasive Ventilation**

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**Non-invasive Ventilation**

**-**Provides positive pressure to the patient via a tight fitting facemask

**CPAP- Continuous Positive Airway Pressure**

-Provides a constant level of positive pressure that doesn’t vary based on the patient’s breathing

- Example- CPAP at a pressure of 10 centimeters of water

**BiPAP- Bi-Level Positive Airway Pressure**

-Provides a baseline level of pressure all the time and increases pressure above that baseline with each inhalation

-Technically BiPAP is a proprietary term but it is often used universally to encompass all modes of non-invasive ventilation

-Example- BiPAP at a pressure of 10/5 (centimeters of water)

-Pressure of 5 all the time, 10 when the patient inhales

**BiPAP vs. CPAP**

**-**No differences in any clinically important outcomes in studies

-BiPAP may be more comfortable since it lets patient “rest” in

between breaths

-CPAP tends to be more portable (more used in EMS systems)

**How non-invasive ventilation (NIV) works**

-Improves laminar flow of air- stents open smaller airways

-This decreases atelectasis which improves pulmonary compliance

and decreases the patient’s work of breathing

-For pulmonary edema- does not “blow the fluid out of the lungs”

-Increases intrathoracic pressure -> decreases venous return

-Decreases preload and afterload

**When to use NIV**

**-**Any patient with respiratory distress who is not responding to

simple interventions like albuterol

-Common indications- COPD, Asthma, CHF, Pulmonary edema, pneumonia

-Can also use NIV to pre-oxygenate prior to intubation

-Don’t need to figure out the diagnosis before you start NIV- shoot first and ask questions later- use it early and often

-Least evidence for use in asthma

-Can also use for patients with DNR/DNI to relieve air hunger and/or buy time to address resuscitation status

**When NOT to use NIV**

**-**Patients who are unconscious or altered- aspiration risk

-Hypotension- decreasing intrathoracic pressure can decrease BP

-If the patient’s mental status decreases, move to intubation

**PEARL-** Make sure the BiPAP machine doesn’t have a backup rate that kicks in if the patient goes apenic- you are supporting the patient’s ventilation- not providing it

**NIV and MI**

-Early study with CPAP vs. BiPAP in patients with acute pulmonary edema- more myocardial ischemia in BiPAP group

-Newer and larger studies have not shown this relationship

-Don’t let concern for MI stop you from using NIV

**How to use NIV**

**-**Get the machine- best to have it already in the ED but call for it early if you don’t have it readily available

-Have your airway equipment ready to go if patient gets worse

**-Don’t just slap it on the patient and turn it up!**

**-**This will get you slugged by the patient!

-Coach the patient through it- my standard script

“We are going to help you breathe by giving you a mask. It will blow some air into your face and it will feel really weird but if you relax and let it do some of the breathing for you, I promise you will feel better**”**

**“How to Sell Ice Cream in the Desert”**- adapted from mdaware.org (Seth Treuger- Twitter- @mdaware)

-Put the mask on with no tubing attached

-Strap the mask firmly onto the patient’s face with an assistant on the other side of the patient

-Set the BiPAP to 0/0 setting at 100% FiO2

-Blows pure oxygen into the patient’s face to get them used to it

-Start at 0/2 and alternate increasing top and bottom numbers by 1-2

-Increase settings every 10-15 seconds

-First target 10/5

-Can go up to 20/10 as a maximum, some say 25/10

-Keep reassuring the patient

-Seth recommends a hand on the shoulder or “smooth jazz PRN”

-SMALL, TINY dose of fentanyl

-Can help with air hunger

-12.5 to 25 mcg of fentanyl IV

-If you get this far, be 100% ready to intubate

-Ketamine and DSI

-This represents the first step of Delayed Sequence Intubation (DSI)

-This is an advanced airway technique- can hear all about it at emcrit.org

**The bare bones approach to the above technique**

**-**Coach the patient through the process, reassure them constantly

-Initial settings of 10/5, go higher after a few minutes if needed

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