CPAP for EMTs Trial

Elkhart County EMS

12-12-17

GOALS & OBJECTIVES

- Understand the basics of the respiratory system
- Understand what CPAP is and how it works
- Learn how to appropriately apply CPAP to patients
- Look at outcomes:

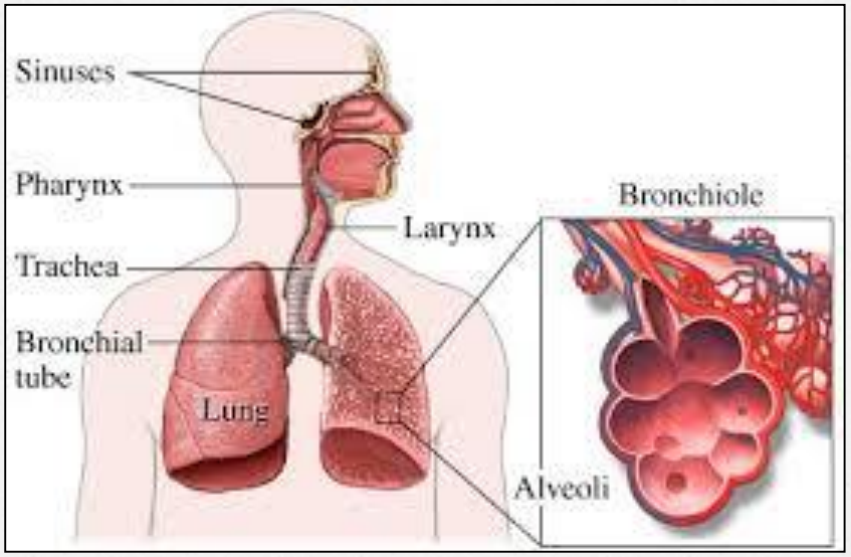
    1. Are there fewer intubations
    2. Are outcomes improved by earlier application of CPAP
    3. Can CPAP be applied appropriately by EMT B

INTRODUCTION

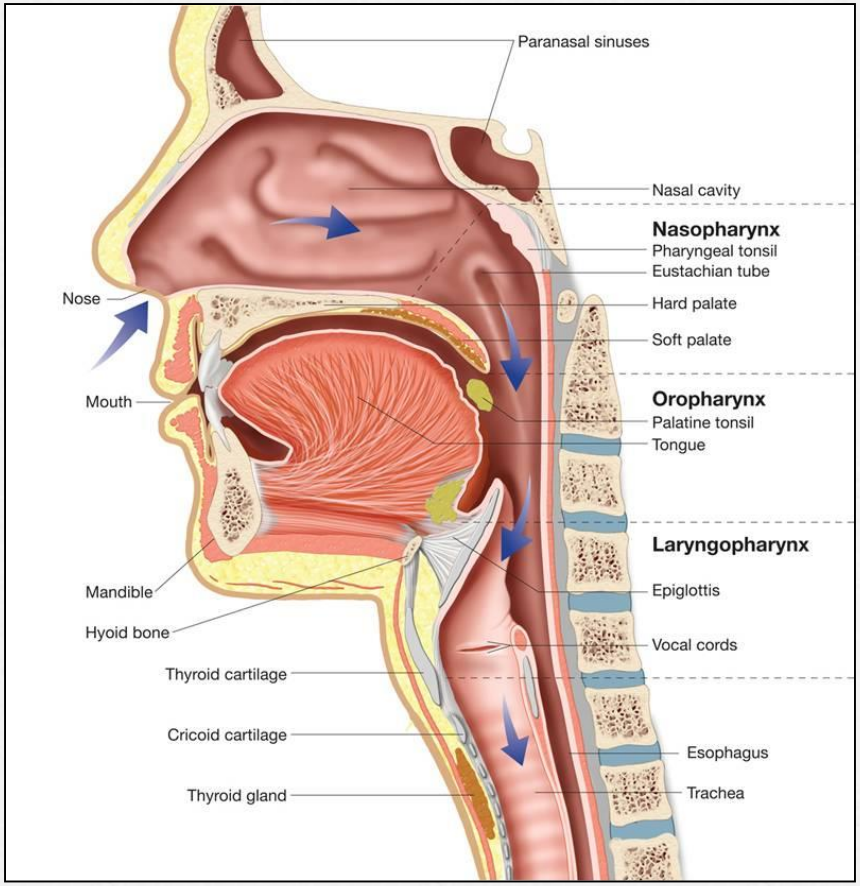
The respiratory system consists of the nasopharynx, oropharynx, trachea, bronchi, and alveoli

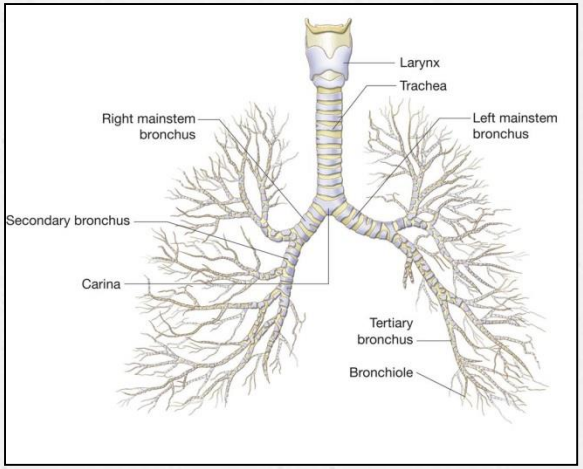
As we inhale, Oxygen is brought into the lungs inflating the lungs and alveolar sacs

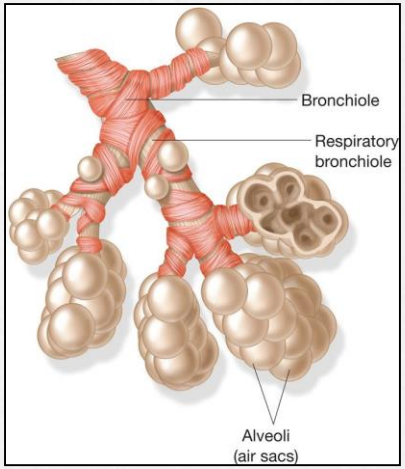
As we exhale, Carbon Dioxide is forced out if the lungs, deflating the lungs



ANATOMY


Paranasal sinuses
Nasal cavity
Nasopharynx
Pharyngeal tonsil
Eustachian tube
Nose
Hard palate
Soft palate
Mouth
Oropharynx
Palatine tonsil
Tongue
Laryngopharynx
Mandible
Epiglottis
Hyoid bone
Vocal cords
Thyroid cartilage
Cricoid cartilage
Esophagus
Thyroid gland
Trachea


Larynx
Trachea
Right mainstem bronchus
Left mainstem bronchus
Secondary bronchus
Carina
Tertiary bronchus
Bronchiole


Bronchiole
Respiratory bronchiole
Alveoli (air sacs)

PHYSIOLOGY

- Ventilation
  - Process of moving air into and out of chest
- Inhalation
  - Active process
  - Muscles expand; size of chest increases
  - Negative pressure pulls air into lungs
- Exhalation
  - Passive process
  - Muscles relax; size of chest decreases
  - Positive pressure created; air pushed out

PEEP

Positive End Expiratory Pressure (PEEP)

- The pressure needed to keep the alveoli open
- Increases surface area / cellular respiration

RESPIRATORY CONDITIONS THAT CPAP CAN HELP

Asthma:
A respiratory condition caused by spasms in the bronchi causing an obstructive airway. Patients have difficulty exhaling and feel as if they are wheezing. On exam, these patients may have wheezes while they exhale which comes from constriction of the airways.

Chronic Obstructive Pulmonary Disease (COPD):
Chronic (*long term*) inflammatory lung disease that causes obstructed airflow from the lungs. Most common are Emphysema & Bronchitis. Patients have difficulty exhaling. This increases work of breathing and may also increase the carbon dioxide in the blood from inability to properly expire.

Congestive Heart Failure (CHF):
A process that results from the hearts inability to properly pump blood around the body. Can lead to fluid backing up into the alveolar sacs. Patients can't properly exchanges gases and "drown" from these fluids.

RESPIRATORY CONDITIONS THAT CPAP CAN HELP

Pulmonary Edema:
Extracellular fluid fills the alveolar sacs leading to decreased gas exchange and respiratory distress.

Pneumonia:
Infectious process. Growth of organism leads to damage and fluids in the lung. This will lead to respiratory distress.

RESPIRATORY DISTRESS
FROM ANY DISEASE PROCESS
CAN BE HELPED WITH CPAP

CPAP: HOW IT WORKS

CPAP is a noninvasive device that helps keep the alveolar sacs open.

It is an effective tool that can help a patient move more air and increase oxygen saturations and decrease carbon dioxide.

It also works by forcing the extracellular fluid in the alveolar sacs back into the capillaries

Leads to better gas exchange.

SIDE EFFECTS TO CPAP

Very few side effects, however, here are some possibilities:

1. Hypotension
2. Pneumothorax
3. Aspiration
4. Drying of eyes

YOU <u>MUST</u> CALL FOR MEDICS
AS SOON AS YOU KNOW YOU ARE GOING TO USE IT.

Remove Mask IF……

Patient loses consciousness

starts to vomit

can't tolerate the CPAP

It is a useful tool - when used correctly.

INDICATIONS

Patients over 10 years old presenting in acute respiratory distress who are able to follow commands and maintain a patent airway who display findings of any of the following conditions:

- CHF
- Pulmonary edema
- Asthma/COPD
- Pneumonia

AND meets Two or more of the following criteria

INDICATIONS - Continued

Respiratory rate > 24/minute

Notable increased work of breathing

SpO2 < 92% at any time

Skin mottling, pallor or cyanosis suggesting hypoxia

Presence of abnormal breath sounds or frothy sputum

CONTRAINDICATIONS

Patient less than 10 yrs old

Respiratory arrest: Must be breathing on their own

Altered level of consciousness: Poor respiratory drive. CPAP will not help

Trauma or known pneumothorax: collapse of lung could be made worse with CPAP

Hypotension: (Sys BP <90) Could further decrease the blood pressure due increase intrathoracic pressure

CONTRAINDICATIONS - Continued

Facial trauma/deformity/burns inhibiting proper mask fit

Recent facial or gastric surgery

High risk of aspiration/active vomiting: could aspirate vomit into the lungs

Tracheostomy

SPECIAL CONSIDERATIONS

Remove CPAP if patient can not tolerate mask

Progression to respiratory failure

CPAP should not delay Rx admin

Advise the receiving facility of initiation of CPAP therapy as soon as practical

DNR is not a contraindication to CPAP use

Observe patient for S/S of

- Hypotension, respiratory failure or gastric distension

COMPLICATIONS

Heightened sense of claustrophobia or smothering

Abrasions to the bridge of the nose

Significant mask leak may lead to rapid life threatening hypoxia

Patient discomfort

Loss of definitive control of airway and breathing

Air in the stomach (less common)

COMPLICATIONS - Continued

Impaired access to airway for suctioning (less common)

Facial skin pressure stress (long term use)

High external pressures may increase intrathoracic pressures thus decreasing venous return and decreasing cardiac output (Rare complication)

Potential for barotraumas, pneumothorax or pneumomediastinum (Rare complication)

Potential for aspiration, gastric distention and inability to clear secretions (Rare complication)

PRECAUTIONS

Mechanical ventilation and intubation remains the mainstay of treatment for patient with persistent hypoxia or respiratory muscle fatigue

Intubation should be available for patients who do not respond to non-invasive positive pressure ventilation

Application and usage

Assess patient and determine if CPAP is appropriate

Explain the device to the patient. It may make the patient feel like they are being smothered and anxious. Help talk them through this.

Reassess the patient and make sure medics are enroute.

Discontinue CPAP and start bagging the patient if breathing becomes inadequate.

SUMMARY

CPAP is a non-invasive

Can only be used on alert patients that are breathing on their own.

It is easy to apply

Must be stopped if patient vomits or becomes unresponsive.

Works on most patients in respiratory distress.