NON INVASIVE VENTILATION.

DR RAMESH.

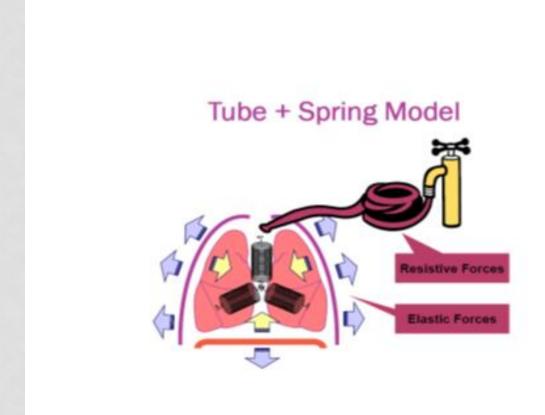
OBJECTIVES.

- Definitions.
- Advantage and disadvantage.
- Indications.
- Contraindications.
- · Modes.

INTRODUCTION.

- NIV is the delivery of mechanical ventilation to the lungs using techniques that does not need endotracheal intubation.
- Initially used for treatment of hypoventilation secondary to neuromuscular disease.
- Now accepted in the treatment of respiratory failure.

PHYSIOLOGY.



PHYSIOLOGY.

- Inspiration needs energy.
- Expiration is passive.
- Energy is needed to overcome resistance and elastic forces for the flow of gas.
- Respiratory failure occurs when resistance or elastic forces increases.

BENEFICIAL EFFECTS OF NIV.

- Increases the FRC.
- Moves the fluid out of the lungs.
- Avoids lung collapse.
- Increases the alveolar ventilation.
- Decreases the work of breathing.
- Improves the V/Q mismatch.
- Improves shunt.
- This leads to better oxygenation, CO2 clearance and Reduces WOB.

ADVANTAGES.

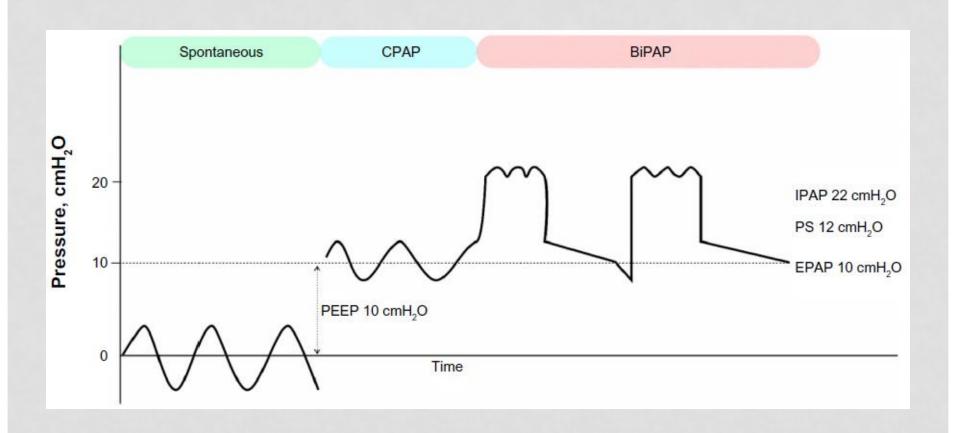
- Non invasive.
- Comfortable.
- No need of sedation.
- Oral patency maintained.
- Avoids complications of ETT.
- Reduced cost and LOS.

DISADVANTAGES.

- · Slow correction.
- Mask problems- leak, eye irritation and skin injury.
- Lack of airway access-suction, aspiration.
- Claustrophobic.
- Workload and supervision.

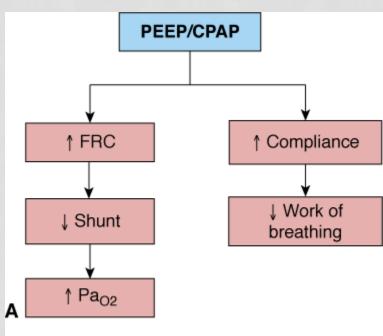
TYPES OF RESPIRATORY FAILURE AND TYPE OF NIV.

- Type 1 or hypoxemic failure.
- Type 2 or hyper carbic failure.
- Type 1- CPAP.
- Type 2- BiPAP.



CPAP.

Improves oxygenation.



Source: Tobin MJ: Principles and Practice of Mechanical Ventilation, 3rd Edition: www.accessanesthesiology.com

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BIPAP.

• EPAP

- Provides PEEP
- Increases FRC
- Reduces FiO2

· IPAP

- Decrease WOB and oxygen demand
- Increase TV
- Decrease RR

WHEN TO USE NIV

- Indication
- Contraindication
- Assessment- sick but not moribund, can protect airway, cooperative and stable hemodynamics.
- Ceiling of therapy

CONTRAINDICATIONS

- Agitated
- Unable to protect airway
- Excessive vomiting
- Unstable CVS
- Untreated pneumothorax
- Bowel obstruction
- Facial trauma, burns, surgery
- Fixed airway obstruction

COMPLICATIONS

- Failure
- Hypoxia
- Aspiration
- Low BP
- Pressure ulcers
- Gastric distension
- Barotrauma

LVF.

- CPAP- 5 to 8 to a maximum of 15.
- Titrate with saturation and ABG.
- Aim to achieve TV 7ml/kg and RR< 25.

COPD.

- EPAP- 3 to 8.
- IPAP- 15 to 30.
- Trigger- maximum sensitivity.
- Back up rate 15.
- I/E ratio 1:3.
- Titrate with saturation and ABG.

SETTING UP.

- Communication and reassurance.
- Correct mask size.
- Documentation.
- Follow up and recording observations.

Summary for providing acute non-invasive ventilation.

Indications Contraindications **NIV SETUP NIV Monitoring** for NIV for NIV Oxygenation COPD Absolute Mask Full face mask (or own if home user of NIV) pH < 7.35 Severe facial deformity Aim 88-92% in all patients pCO2 >6.5 Facial burns RR>23 Fixed upper airway **Initial Pressure settings** Note: Home style ventilators CANNOT If persisting after obstruction provide > 50% inspired oxygen. EPAP: 3 (or higher if OSA known/expected) bronchodilators and controlled oxygen therapy Relative If high oxygen need or rapid desaturation IPAP in COPD/OHS/KS 15 (20 if pH <7.25) pH<7.15 on disconnection from NIV consider IMV. (pH<7.25 and additional Up titrate IPAP over 10-30 mins to IPAP 20-30 to achieve adverse feature) adequate augmentation of chest/abdo movement and slow RR GCS <8 Confusion/agitation IPAP should not exceed 30 or EPAP 8* Cognitive impairment Neuromuscular without expert review (warrants enhanced disease observation) IPAP in NM 10 (or 5 above usual setting) Respiratory illness with Red flags RR > 20 if usual VC <1L even Indications for pH <7.25 on optimal NIV if pCO2<6.5 RR persisting > 25 referral to ICU **Backup rate** New onset confusion or patient distress pH < 7.35 and pCO2>6.5 AHRF with impending Backup Rate of 16-20. Set appropriate inspiratory time respiratory arrest Actions I:E ratio NIV failing to augment Check synchronisation, mask fit, exhalation COPD 1:2 to 1.3 chest wall movement or port : give physiotherapy/bronchodilators, OHS, NM & CWD 1:1 consider anxiolytic reduce pCO2 Inability to maintain Sao2 > Inspiratory time **CONSIDER IMV** 85-88% on NIV 0.8-1.2s COPD Obesity 1.2-1.5s OHS, NM & CWD Need for IV sedation or pH <7.35, pCO2>6.5, RR>23 adverse features indicating Use NIV for as much time as possible in 1st 24hours. need for closer monitoring Taper depending on tolerance & ABGs over next 48-72 hours Daytime pCO2> 6.0 and and/or possible difficult somnolent SEEK AND TREAT REVERSIBLE CAUSES OF intubation as in OHS. DMD. AHRE **NIV Not indicated** * Possible need for EPAP > 8 Asthma/Pneumonia Severe OHS (BMI >35), lung recruitment eg hypoxia in severe Refer to ICU for consideration IMV if kyphoscolios, oppose intrinsic PEEP in severe airflow increasing respiratory rate/distress obstruction or to maintain adequate PS when high EPAP pH <7.35 and pCO2 >6.5

A Craig Davidson et al. Thorax 2016;71:ii1-ii35



• Thank You.