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and Epidemic Control

Centre of Excellence for Clinical Management of COVID 19  
All India Institute of Medical Sciences, Bhopal

## Clinical Scenario

**A COVID patient in ICU:  
Oxygenation & Ventilation**



# Clinical Vignette

- A 77-year-old female with a history of hypertension and hyperlipidemia who presented as a transfer to our hospital facility with worsening fevers, cough, and respiratory distress.
- HR-65/min, BP 140/100 mmHg,
- RT-PCR Negative
- Oxygen@7 liters going
- RR 16-18
- Patient comfortable
- SpO2 -88-92

# Diagnosis

- Chest X ray
- USG
- CT Scan
- Role of Inflammatory marker

Discuss Plan of Oxygenation & Ventilation in this patient?

# What are Oxygen delivering devices?

Nasal Prong

Face Mask

Venturi Mask

Partially rebreathing Mask

Non-rebreathing Mask

Role of AMBU Bag

# Heated Humidified High flow Nasal Canula (HHHFNC)

- When should it be started?

- Advantages

  - CPAP 5-8

    - Reduce- Dead Space

      - Reduce work of breathing

        - Ciliary clearance is not hampered

- Parameters to be set

  - Flow

  - FiO<sub>2</sub>

  - Ambient Temperature

- Special Flow meter and preferably Central Oxygen supply

# Hiflow

<b>Heated Humidified</b>	<b>Provide Heated Humidified gas</b>
I-nspiratory demand	Can better meet peak inspiratory flow demand
F-RC	Enhance FRC
L-ight	More Easily tolerable than CPAP or BIPAP
O-xygen dilution	Can minimize oxygen dilution by meeting flow demand
W-ash out dead space	Can wash out dead space Help reduce work of breathing and enhance oxygenation

# Pitfalls & Disadvantages

- Size of Nasal Canula
- Mouth open or closed
- Non-displaced nasal canula

## **Disadvantage:**

- CPAP single level pressure support
- Max CPAP level are 5-8
- Burning sensation if distil water is not replaced
- Too much requirement of distil water
- Not effective in type II respiratory failure & ADHF

# NIV

## Initial NIV Setting:

- IPAP 10 cms of H<sub>2</sub>O titrated reapidly in 2-5 increments at a rate of approximately 5cms of water each 10 min
- Usual Pressure target of 20 or more until a therapeutic response is achieved or patients tolerability has been reached.
- EPAP of 4-6 is usually recommended
- Interface- Helmet, face mask, nasal mask etc
- Monitor frequently for leak



# How to check for NIV is working or not

## **Success of NIV:**

If no improvements in first 2 hours in

- Tachycardia
- Tachypnoea
- PH
- Oxygenation

## **Failure of NIV:**

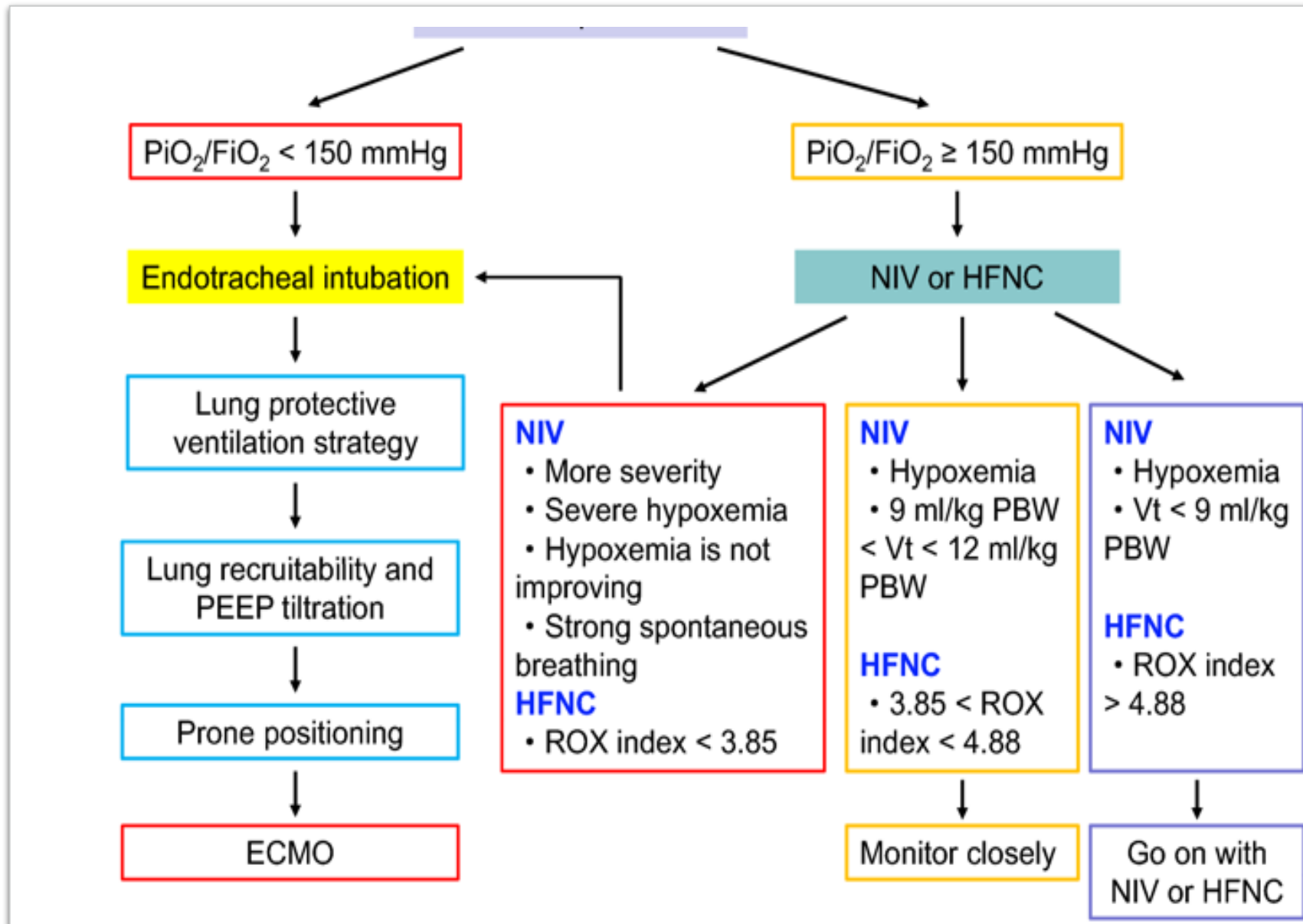
- GCS low, Poor tolerance, no improvements in above parameters, highly agitated, excessive secretions, High vasopressors

## Disadvantage of NIV

- Can not have meal without removing the interface
- Meal breaks may lead to desaturations
- Poor tolerance of interface specially F/M
- Can not be used in unconscious patient- may lead to aspiration
- Prolonged BIPAP Mask administration may lead to Facial erythema and skin necrosis

## **SILI:**

Self inflicted/induced lung injury- important in COVID patients



When to intubate?  
Early vs delayed vs DNI

COVID-19 with hypoxia

Indication for endotracheal intubation?

Yes

✓ **Do it:**  
Endotracheal intubation

✓ **Do it:**  
Expert in airway to intubate

✓ **Do it:**  
Use N-95/FFP-2 or equivalent  
and other PPE/infection  
control precautions

✓ **Do it:**  
Minimize staff in the room

⚠ **Consider: if available**  
Video-laryngoscope

No

Tolerating supplemental oxygen?

Yes

✓ **Do it:**  
Monitor closely for worsening

✓ **Do it:**  
Target SpO<sub>2</sub> 92 to 96%

✓ **Do it:**  
Appropriate infection  
control precautions

No

⚠ **Consider:** HFNC

Tolerating HFNC

Not tolerating HFNC or HFNC is not available

Indication for endotracheal intubation?

Yes

⊘ **Do not:**  
Delay intubation if  
worsening

No

⚠ **Consider:** a trial of NIPPV

✓ **Do it:** Monitor closely at short intervals

⊘ **Do not:** Delay intubation if worsening

# How to initiate the Invasive Ventilator



MODE OF  
VENTILATION



MINUTE  
VENTILATION



RESPIRATORY  
RATE



TIDAL VOLUME



I:E RATIO



RATE OF FLOW  
OF GAS & FLOW  
PATTERN



FIO<sub>2</sub>

# Which mode is better for COVID 19 patient

- NO Evidences till now.
- The Mode used for pneumonia Patients
- Low tidal volume strategies
- Plateau Pressure  $\leq 30-32$ , so it better to choose Pressure control mode
- (There are more incidences of Pneumothorax in COVID 19 patients)

# Early Extubation

- Once P/F value of  $\geq 140-150$  on  $\text{FiO}_2$  .4-.5, Driving Pressure 8-10
- $\text{PEEP} \leq 7-8$
- SBT  $\rightarrow$  P/F still 140  $\rightarrow$  T-Piece trial  $\rightarrow$  Successful  $\rightarrow$  Extubation
- **Post extubation Oxygenation Plan:**

BIPAP for 6-8 hours  $\rightarrow$  maintain  $\geq 94\%$  saturation  $\rightarrow$  on  $\text{FiO}_2$  .40  $\rightarrow$

Use Face mask (if more than 10 L oxygen required)  $\rightarrow$  Switch to HFNC w

With Awake Proning  $\rightarrow$  Face mask (if Oxygen required is less than 10 litres) ---  
-- Target  $\geq 94\%$  saturation ---- Switch to Nasal Prong



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Thank You

