PRONE POSITIONING
in
MECHANICALLY VENTILATED PATIENT

IARC

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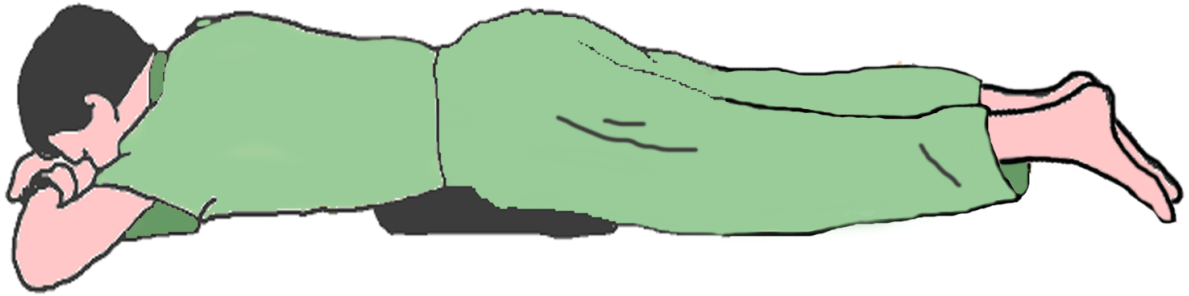
#indiaFightsCorona #RespiratoryTherapy #IARC #PronePostion

Introduction

- Maneuver where the patient is sleeps on his/her stomach also know as in the “Prone” position.
- It is done to manage severe hypoxemia.
- It is a strategy to improve oxygenation.

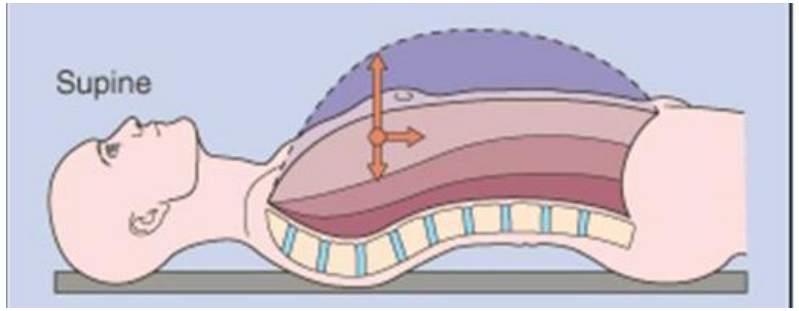


European Respiratory Review 2014 23: 249-257; DOI: 10.1183/09059180.00001114

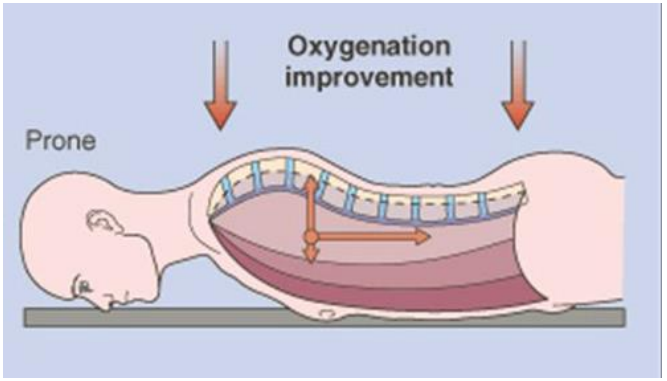
Highlights of prone position

- To improve oxygenation

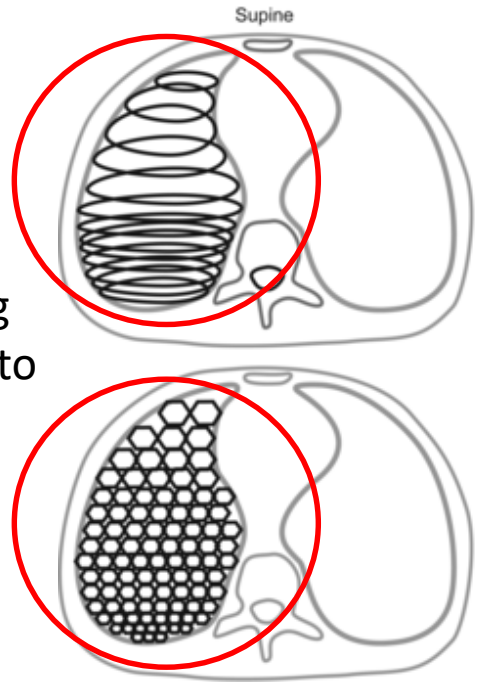
Supine



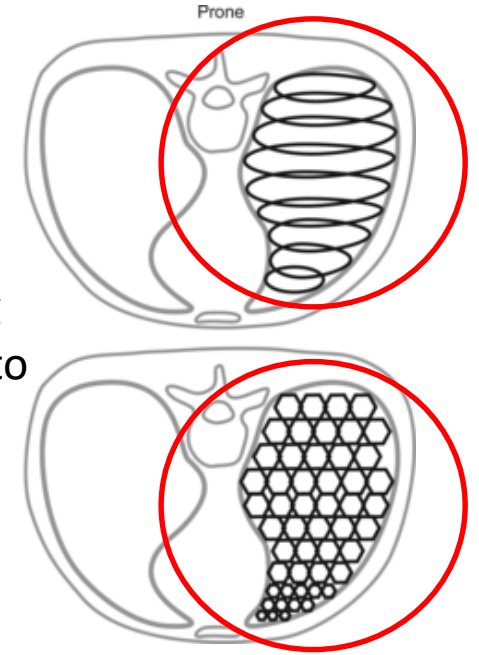
Prone



Expands the "front" of the chest allowing more oxygen to reach.



Expands the "back" of the chest allowing more oxygen to reach.



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A-summary-showing-the-sequential-effects-of-prone-position-on-acute-respiratory-distress_fig2_301637959 [accessed 12 Apr, 2020]

Highlights of prone position

- Reduce prolong ventilation.
- To improve respiratory mechanics
- To facilitate the drainage of secretions.
- To reduce Ventilator Associated Lung Injury (VALI).
- Done for at least 16-20 hours a day

Ghelichkhani, P., & Esmaeili, M. (2020). Prone Position in Management of COVID-19 Patients; a Commentary. *Archives of Academic Emergency Medicine*, *8*(1).

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When do you use Prone Positioning?

- Severe ARDS
- Failure to improve oxygenation despite lung protective ventilator strategies (low VT, high PEEP), lung recruitment maneuvers.
- Pao_2/FiO_2 < 150 with PEEP requirement of 10cmH_2O
- Reduced lung compliance

Chest. 2017 Jan; 151(1): 215–224.

When do you NOT use Prone Positioning?

- Facial/neck trauma or spinal instability
- Recent sternotomy or large ventral surface burn
- Elevated intracranial pressure
- Massive hemoptysis
- High risk of requiring CPR or defibrillation
- Abdominal and thoracic surgery

Chest. 2017 Jan; 151(1): 215–224.

What do you need before you begin?

- Minimal of 5 staff members to safely position the patient
- At least 5-10 foam dressings for padding
- 3 Waffle cushions: 2 for upper extremities and 1 for head
- 2 flat sheets

https://www.massgeneral.org/assets/MGH/pdf/news/coronavirus/prone-positioning-protocol.pdf

What do you need before you begin?

- ECG stickers
- Ambu with mask
- Gel pad for side of face/nose
- Additional off-loading may be needed around nose to protect from ETT/NGT, use:
  - Foam strip to cover nares/tip of nose, and bridge of nose

https://www.massgeneral.org/assets/MGH/pdf/news/coronavirus/prone-positioning-protocol.pdf

The Turning Procedure for patient on Mechanical Ventilation

Step 1 – Staffing

Team members to introduce themselves and state their role

Additional staff allocated to the management of chest drains/ECMO cannulas if in situ

Doctor or Respiratory Therapist positioned at head end and responsible for coordinating procedure

At least two other people either side of the patient, but more may be required depending on the size of the patient

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 2 – Positioning

Patient should be laid flat with the bed in a neutral position, on a clean sheet with a slide sheet beneath

Anterior ECG electrodes removed

Arm closest to the ventilator is tucked underneath the buttock with the palm facing anteriorly (See diagram)

Pillows if required, can be placed over the chest, iliac crests and knees.
They should be placed strategically, according to the patient's body to reduce the pressure on the abdomen

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 3 – Patient wrapping

- A clean bed sheet should be placed on top of the patient leaving only the head and neck exposed
- The edges from the top and bottom bed sheets are rolled tightly together thereby encasing the patient between the two and keeping the pillows in the correct position on top of the patient

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 4 – Horizontal Move

Keeping the bed sheets pulled taught and the edges rolled tight, the patient should be moved horizontally to lie on the edge of the bed

The direction of the horizontal move should be away from the ventilator in the opposite direction to which the patient will be turned

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 5 – Lateral turn

Maintaining a tight grip on the rolled up sheets and rotate the patient 90° to lie on their side

Staff should adjust their hand positions on the rolled up sheets

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 6 – Proning completion

Carefully turn patient into the prone position.

Carefully support the head and neck and turn the head to face the ventilator as the patient is moved from the lateral to prone position.

Ensure the ETT is not kinked and that a CO2 trace is still present on the capnograph. Note the length of the ETT at the lips and review ventilator settings.

Reattach the ECG electrodes and ensure all monitoring is re-established

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 7 – Positioning

Ensure the patient is in the centre of the bed and remove the slide sheet.

Absorbent pad placed under patients head to catch secretions

The patient should be nursed at 30° in the reverse Trendelenburg position

The position of both the head and arms should be alternated every two to four hours

Carefully position the arms in the ‘swimmers position’. This involves raising one arm on the same side to which the head is facing whilst placing the other arm by the patients side.

https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

Step 8 – Pressure Care

Ensure optimal positioning of pillows tailored to the patient's body habitus

Pressure areas should be meticulously checked. No direct pressure on the eyes

Ears not bent over

Penis hanging between the legs with the catheter secured
Lines / tubing not pressed against the skin

ETT not pressed against the corner of the mouth / lips
Nasogastric tube not pressed against nostril

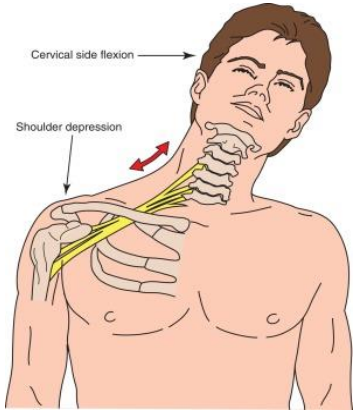
https://www.ficm.ac.uk/sites/default/files/prone_position_in_adult_critical_care_2019.pdf

When to stop?

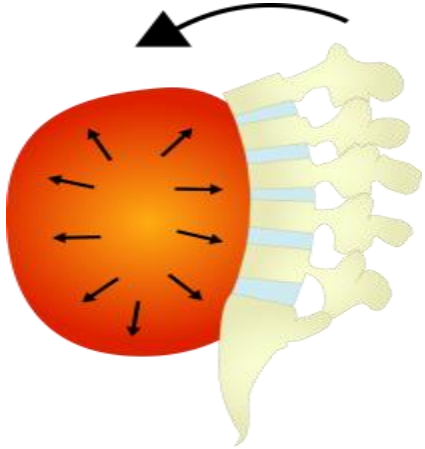
- When PaO_2/FiO_2 remains > 150 mm Hg 4 h after supinating (with PEEP < 10 cm H_2O and FiO_2 < 0.6).
- Optimal strategy is unclear: consider continuing prone positioning until clear improvement in gas exchange, mechanics, and overall clinical course.
- Target plasma Ph. >7.20 - <7.45
- Tidal volume 6PWD
- Target oxygenation 55- 80 mmhg

Chest. 2017 Jan; 151(1): 215–224.

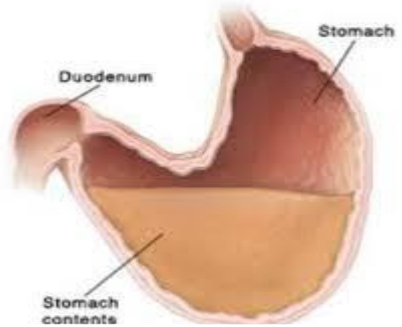
Potential complications



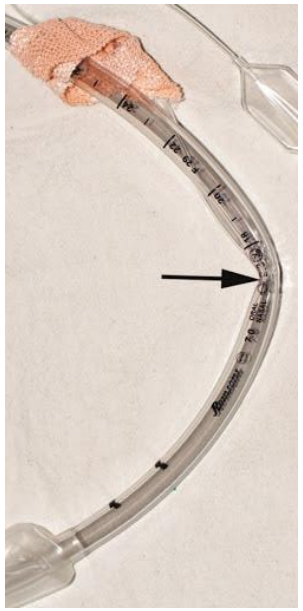
Brachial plexus injury



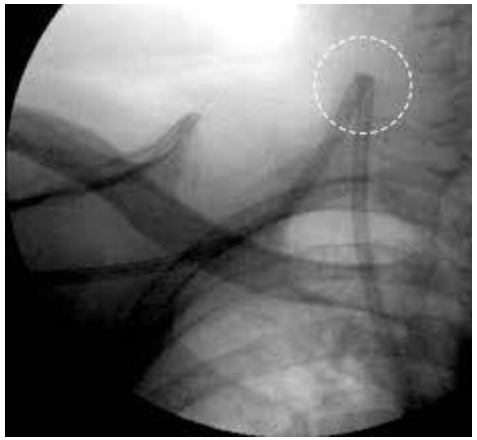
Elevated intra abdominal pressure



Increased gastric residuals



ET kinking



Vascular catheter kinking

Facial edema

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Thank you

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