

COVID-19

Proning in Spontaneously Breathing Patients

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Definitions

- Hypoxaemia
 - abnormally low level of oxygen in the blood ($\downarrow p_aO_2$)
- Hypoxia
 - inadequate O_2 supply to the tissue
 - may be general or local
- Possible to be hypoxaemic without being hypoxic

Mechanisms of Hypoxaemia

- $\downarrow F_iO_2$
- Hypoventilation
- V/Q mismatch
- Diffusion limitation
- Right-to-left shunt
 - anatomic
 - physiologic
- Haemoglobin disorders

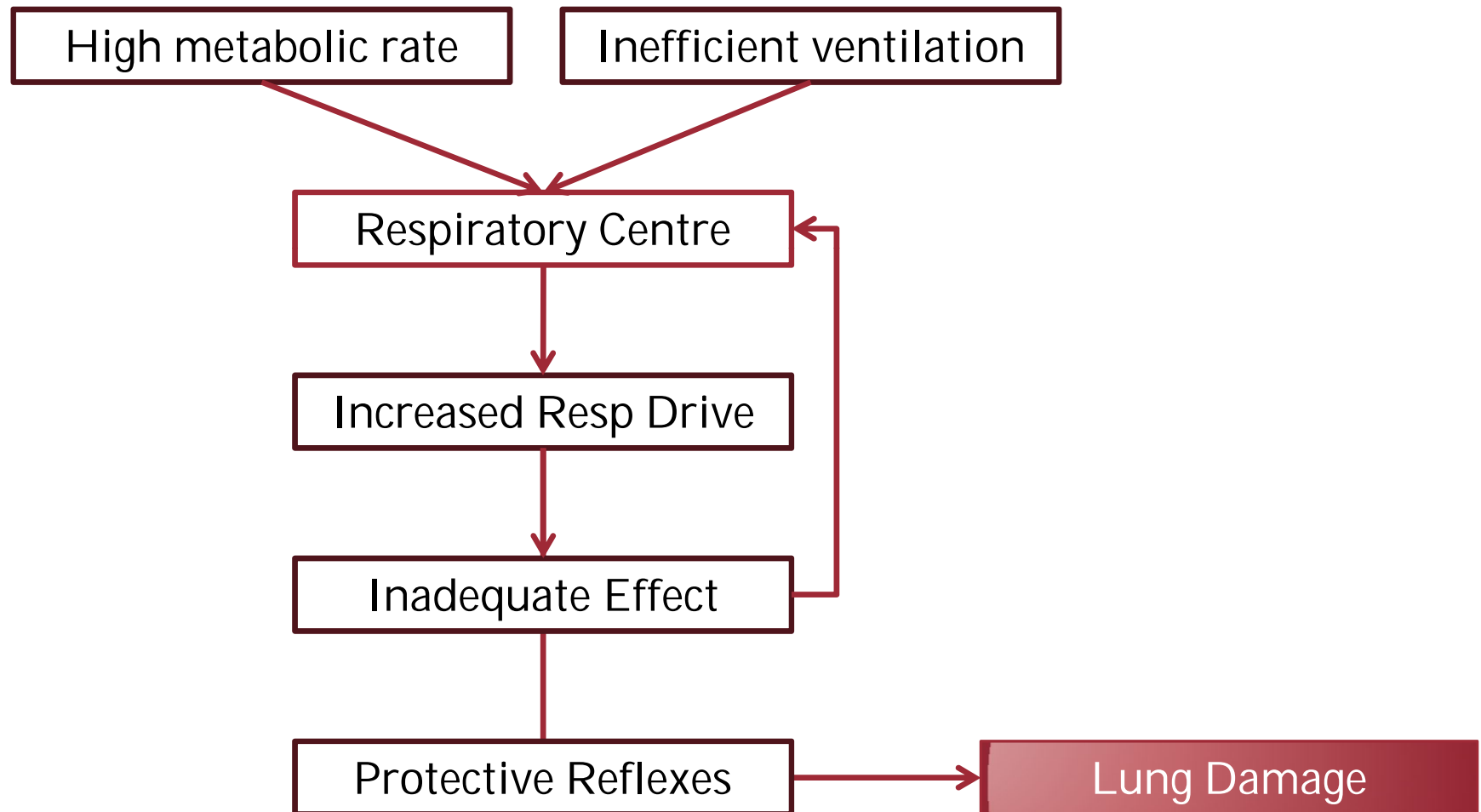
Differentiating the Mechanism

- $\downarrow F_iO_2$
 - Hypoventilation
 - V/Q mismatch
 - Diffusion limitation
 - Right-to-left shunt
 - anatomic
 - physiologic
 - Haemoglobin disorders
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- Corrects with O_2
 - Difficult to correct with O_2
 - $\uparrow\uparrow p_aCO_2$
 - Worsens with exercise

Hypoxaemia in COVID-19

- Inflammatory oedema
 - V/Q mismatch and shunting
- Lung microthrombi suspected
 - deadspace
- Sedation
 - dependent atelectasis
- Impaired hypoxic vasoconstriction
 - V/Q mismatch

P-SILI



Traditional Response

- Invasive mechanical ventilation
- Sedation
- Paralysis
- PEEP
- Lung protective ventilation strategies

COVID-19, ventilator shortages and the need for alternative strategies

Elharrar et al

- Single-centre before-after study, 24 patients
- Proned on current oxygenation strategy
- 4 did not tolerate (< 1 hr)
 - delayed intubation
- 6 of 15 showed 20% increase in p_aO_2 (9.9 → 12.7)
- 3 returned to baseline after supination

Sartini et al

- 1-day before-after study, 15 patients
- NIV and sessions of proning (median 2 sessions, 3 hr ea)
- P:F improved 100 → 122
- RR improved 28 → 24
- At 1 hr, remained improved in 12 of 15

Physiologic Basis

- Higher density of blood vessels in dorsal lung with improved V/Q matching
- ↓ chest wall compliance
- More homogenous ventilation
- More uniform distribution of stress

Evidence from ARDS

- Improves oxygenation
- Short durations not associated with improved survival
- 16 hr/day required

Cautious Conclusions

- Transient effect with return to baseline after supination
- Tolerance sometimes a limitation
- Benefits of short sessions questionable
- Can it prevent intubation?
 - physiological studies and RCT's in progress
- Will it result in delayed intubation?
 - monitor patients where prone positioning is used

References



EDITORIAL

Is the Prone Position Helpful During Spontaneous Breathing in Patients With COVID-19?

Irene Telias, MD; Bhushan H. Katira, MD; Laurent Brochard, MD

A substantial proportion of patients with coronavirus disease 19 (COVID-19) develop severe respiratory failure and

dation, paralysis, and positive end-expiratory pressure to control breathing effort ensures lung protective ventilation (ie, low