Summary of Current Literature: Prone Positioning in Critically Ill COVID-19 Patients

- No study till date evaluated effectiveness of mechanical ventilation in prone position with conventional ventilation in critically ill COVID-19 patients.
- Mechanical ventilation in prone position was used in varied proportion of critically ill patients; up to 28% of patients required prone positioning in one series.
- Indications and clinical impact of prone positioning have not been reported in these patients.
- One small study reported improvement in lung recruitability with prone positioning.

Prone Positioning in Critically Ill COVID-19 Patients

Journal Article, Retrospective series
March 30, 2020


Summary

Methods:
- Retrospective review of 24 critically ill, laboratory confirmed COVID-19 patients
- Data from the 9 ICUs in Seattle region, USA

Results:
- Mean (±SD) age was 64 (±18) years and 62% were male.
- Cough and shortness of breath were commonest symptoms (88% each) but only 50% patients were febrile at presentation.
- 58% had diabetes mellitus, 21% had chronic kidney disease and 14% were asthmatic.
- Lymphocytopenia was present in 75% patients and median lymphocyte count was 720/cubic ml.
- CT scan was performed in 23 patients and all had bilateral opacities.
- 75% patients required invasive mechanical ventilation and all of them had PaO2/FiO2 ratio within definition of moderate to severe ARDS.
- Median driving pressure was 12-13 cm H2O during the first three days of ventilation.
- Five patients (28%) were placed in a prone position, 7 (39%) received neuromuscular blockade, and 5 (28%) received inhaled pulmonary vasodilators.
- 50% patients died in the ICU, 17% had been discharged from the ICU but remained in the hospital, 3% were receiving mechanical ventilation and were still in the ICU, and 21% had been discharged from the hospital on 23rd March 2020.

Conclusion:
- More than one-fourth patients required prone positioning.
- ICU mortality was high in critically ill COVID-19 patients.

Appraisal
- Only a small number of patients were recruited
- Indications of prone positioning were not reported.
- No data were reported about the outcome of patients who required prone positioning.

Opinion
This small retrospective series reported that majority of the critically ill patients required mechanical ventilation. Around one-fourth of all critically ill patients required prone positioning; however, neither clinical context of prone positioning nor clinical or physiological outcomes of these patients were reported.

Prone Positioning in Critically Ill COVID-19 Patients

Journal Article, Retrospective study of consecutive patients
April 6, 2020

Summary

Methods:
- Retrospective review of 1591 critically ill, laboratory confirmed COVID-19 patients
- Respiratory data were available for 1300 patients
- Data from the ICU networks in Lombardy, Italy

Results:
- Median age was 63 years and 82% were male.
- 68% patients had at least one comorbid condition; hypertension was the commonest (49%) followed by cardiovascular disease (21%). Only 4% patients had associated COPD
- 88% patients received invasive mechanical ventilation and 11% patients received non-invasive ventilation.
- Median PaO2/FiO2 was 160 in all patients with older patients (≥64 years) had lower PaO2/FiO2 ratio [Median difference of 7].
- Median (IQR) positive end-expiratory pressure (PEEP) was 14 (12-16) cm H2O, 89% patients required FiO2 of 0.5 or more and 12% patients required FiO2 of 1.0.
- 27% patients required prone positioning and 1% required ECMO.
- Hypertensive patients were older [median difference 4 years], required higher PEEP and had lower PaO2/FiO2 ratio [median difference 27].
- At the time of writing this paper, 16% patients had been discharged from ICU, 26% patients died in the ICU and 58% patients were still in the ICU.

Conclusion:
- Majority of critically ill patients in Italy were older males and most of them required mechanical ventilation with high PEEP and FiO2
- Nearly one-fourth patients required prone positioning.

Appraisal
- More than half the patients were in the ICU at the time of writing the paper.
- Indications for prone positioning were not reported.
- No data were reported about the outcome of patients who required prone positioning.

Opinion
This retrospective series reported that majority of critically ill patients required mechanical ventilation, high FiO2 and PEEP. Around one-fourth of all critically ill patients required prone positioning; however, neither indication of prone positioning nor outcome of these patients were reported.

Prone Positioning in Critically Ill COVID-19 Patients

Journal Article, Retrospective study
March 23, 2020

Summary

Methods:
- Retrospective review of 12 critically ill, COVID-19 pneumonia patients fulfilling Berlin definition of ARDS
- Single-centre data from China

Results:
- Mean age was 59 years and 7 were male.
- On the day of intubation, mean PaO2/FiO2 was 130 with mean PaCO2 of 57mmHg.
- Seven patients required at least one session of prone ventilation within the six-day observation and three patients received both prone ventilation and ECMO.
- Alternating body position between supine and prone positioning was associated with increased lung recruitability (p=0.02, between group Chi-square test)
- In patients who received prone position, PaO2/FiO2 increased from 120±61 mmHg at supine to 182±140 mmHg at prone (p=0.065 by paired t-test).

COVID-19: Making sense of the literature

- 28-day mortality rate was 61.5% and median time of death since ICU admission was 7 days.
- Three patients died.

**Conclusion:**
- Majority patients with ARDS and COVID-19 pneumonia had poor lung recruitability.
- Prone positioning was associated with increased lung recruitability.

**Appraisal**
- Small sample size of only 12 patients
- Detailed respiratory mechanics data were not reported.
- Patients received various days of non-invasive or invasive ventilatory support before inclusion in the study.
- No formal data collection was performed.

**Opinion**
This retrospective series reported that more than two-thirds of critically ill patients required mechanical ventilation and more than 60% patients died within 28 days. Around 11% of all critically ill patients required prone positioning; however, neither indication of prone positioning nor outcome of these patients were reported.

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**Prone Positioning in Critically Ill COVID-19 Patients**

Journal Article, Retrospective study of consecutive patients

February 24, 2020


**Summary**

**Methods:**
- Retrospective review of 52 critically ill, COVID-19 pneumonia patients
- Single-centre data from Wuhan, China

**Results:**
- Mean age was 59.7 years and 67% were male.
- Fever (98%), cough (77%) and dyspnea (63.5%) were commonest presenting features.
- Forty percent patients had chronic disease and 13.5% had cerebrovascular disease.
- Median duration from onset of symptoms to radiological confirmation of pneumonia was 5 days and median duration from onset of symptoms to ICU admission was 9.5 days.
- Median APACHE II score was 17; 67% patients developed ARDS, 29% patients had acute kidney injury, 23% patients had cardiac injury and 29% patients developed liver dysfunction
- Around 71% patients received invasive mechanical ventilation and 11.5% patients received prone position ventilation.
- Compared with survivors, non-survivors were older [mean age 64.6 years vs 51.9 years] and were more likely to have chronic medical illnesses [53% vs 20%], more likely to develop ARDS, and to receive mechanical ventilation, either invasively or non-invasively
- 28-day mortality rate was 61.5% and median time of death since ICU admission was 7 days.

**Conclusion:**
- Older patients (>65 years) with comorbid conditions and ARDS were at increased risk of death.
- More than 10% of all critically ill patients required prone position mechanical ventilation.

**Appraisal**
- Small sample size of only 52
- Indications of prone positioning were not reported.
- No data were reported about the outcome of patients who required prone positioning.
- Details of respiratory data were not reported

**Opinion**
This retrospective series reported that more than two-thirds of the critically ill patients required mechanical ventilation and more than 60% patients died within 28 days. Around 11% of all critically ill patients required prone positioning; however, neither indication of prone positioning nor outcome of these patients were reported.
COVID-19: Making sense of the literature

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