Pronation in awake COVID-19 patients: a systematic review and meta-analysis

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Background

Pronation is an evidence-based treatment in mechanically ventilated patients with acute respiratory distress syndrome (ARDS). It is meant to improve respiratory mechanics and oxygenation, to reduce atelectasis, regional differences in alveolar inflation, ventilation distribution and pleural pressure gradient. We investigate pronation efficacy and safety in COVID-19 patient.

Methods

We performed a systematic review and meta-analysis of studies on awake proning. Inclusion criteria: awake COVID-19 patients; ≥18 years; with/without sedation; pronation for respiratory failure. The primary endpoint was failure rate due to poor compliance, need for mechanical ventilation or death. Differences in PaO2/FiO2, pO2, SpO2 and respiratory rate before and after pronation, occurrence of side effects and death were analyzed. We compared pre- post pronation variations in the indices of gas exchange, respiratory rate and oxygen saturation..

Results

We included 21 manuscripts involving 348 patients. No failures due to poor compliance or death were reported. Need for mechanical ventilation was reported in 98/348 (28.2%) patients. Adverse events related to pronation were rare.

Patients who underwent pronation showed a significant improvement in SpO2 (MD -6.84; 95%CI -12.25; - 1.42; p 0.01) and PaO2 (MD -39.13; 95%CI -72.22; -6.04; p 0.02), while respiratory rate was reduced (MD 4.16; 95%CI 0.43; 7.89; p 0.03). No difference in PaO2/FiO2 were found.

Table 2: Difference in respiratory parameters before and after prone positioning cycles

Outcome	Number of includes studies	Number of included patients	MD	95% CI	P for effect	I^2 (%)
Δ SpO2	5	136	-6.84	-12.25; -1.42	0.01	98
Δ PaO2	4	50	-39.13	-72.22; -6.04	0.02	93
Δ PaO2/FiO2	2	113	-66.91	-142.36; 8.55	0.08	88
Δ Respiratory Rate	3	124	4.16	0.43; 7.89	0.03	85

MD: mean difference; CI: confidence interval; P: p-value

Conclusions

Prone position is a feasible, safe and effective maneuver in awake COVID-19 patients with acute respiratory failure and is associated with a reduction of respiratory rate and with an improvement of SpO2 and PaO2.