Effect of Driving Pressure on Prone Position to Mortality Rate among ARDS Patients in Phramongkutklao Hospital

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Background: Acute respiratory distress syndrome (ARDS) is still associated with significant mortality. Until now, only three interventions have been proven mortality benefit; namely, low tidal volume (VT) targeting 6 ml/kg predicted body weight, early administration of neuromuscular blocking agent, and prolonged sessions of prone positioning. Recently, data showed that lower driving pressure is also associated with lower mortality rate in ARDS patients. Therefore, decreasing driving pressure after prone position (PP) might be associated with decreasing mortality among ARDS patients.

Objective: To study the effect of driving pressure on prone positioning to mortality rate.

Methods: A prospective cross-sectional study was conducted in patients diagnosed as ARDS with PaO2/FiO2 less than 150 who underwent prone positioning protocol in Phramongkutklao Hospital from October 2016 to December 2017.

Results: Seventeen patients were included in this study with the average age of 60 years old. Nine patients (52.9%) were male. Mean PaO2/FiO2 ratio was 115.33 (±39.37) and respiratory compliance was 20.9 (±5.5). Median time to PP after diagnosed ARDS was 12 (6, 20) hours. The mean duration of PP session was 17.35 (±3.52) hours. Majority of the patients had intrapulmonary-cause ARDS (82.4%), mainly pneumonia. The driving pressure was 17.59 ± 3.2 at supine position (dPS1). After using PP, driving pressure significantly decreased to 15.65 ± 2.18, 15.59 ± 2.76, 15.47 ± 2.67 at 1 hour (dPP1), 4 hours (dPP4) and 16 hours (dPP16), respectively (P < 0.05). After completing the first session of PP, driving pressure was recorded at the supine position again (dPS2), which significantly decreased to 14.88 ± 3 (p = 0.012). The 28-day mortality rate was 52.9%. The initial driving pressure at supine position (dPS1) was 17.25 ± 2.66 and 17.89 ± 3.79 in survivor and non-survivor groups (p = 0.691). There was a trend that driving pressure after PP was lower in the survivor group compared to the non-survivor group, 15.63 ± 2.72 vs 15.67 ± 1.73 (p = 0.970), 14.88 ± 3.18 vs 16.22 ± 2.33 (p = 0.331) and 14.88 ± 2.47 vs 16.0 ± 2.87 (p = 0.404), in dPP1, dPP4 and dPP16, respectively. Driving pressure at supine position after completion of PP (dPS2) in the survivor group was significantly lower in the non-survivor group, 13.38 ± 1.92 vs 16.22 ± 3.23 (p = 0.047).

Conclusion: The driving pressure decreases significantly after PP. There is a trend that driving pressure during PP among the survivor group could be lower than the non-survivor group. While, the higher driving pressure at supine position after the first session of PP significantly is related to higher mortality.

Keywords: Driving pressure, Prone position, ARDS