Efficacy Evaluation of Continuous Epoprostenol Inhalation in the Treatment of ARDS, Including SARS-CoV-2 Related ARDS

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Introduction: Acute respiratory distress syndrome (ARDS) affects 10% of ICU admissions and 23% of mechanically ventilated patients and has an associated mortality rate of 40-50%.[1-3] Along with identifying and treating the cause, the management of ARDS is mainly supportive with goals of improving oxygenation, minimizing pulmonary edema, and preventing ventilator lung injury.[2,4-5] Pulmonary vasodilators, such as inhaled nitric oxide and inhaled epoprostenol, have been used as adjunctive therapy in those patients with severe ARDS, but there is an unknown clinical significance of their use. The purpose of this study is to identify the response rate to inhaled epoprostenol and to identify patient characteristics associated with a positive response to inhaled epoprostenol in adults with ARDS.

Methods: Patients over the age of 18 years old diagnosed with ARDS and treated with inhaled epoprostenol were included in the study. The primary endpoint was the determination of patient characteristics associated with a positive response to inhaled epoprostenol. Positive response was defined as an improvement in PaO_2:FiO_2 (P:F) of at least 10% within six hours of inhaled epoprostenol initiation. Secondary endpoints included the percentage of patients with a positive response to inhaled epoprostenol and the change from baseline to six hours in PaO_2:FiO_2 and SpO_2:FiO_2. Statistical analysis included multivariate logistic regression and Wilcoxon Signed Rank test.

Results: 331 patients met inclusion criteria and were included in the study. Lower baseline P:F was associated with increased likelihood of positive response (OR 0.973, (95%CI 0.985-0.981), $p < 0.001$). SARS-CoV-2 related ARDS was associated with a lower likelihood of response (OR 2.137 (95%CI 1.265-3.609), p 0.005). Other variables tested were not significantly associated with a positive response. We observed a 67.1%(n=222) positive response rate to inhaled epoprostenol in our general population. When broken down into subgroups, SARS-CoV-2 related ARDS had a 57.7% positive response rate while non-SARS-CoV-2 related ARDS had a 71.8% positive response rate. Within six hours, inhaled epoprostenol caused a statistically significant change in PaO2:FiO2 (71 before vs 95 after, $p < 0.001$) and SpO2:FiO2 (94 before vs 120 after, $p < 0.001$).

Conclusion: Inhaled epoprostenol was associated with a positive effect in a majority of moderate to severe ARDS patients, including patients with SARS-CoV-2-related ARDS. A lower baseline P:F and non-SARS-CoV2-related ARDS was associated with an increased likelihood of a positive response to inhaled epoprostenol.

References

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