

DETERMINATION OF POSITIVE END-EXPIRATORY PRESSURE IN PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME – A VENTILATION-PERFUSION MATCHING APPROACH

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BACKGROUND/AIM: To determine the effects of different positive end-expiratory pressure (PEEP) in the lung protective strategy on ventilation-perfusion distribution measured by the multiple inert gas elimination technique.

METHODS: Eight patients ventilated with low tidal volume in medical intensive care unit were subjected to this study. The inflation pressure-volume curve was obtained and the lower inflection point pressure (P_{LIP}) was determined. The intrapulmonary ventilation/perfusion distribution was measured by the multiple inert gas elimination technique. To each patient, six levels of PEEP were studied in an incremental manner from 0 to 8 cmH₂O above the P_{LIP} .

RESULTS: These patients had a large intrapulmonary shunt and dead space with an additional mode at the high ventilation-perfusion regions. Intrapulmonary shunt and dead space improved with increasing positive end-expiratory pressure up to 2-5 cmH₂O above the lower inflection point pressure. Higher PEEP increased dead space without further reduction in intrapulmonary shunt. The dispersion of ventilation and perfusion also followed a similar trend. Other endpoints commonly used for titrating positive end-expiratory pressure, such as oxygenation, alveolar recruitment and lung compliance, all increased with increasing PEEP while hemodynamic parameters were unaffected.

CONCLUSION: Our results suggested that PEEP of 2-5 cmH₂O above the lower inflection point pressure may provide optimal ventilation-perfusion matching during protective lung ventilation.

Key words: positive end expiratory pressure, lower inflection point, intrapulmonary shunt, multiple inert gas elimination technique