

Driving pressure and hospital mortality in non-ARDS patients



According to researchers in Canada, driving pressure was not associated with hospital mortality in a cohort of mechanically ventilated, critically ill patients without Acute Respiratory Distress Syndrome (ARDS), in whom compliance was also not associated with mortality. They say their findings published in the journal CHEST need to be replicated in other patient cohorts.

Previous research shows that driving pressure is associated with mortality in patients with ARDS and with pulmonary complications in patients undergoing general anaesthesia. Whether driving pressure is associated with outcomes of patients without ARDS ventilated in the intensive care unit is unknown. In this study, the researchers sought to determine the independent association between driving pressure and outcomes in mechanically ventilated patients without ARDS on day 1 of mechanical ventilation.

This retrospective analysis included a cohort of 622 mechanically ventilated adult patients without ARDS on day 1 of mechanical ventilation from five intensive care units from a tertiary centre in the United States. Primary outcome was hospital mortality. The presence of ARDS was determined using the minimum daily PaO₂:FiO₂ (PF) ratio and an automated text search of chest x-ray reports. The dataset was validated by first testing the model in 543 patients with ARDS.

The research team found that the driving pressure on day 1 was not associated with hospital mortality in a cohort of critically ill patients without ARDS ventilated for 48 hours or more. The results of the primary analysis were confirmed in a series of preplanned sensitivity analyses. In addition, the team found that the driving pressure affects patients with a PF ratio ≤ 300 regardless of the results of the chest x-ray or, consequently, the diagnosis of ARDS.

According to the researchers, there are several possible explanations for the lack of association between driving pressure and hospital mortality in patients without ARDS:

- Direct pressure is a way of representing the tidal volume adjusted for the compliance and can be calculated from these numbers. There is no evidence that compliance is a major risk factor for mortality in patients without ARDS; therefore, it should not be surprising that a “compliance adjusted tidal volume” was not associated with mortality.
- Only 11% of patients without ARDS and 18% of patients who had ARDS did not have spontaneous respiratory rates greater than the set respiratory rate. During an assisted breath, the patient generates part of the total work of breathing, and the measured plateau pressure may be a poor surrogate for the transpulmonary pressure.
- Patients without ARDS received uniformly low levels of positive end-expiratory pressure (PEEP). Muscedere et al. showed that ventilating rat lungs with smaller volumes and PEEP below the lower inflection point of the volume-pressure curve resulted in ventilator-induced lung injury. The combination of low PEEP and low driving pressure could have had similar effects in this dataset, the researchers point out.
- The study’s dataset might have lacked the power to detect an association between driving pressure and mortality or might, as in any clinical database, contain spurious measurements, which increased noise and interfered with the finding of an actual association.

“The results from our data are compatible with a difference that spans a 4% reduction to a 5% increase in the odds of dying for each cmH₂O increase in the average driving pressure in the first full day of mechanical ventilation. However, we must note that the true difference is more likely to be towards the centre of that interval,” the researchers write.

Source: [CHEST](#)

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