

Timing of Invasive Mechanical Ventilation in Patients With Sepsis



Mechanical ventilation (MV) can be both beneficial and harmful for critically ill patients. It improves gas exchange, reduces the work of breathing, and lowers self-inflicted lung injury risk. MV, often accompanied by sedatives and neuromuscular blockers, can also reduce oxygen consumption and carbon dioxide production, and in patients with cardiac issues, it may enhance heart function by decreasing intrathoracic pressure. These effects can stabilise haemodynamics and correct acid-base disturbances in sepsis. However, MV can lead to ventilator-induced lung injury, diaphragm dysfunction, laryngeal injuries from intubation, and complications from sedatives like delirium and prolonged ICU stays.

These risks sometimes lead physicians to use noninvasive ventilation (NIV) or high-flow nasal cannula (HFNC) as alternatives, though these methods can delay necessary MV and may result in worse outcomes if they fail. The effectiveness of early MV in sepsis remains debated, with some studies showing benefits and others showing no significant advantage.

This study aimed to explore the impact of the timing of invasive MV on outcomes in a large cohort of sepsis patients, hypothesising that early MV is beneficial. The study analysed data from adult sepsis patients admitted to the ICU and receiving MV between September 2019 and December 2021. Data was sourced from 20 hospitals in Korea via the Korean Sepsis Alliance. Patients were categorised into 'early MV' (those who started MV on the first day of ICU admission) and 'delayed MV' (those who started MV later). The study compared outcomes such as ICU mortality, hospital mortality, length of ICU and hospital stay, and organ failure at ICU discharge between the two groups.

Among 2440 patients who received MV during ICU stay, 2119 were in the 'early MV' group and 321 in the 'delayed MV' group. 295 patients from each group with similar baseline characteristics were compared.

The 'early MV' group showed lower ICU mortality compared to the 'delayed MV' group (36.3% vs. 46.4%). The 'early MV' group also had lower in-hospital mortality, shorter ICU stays, and required tracheostomy less often. 'Early MV' was associated with reduced ICU mortality.

This study's results align more closely with studies on acute respiratory failure (ARF), acute respiratory distress syndrome (ARDS), and COVID-19, which also suggested mortality benefits with early MV.

The study also noted that early MV was linked to a reduced need for tracheostomy and a shorter ICU stay, challenging the notion that early MV necessarily prolongs ICU duration due to sedatives and paralyzing agents. However, it did not find a significant difference in ARDS progression between early and delayed MV groups. Additionally, while renal replacement therapy was more frequent in the early MV group, fewer patients needed it by ICU discharge, indicating a potentially favourable impact on renal function.

In sepsis patients admitted to the ICU who received invasive MV, early MV was associated with lower ICU and in-hospital mortality, a shorter ICU stay, a reduced need for tracheostomy, and a relatively lower frequency of renal replacement therapy at ICU discharge.

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