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Diaphragm Dysfunction on Admission to ICU: Prevalence, Risk Factors and Prognostic Impact - a Prospective Study.

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Abstract

Rationale: Diaphragmatic insults occurring during intensive care unit (ICU) stays have become the focus of intense research. However, diaphragmatic abnormalities at the initial phase of critical illness remain poorly documented in humans. **Objective:** To determine the incidence, risk factors, and prognostic impact of diaphragmatic impairment on ICU admission. **Methods:** Prospective, six-month, observational cohort study in two ICUs. Mechanically ventilated patients were studied within 24 hours following intubation (day-1) and 48 hrs later (day-3). Seventeen anesthetized intubated control anesthesia patients were also studied. The diaphragm was assessed by twitch tracheal pressure (Ptr,stim) in response to bilateral anterior magnetic phrenic nerve stimulation. **Main Results:** Eighty-five consecutive patients aged 62 [54-75] (median [interquartile range]) were evaluated (medical admission 79%; SAPS II, 54 [44-68]). On day 1, Ptr,stim was 8.2 [5.9-12.3] cmH₂O and 64% of patients had Ptr,stim <11 cmH₂O. Independent predictors of low Ptr,stim were sepsis (linear regression coefficient, -3.74; standard error, 1.16; p = 0.002) and SAPS II (linear regression coefficient, -0.07; standard error, 1.69; p = 0.03). Compared to non-survivors, ICU survivors had higher Ptr,stim (9.7 [6.3-13.8] vs. 7.3 [5.5-9.7] cmH₂O, p=0.004). This was also true for hospital survivors vs. non-survivors (9.7 [6.3-13.5] vs. 7.8 [5.5-10.1] cmH₂O, p=0.004). Day 1 and day 3 Ptr,stim were similar. **Conclusions:** A reduced capacity of the diaphragm to produce inspiratory pressure (diaphragm dysfunction) is frequent upon ICU admission. It is associated with sepsis and disease severity, suggesting that it may represent another form of organ failure. It is associated with a poor prognosis.

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