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Timing of Limitations of Life Support in the Intensive Care Unit and Sequential Organ Failure Assessment (SOFA) scores: The Authors Reply

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We thank Dr. Sprung (1) for his comments regarding our study evaluating the association between changes in organ failure status and limitations in the use of life support (2). We agree that advance directives and neurological disorders are important factors associated with the use of life support (3). Patients were excluded from our analysis if they were in a neurological specialty ICU at the study site hospital, had pre-existing cognitive impairment, or had any pre-existing limitation in life support at the time of enrollment. Thus, neurological disorders and advance directives limiting the use of life support were unlikely to have a major influence in our analysis. As mentioned by Dr. Sprung, we also considered the impact of chronic diseases by adjusting for 2 separate comorbidity indices, the Charlson Comorbidity Index (4) and the Functional Comorbidity Index (FCI)(5), in our statistical analyses.

We see consistency in our findings, from a multi-site cohort of acute lung injury patients in Baltimore, USA, with those of the Ethicus study, which surveyed intensivists in Europe (6).

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Specifically, we observed an increasing rate of limitations in life support when SOFA scores did not improve over multiple days in the intensive care unit. We believe that this finding provides empirical support for Ethicus' survey-based finding that intensivists' most common reason for end of life decisions was "unresponsiveness to maximal therapy."

Unresponsiveness to maximal therapy was defined in Ethicus in one of two ways: (2) a hypoxemic patient who does not have an increase in arterial oxygen tension (PaO_2) in response to an increasing fraction of inspired oxygen (FiO_2) and increasing positive end-expiratory pressure, or (3) a patient in shock whose blood pressure does not increase in response to vasopressors (6). The respiratory component of the SOFA score, used in our study, is determined by the $\text{PaO}_2/\text{FiO}_2$ ratio, and the cardiovascular component is defined by mean arterial pressure, and the number and dose of vasopressors required. Thus, an ALI patient whose SOFA score does not improve over days of treatment in the ICU is likely to meet the Ethicus definition of being unresponsive to maximal therapy.

Hence, we believe that both our findings and those of the Ethicus study suggest that in critically ill patients, decisions to limit life support are infrequent until days of life-sustaining treatment have demonstrated no meaningful improvement. The fact that two studies, with different designs and conducted on different continents, reached such similar conclusions should strengthen our confidence in these results.

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