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## To Withdraw or To Continue ICU Care: When is it a Premature Question?

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### Keywords

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The decision to withdraw care in critically ill patients in Intensive Care Units (ICUs) is complex, ethically challenging, and has been associated with an increased incidence of physician and nursing burnout (1). Efforts have been made to create guidelines to facilitate these decisions (2). Ideally, goals of care decision-making is a collaboration between patients and their surrogates with guidance from the healthcare team; it should be individualized, not prescriptive. Several studies have focused on the communication aspects that influence these decisions (3), but very few studies have evaluated the decision itself to withdraw care, or the impact of decision-making variations on patient outcomes.

In a single center retrospective study out of Cleveland, Weimer *et al.*, evaluated 383 patients with intracranial hemorrhage and found that there was an increased incidence of premature in-hospital death in those patients where a decision was made to withdraw life-support. However, in the group where there was a decision to continue care, 98% died or remained severely disabled at twelve months. Thus, the authors concluded that “withdrawal of life-sustaining therapy may not represent a self-fulfilling prophecy” in terms of patient outcomes. In this current issue of *Critical Care Medicine*, Maharaj *et al.* parse through whether variations in ICU level practice contribute to a decision to withdraw or withhold life-sustaining treatment (DWLST) and to patient 180-day mortality (4).

The current study used a retrospective observational cohort design to include adult (age > 16) ICU patients from the United Kingdom National Clinical Database (247 ICUs) from 2009 to 2016. The authors assessed patient and ICU demographics and used an instrumental variable analysis. The analysis assists in accounting for causal inference and confounders. This type of analysis (5) required two steps: 1) construction of the instrumental variable as the estimated random ICU effect on DWLST and 2) evaluation of the effect of the instrumental variable on patient outcome (mortality at 180 days). Additional subgroup

analyses and statistical modeling was completed to assess the validity of the instrument. The study focused on patients for whom DWLST was affected by the ICU-level instrument variable and those in the “marginal population” defined as individuals who are neither so unwell that a DWLST would likely be made regardless nor those that are so robust that a DWLST would never be considered.

The study included 92,327 adult patients in whom a DWLST has been made (about 11.6% of the total ICU patients during the timeframe of the study). Notably, there was a higher incidence of DWLST in nursing home patients, patients with longer ICU stay, those with a higher APACHE II score, and those readmitted to the ICU during the same hospital course, suggesting that patients with a DWLST were more critically ill and/or were older. Conversely, there was a lower incidence of withdrawal of care in ICUs with larger patient volumes (greater than ten beds) and in surgical ICUs compared to medical ICUs (odds ratio 0.22, CI 0.22–0.22;  $p < 0.001$ ). Using instrumental variable analysis, the authors assessed the practice pattern variation in ICUs with different characteristics and estimated that for 5.9% of the patients, a DWLST was influenced by the specific ICU of admission. It was also found that having a DWLST made was associated with an increase in 180-day mortality of 25.6% (95%CI 23.2% to 27.9%).

The discrepancy in DWLST amongst critically ill surgical versus medical patients has been noted previously in the UK database (8), and could suggest that patients who are well enough to tolerate surgery are a healthier population than those in medical ICUs where a subset may be suffering from end stage diseases that would preclude surgical candidacy. Another retrospective study with patient propensity matching looked at outcomes in obese patients in medical versus surgical ICUs and found that there was an increased incidence of death in medical versus surgical patients (21% vs 13%;  $p = 0.03$ ) (9). Are these practice pattern variations a characteristic of the medical condition of the patient, physician training background, or ICU culture? This will be nearly impossible to determine.

In addition, the ICU volume–outcome relationship has been explored previously via a retrospective cohort of Japanese hospitals, and the results showed that higher ICU volume (to hospital bed) ratio was associated with a lower mortality (6). Thus, as this current study suggests, perhaps there are significant variations in DWLST dependent on ICU-specific characteristics. Beyond the ICU level variability, are ICU physicians and nurses good at predicting outcomes in patients? A single study prospectively followed 303 patients and determined that ICU physicians and nurses were generally good at predicting 6-month mortality in critically ill patients (7). Yet, there are differences across providers as we have all experienced. Thus, the trends in ICU DWLST in this study must be interpreted with caution.

There are some very important limitations to these results that the authors acknowledge. Two of the essential conditions of the instrumental variable analysis to perform properly, as the authors point out, are 1) the instrument “must have no direct effect on the outcome other than through treatment,” and 2) “should also be independent of unmeasured confounders.” The authors have undertaken significant steps to assess and account for these. However, at its core, this is a retrospective study that is reliant on a model that cannot fully assess for

unmeasured confounding variables. It would be impossible and unethical to try to achieve the objective of this study with a randomized trial, or even a prospective cohort, and thus, we are left with the current study design. Also, the study did not assess patient preference, and only evaluated the last ICU admission. Thus, we can imagine that a patient that has had several prior ICU hospitalizations might lean towards DWLST even when he might appear “healthier” than another acutely gravely ICU patient who chooses aggressive measures. This decision might not be premature based on the patient characteristics or preferences.

As we continue to strive to individualize care for our critically ill patients and guide patients and their families through goals of care discussions, we would like to hope that our actions are not swayed by a unit culture that trends toward optimism versus pessimism. Yet, this study definitely gives us pause. Maharaj *et al* attempt to objectively determine whether a decision to withdraw care might be untimely in certain patients and found that there are certain ICU characteristics that may contribute to this decision. Despite the limitations of this study, it is prudent that we continue to check our own biases as we continue to provide the best care and comfort to our patients.

### Copyright Form Disclosure:

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