

## Predicting Critical Illness Mortality and Personalising Care



Predicting mortality has always been a corner piece of critical care research and practice, and novel early outcome predictors are needed to guide patient/family expectations and decision-making, according to an Editorial article published in the journal *Critical Care*. The article discusses how muscle quality and quantity measurement could provide an additional "dimension" to prediction of outcome and personalisation of care in the ICU.

**See Also:** [Is Exercise Rehabilitation After ICU Discharge Effective?](#)

Skeletal muscle quality is recognised as a marker of function in healthy individuals and critically ill patients. Alterations are seen with ageing, immobilisation, chronic disease states and critical illness. These conditions demonstrate qualitative changes in muscle structure as a result of increasing collagen and lipid deposition. Intramyocellular lipid accumulation is additionally a hallmark of metabolic diseases, and may exacerbate tissue metabolic derangements in the critically ill.

However, these data are limited in that they are unable to relate either chronic disease states and poor muscle quality, or muscle quality and functional outcomes, say article authors Zudin A. Puthucherry, MD, PhD, Division of Critical Care, University College London Hospitals, London, and Paul Wischmeyer MD, EDIC, Duke Clinical Research Institute, Duke University of Medicine, Durham, USA.

It's important for outcome predictors to be able to predict not only risk of death but also disability, so a patient's wishes may be honoured and a realistic appraisal of functional outcomes can be made.

"It is vital we improve upon our ability to inform patients and families early in critical illness on the likelihood of significant morbidity. It is possible that admission skeletal muscle quality and quantity may be key to this discussion in the future. Ongoing testing via lean body mass ultrasound and other modalities may also be vital to continued discussions of prognosis," the authors write.

In addition, these tests of muscle quality should assist in guiding therapy, according to the authors. A recent post-ICU recovery consensus conference indicated that a major gap exists in understanding how to effectively and efficiently screen patients for specific post-ICU impairments to determine the need for further diagnostic work-up and treatment.

"The ability of the muscle to utilise substrate such as lipid and overall glycogen content may be key in delivering personalised nutrition to improve outcomes. Patients with low muscle quality and quantity may have greater and different specific nutritional requirements," the authors explain. "Conversely, increased muscle myosteatosis as defined by decreased skeletal muscle density or increased intermuscular adipose tissue may indicate impaired muscle substrate utilisation."

These assessments may be a key innovation prior to major surgery or cancer therapy, according to the authors. For example, patients with poor skeletal muscle quality could be enrolled in prehabilitative exercise/nutrition programmes to improve skeletal muscle quality and quantity.

"Clinical trials systematically evaluating muscle quality and quantity measures via CT scan and ultrasound could then be performed to assess interventions and target ideal methods to optimise patients," the article says. "Further, in the ICU, these techniques need further study to determine the muscle-level effects of individual nutrition (e.g., protein delivery, anabolic agents and specific ICU-rehabilitation interventions (e.g., in-bed ergometry, functional electrical stimulation))."

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Published on : Tue, 7 Feb 2017