

**Individualized nutrition** Copper Hall Friday 08:00

# Individualized ICU nutrition takes center stage tomorrow morning

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machines give different answers. However, some recent studies from our group have validated two machines that give reliable measurements in critically ill patients on mechanical ventilation.

However, patients with CPAP, high oxygen fractions or leakage in the system cannot be reliably measured. In principle patients not mechanically ventilated can be measured using a mask or hood system, but practically this is more difficult to implement.

As mentioned above, measuring muscle could identify patients with severe cachexia that are in need for a long-term intervention and rehab program but will not monitor the individuals' day-to-day protein needs.

## **Am I right in saying that protein is more crucial than calories for catabolic critical illness? Is the view shared by all? Aren't many ICUs still basing their diets on fat, rather than protein?**

This view is very popular but not shared by all since the evidence for this in good clinical trials is missing. Observational studies have indicated this. What is very important is to find out whether one can feed too much protein, and whether this is as dangerous as energy overfeeding. If we can determine the safe upper level for the individual patients, this would probably be a useful approach for feeding. But how to monitor this is not yet clear. Maybe amino acid levels in the circulation can help us to find the individual's 'safe' level.

## **What technologies are intriguing to you? Are there concepts that you will be sharing (e.g. will you be discussing the SenseWear technology I saw in a recent paper of yours?)**

Measuring muscle mass by imaging techniques is a very promising technique in the ICU – firstly to identify the severely cachectic patients as mentioned above. But if we can measure muscle mass accurately over time, and can actually measure a decline in muscle mass over a few days, this could be very useful for guiding feeding – or at least ensuring that the protein feeding is not suboptimal. However the techniques available are either not good enough on an individual level, or not tested



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*Olav Rooyackers*

for individual, accurate measures.

The idea with SenseWear was that this might be useful in patients that are not able to be measured by indirect calorimetry. However, the results basically showed that its utility in the

ICU is not better than the Harris-Benedict prediction, and therefore not very useful.

Bedside monitoring of nutrient levels might be one promising option to guide individual nutrition of specific

nutrients. We have validated a device to estimate blood glutamine levels at the bedside, and implemented a protocol of glutamine feeding/supplementation guided by the blood levels to normalize these when low, and to prevent physiologically high blood levels

## **Your center is dedicated to metabolic and nutritional problems in the ICU. What specific research are you focusing on?**

We are mainly investigating the pathophysiology behind nutritional challenges in the critically ill. Many of the open questions about the nutritional needs are not answered since we know too little about the handling of the nutrients by the critically ill body (i.e. whether nutrition will actually inhibit the endogenous energy supply). Our studies focus on assessing the physiological handling of different nutrients in the actual patients in our ICU by using tracer technology. With very low amounts of stable isotope-labelled nutrients that we give to the patients, we can follow the fate of this nutrient in the body.

More specifically, we are studying: a) what the critically ill body does with extra protein, given either enterally or parenterally; b) what causes low glutamine levels during critical illness (is it a low production or a high utilization?) and how does supplemented glutamine affect this; and c) how are the utilizations of different nutrients (glucose, fat, protein) related to the patients energy expenditure, and how are these affected by nutrition.

## **Speaking of research, what should the future hold, do you think?**

In my eyes, future trials should be designed based on better knowledge of the physiology, and of nutrient handling. These should definitely look at the three macronutrients separately, but also in combination, since we hardly ever eat just one. These macronutrients should not be given alone: but they should also not be varied between the groups altogether.

What we need to focus our research on is defining the nutritional needs in different patients, and finding ways to monitor the needs of the individual patient.