

‘Little evidence, much controversy’ for protein intake in critical illness

The optimal management of nutrition in critical illness still straddles the boundaries of consensus and controversy, with topics such as calorie and protein intake, re-feeding syndrome, gastric residual volume monitoring, parenteral/enteral nutrition, measurement techniques and pharmaconutrients all representing hot topics in the field.¹

Tackling some of these issues, and emphasizing protein intake specifically, will be Jan Wernerman (Karolinska University Hospital, Huddinge, Stockholm, Sweden), who spoke to *ISICEM News* to share his perspectives ahead of the session.

By way of introduction, Professor Wernerman first commented on the predictive equations used to gauge the appropriate calorie needs of an ICU patient. Commonly based on weight, height, age, gender and severity of illness, the accuracy is known to vary considerably.² With estimates usually falling between 20 and 35 kcal/kg/day, under- or over-feeding becomes more of an issue with the ongoing variability of need that the patient may exhibit.²

This is particularly troublesome for underweight or overweight patients staying for prolonged periods in the ICU: “Here a daily erroneously intake of > 300 kcal constitutes a real problem,” commented Professor

Wernerman.

He added: “Overweight patients are problematic. They cannot lose weight in the ICU safely, because they will lose muscle and fat on approximate equal weight. However, they really need their muscle (which they have plenty of from the start) to get around. If there is an extensive

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muscle loss, the rehabilitation will be really problematic.”

The challenge of personalized and accurate nutrition becomes even more complex when estimating protein needs, not least because the neutral tissue protein balance required in healthy individuals is quite different to that of an ICU patient.¹ “In ICU patients both synthesis and degradation of proteins is higher than normal, very unevenly distributed in between organs,” continued Professor Wernerman. “Muscle tissue is constantly lost

in the initial 3-4 weeks related to an enhanced degradation, while synthesis is broadly speaking on a ‘normal’ level. For the very longstayers, this loss of muscle proteins levels off.

“But the concept of an enhanced ‘need’ for protein intake rests on very weak evidence, most often nitrogen balance data or retrospective observational data. On a whole-body basis, our research group have shown that extra protein supply up to the level of 1.5-2.0 g/kg/24h gives a better protein balance that is attributable to a higher whole-body protein synthesis (when measure with labelled phenylalanine). However, at this timepoint we cannot say where this protein accretion takes place, and most importantly if it has an impact on outcomes.”

To measure protein need, Professor Wernerman noted that protein turnover assessment using isotopes gives an intriguing ‘snap shot’, achieved by incorporating stable isotopes of carbon, hydrogen or nitrogen into amino acid tracers, which can then be infused or ingested to trace the metabolism of the body.³ Whole-body protein synthesis and protein breakdown can then be investigated given that the labelled amino-acid compounds will be incorporated into the muscles at a rate that reflects fractional synthetic

protein rates.³

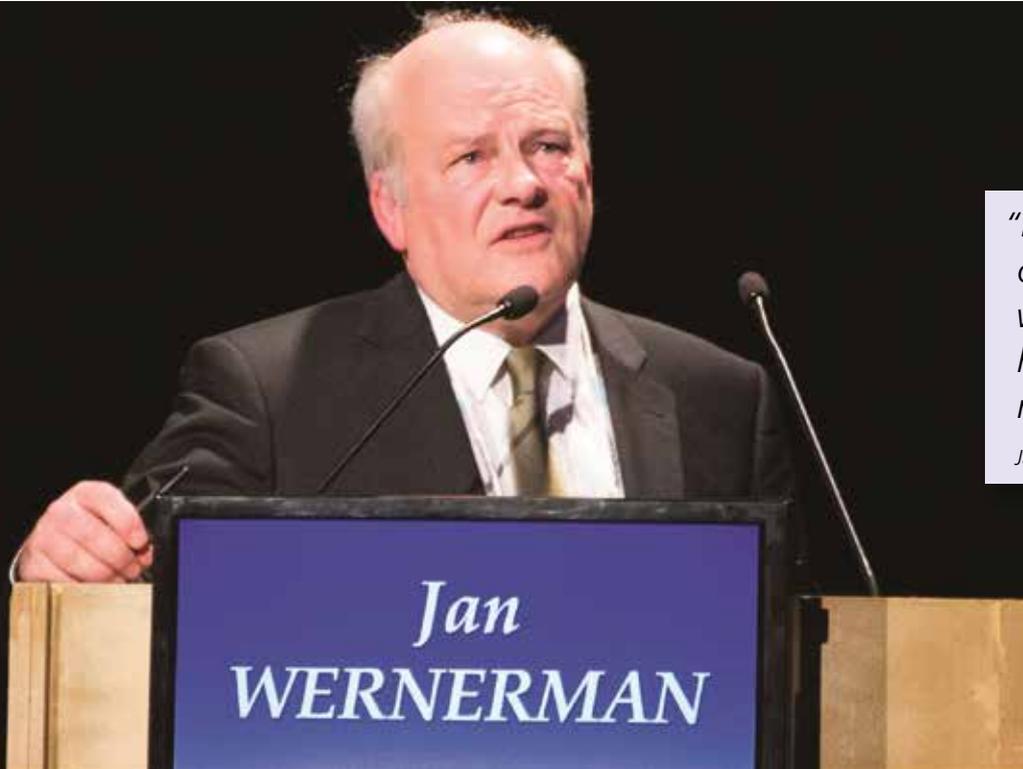
Alternatively, he noted that “Scanning techniques are attractive as being non-invasive. The resolution, however, is unfortunately not good enough for longitudinal studies. So far scanning techniques have only been applied to muscle tissue.”

Professor Wernerman will present the nuances of protein intake in the ICU in more detail during this afternoon’s session, but for now, he offered some ‘take-home’ messages for the ISICEM audience. “Do not get over-enthusiastic with the high-protein messages. Stay in line with the ESPEN⁴ guidelines for protein intake. In addition, be conservative with energy intake, in particular during the initial phase of critical illness.

“For the long-stayers in ICU, nutrition needs to be individualized, and the most important thing is to avoid doing harm.”

References

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