Abstract T1P116

**Effect of obesity in critically ill patients; Muscle Quality as an explanatory outcome for the “Obesity Paradox”**

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**Introduction:** Obesity and overweight are associated with an increased risk of death in the general population, but in specific disease conditions, a decrease in mortality has been reported. The ‘obesity paradox’ of critical illness refers to better survival with a higher body mass index. Hypercatabolism in the acute phase of the critical illness is presumed to be an adaptive response providing the essential fuel for energy production in vital organs. However, when hypercatabolism persists it may result in muscle wasting and weakness. Skeletal muscle quality is recognized as a marker of function in healthy individuals and critically ill patients. To determine muscle histology on an ICU; a muscle biopsy is needed. However, this procedure is invasive. By using a novel non-invasive assessment of muscle histology we aim to study muscle quality in obese and non-obese critically ill patients.

**Methods:** Muscle Quality index will be determined using traditional non-invasive ultrasound, which involves pacing a probe over a predefined area of the quadriceps muscle (rectus femoris, vastus lateralis, vastus medialis and intermedius). The pixel-intensity-complex of the muscle fibers was measured to quantify the amount of contractile versus non-contractile structures within the region of interest. The mean pixel intensity was averaged from the 6 cropped and segmented scans (3 long-axis and 3 short axis scans) and scaled to create the Muscle Quality Index with MuscleSound® software. This non-invasive assessment is called Virtual Muscle Histology. Fig. Heatmap Muscle Quality Index of septic patient.

**Results:** In the total group (N = 26) were 9 patients defined as obese by a BMI >30kg/m2. In this obese subgroup, the wasting patterns were distinctly different than the non-obese group, when comparing sepsis and neurotrauma. The obese group had a higher muscle quality index by volume in regard to the non-obese, by admittance ICU. The speed of wasting, as defined in decline in muscle quality, was lower in the first 4–5 days in the obese group in comparison with the non-obese.

**Conclusion:** Critically ill patients with obesity seem to have higher muscle quality, as measured by the virtual muscle histology assessment, at admittance compared to non-obese ICU patients. This might be the metabolic protective shield also described as the “obesity paradox”.

**Conflicts of Interest:** Jeroen Molinger is an Advisor to the Science Committee of MuscleSound

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