EDITORIAL

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Grading the Reduced Muscle Mass in the Context of GLIM Criteria

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GLIM criteria for the diagnosis of malnutrition (MN) has been introduced as a consensus report from the global clinical nutrition community (1). It has been created as a response to meet the need for consensus on diagnostic criteria for application of MN in clinical settings. It has been convened by several of the major global clinical nutrition societies and aimed to secure the broad global acceptance.

GLIM consensus suggested two sets of criteria: the phenotypic and the etiological criteria for diagnosis of MN. The phenotypic criteria included (i) weight loss, (ii) reduced body mass index, (iii) reduced muscle mass and the etiological criteria included (i) reduced food intake/assimilation and (ii) disease burden/inflammation. GLIM recommended that the combination of at least one phenotypic criterion and one etiologic criterion is required to diagnose MN. The threshold values for the consensus diagnostic criteria and the severity grading were also given.

The "**reduced muscle mass**" is a component for both the diagnosis and the grading the MN. Reduced muscle mass is classified as "mild to moderate" and "severe" deficit of reduced muscle mass per validated assessment methods. It has been noted that the thresholds for reduced muscle mass need to be adapted to race. However, the guidance according to severity grading by reduced muscle mass is lacking in the current GLIM format, mainly due to lack of clear evidence that the sarcopenia community provides suggestions for binary cut-offs, but not for grading (2).

Recently a Turkish population based study documented and reported cut-off points to identify sarcopenia according to European Working Group on Sarcopenia in Older People (EWGSOP) definition (3). In their revised consensus report, EWGSOP2 opted to provide recommendations for cut-off points for low skeletal muscle mass for appendicular skeletal muscle mass, but not the total skeletal muscle mass (2). After publication of EWGSOP2, it has been suggested that if a clinician assesses the total skeletal muscle mass instead of the appendicular muscle mass, then the documented Turkish total skeletal muscle mass index thresholds as 9.2 kg/m^2 and 7.4 kg/m^2 could be used in males and females, respectively (4).

In their article in United States population, Janssen et al. (5) considered class I sarcopenia as skeletal muscle mass index being within minus one to minus two standard deviations of young adult values and class II sarcopenia as skeletal muscle mass index being below minus two standard deviations of young adult values (5). Analogously, we may suggest to designate "mild to moderate" reduced muscle mass as having "muscle mass lower than young mean-one standard deviation" and "severely" reduced muscle mass as "muscle mass lower than young mean-two standard deviation" considering the total skeletal muscle mass data of the young Turkish adult study population (3). Accordingly, the stage 1: "mild to moderate" reduced muscle mass could be regarded as 10.1 kg/m^2 and 8.2 kg/m^2 and the stage 2: "severely" reduced muscle mass could be regarded as 9.2 kg/m^2 and 7.4 kg/m^2 in males and females, respectively in the Turkish population.

This approach seems feasible and the suggested cut-off points appear acceptable, particularly in ethnically similar populations, for use until we have achieved evidence enough to advise generic cut-offs for grading reduced muscle mass in the context of the GLIM criteria. Hopefully, pending GLIM or EWGSOP initiatives will be able to provide such generic muscle mass cut-off values. Globally generic cut-offs would likely facilitate applicability and implementation into clinical practice. Still

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we may consider that we may end up with regional cut-offs, due to variations in muscle mass due to ethnicity. Therefore, the nutrition and sarcopenia communities need studies that, in various populations, address population based cut-offs for muscle loss, as well as studies that evaluate predictive validity (for non-beneficial clinical outcomes) of such cut-offs.

Ethics

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Authorship Contributions

Surgical and Medical Practices: G.B., Concept: G.B., T.C, Design: G.B., T.C., Data Collection or Processing: G.B., Analysis or Interpretation: G.B., T.C., Literature Search: G.B., T.C., Writing: G.B., T.C.

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