Editorial Commentary

Proposal of definition and diagnostic criteria for sarcopenic obesity by ESPEN and EASO

Toshimi Kaido^

Department of Gastroenterological and General Surgery, St. Luke's International Hospital, Tokyo, Japan

Correspondence to: Toshimi Kaido, MD, PhD. Department of Gastroenterological and General Surgery, St. Luke's International Hospital, 9-1 Akashi-cho, Chuo-ku, Tokyo 104-8560, Japan. Email: kaido@luke.ac.jp.

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In the last decade, many investigators including us have reported the negative impact of preoperative sarcopenia or low skeletal muscle mass on outcomes after surgery including hepato-biliary-pancreatic (HBP) surgery such as liver transplantation, liver surgery, biliary surgery, and pancreatic surgery (1-5). In addition to low skeletal muscle mass, the abnormality of body compositions, decreased muscle quality and visceral obesity, has been clarified to be also negatively associated with poor outcomes after HBP surgery (2-5). Consequently, it was easily supposed that co-existence of sarcopenia and obesity, called sarcopenic obesity (SO), had more strong negative impact on outcomes. Actually, not a few studies have demonstrated negative clinical impact of SO on outcomes after HBP surgery using various definitions for SO (6-10). We reported that patients with SO, defined by low skeletal muscle mass with high visceral fat to subcutaneous fat ratio evaluated by preoperative computed tomography (CT) image, had significant worse survival than non-sarcopenia patients and patients with sarcopenia only after liver transplantation, hepatic resection, and pancreatic resection (6-9). The absence of widely accepted diagnostic criteria for SO has been the most significant issue in assessing the impact of SO. The identification of patients and accurate estimation of SO prevalence are hampered by the lack of diagnostic criteria for SO. Moreover, the lack of diagnostic criteria makes it difficult to develop strategies of SO prevention and treatment. Therefore, the creation of the widely accepted diagnostic criteria for SO has been eagerly anticipated.

Under such a background, we read with great interest the recent article written by Donini *et al.* (11), a joint consensus statement of the European Society for Clinical Nutrition and Metabolism (ESPEN) and the European Association for the Study of Obesity (EASO). ESPEN and EASO launched an initiative to reach expert consensus on the definition and diagnostic criteria for SO. The consensus process involved 38 worldwide academics from a range of fields, including obesity, sarcopenia, nutritionists, geriatricians, and experts in body composition, based in 16 countries on four continents. The consensus process used a four-step Delphi process consisting of a series of web-based surveys. A very solid recommendation basis was formed for a worldwide plan that included SO definition, screening, diagnosis, and staging using a decision algorithm to direct the patient identification and diagnostic procedure as follows after four rounds of web-based questionnaires. I would like to summarize the definition and diagnostic criteria for SO.

SO was defined as the co-existence of excess adiposity and low muscle mass/function. As for diagnostic procedures,

^ ORCID: 0000-0001-9409-3188.

evaluation of individuals with suspected SO consists of two different levels: screening and diagnosis. With ethnicity-specific cutoff scores and surrogate indications of sarcopenia, such as clinical symptoms, suspicion factors, or validated questionnaires like the SARC-F in older adults, SO screening is predicated on the simultaneous presence of an elevated body mass index (BMI) or waist circumference. The panel recommends using the cut-off values given by the World Health Organization (WHO) for BMI (12,13) and the references given by the National Institutes of Health (14) and Misra *et al.* (15) for waist circumference for Caucasians and Asians, respectively.

Next, the diagnosis of SO will be performed in two steps by sequential evaluation: altered skeletal muscle functional parameters considering strength and altered body composition. The group suggests using tests to measure skeletal muscular strength, such as the hand-grip strength (HGS), knee extension strength, or chair-stand test, when discussing the functional properties of skeletal muscles. Body composition will continue to be taken into account during the diagnostic process if muscle functional measures point to the presence of SO. The organization supports its assessment using dual-energy X-ray absorptiometry (DXA) or, as a backup option, bioelectrical impedance analysis (BIA). The committee suggests adopting the cut-off values given by Jones *et al.* (16) and Chen *et al.* (17) for HGS (for Caucasian and Asian populations, respectively), the references given by Gallagher *et al.* (18) for fat mass (FM), from Janssen *et al.* (19) for skeletal muscle mass adjusted by weight (SMM/W) and by Batsis *et al.* (20) for appendicular lean mass adjusted to body weight (ALM/W). The presence of relevant body compartments (low ALM/W by DXA or low SMM/W by BIA) or excessive adiposity (FM%) and reduced skeletal muscle mass are required to make the diagnosis of SO.

Once the diagnosis of SO has been made, a two-level staging based on the presence of comorbidities should be performed with the aim of stratifying patients based on the severity of SO. The SO stages should be defined as follows:

- Stage I: no complications attributable to altered body composition and skeletal muscle functional parameters;
- Stage II: presence of at least one complication attributable to altered body composition and skeletal muscle functional parameters including metabolic diseases, disabilities resulting from high FM and/or low muscle mass, cardiovascular and respiratory diseases.

The proposed staging is intended to group patients into subgroups based on clinical severity and increased risk of unfavorable outcomes, indicating those who require more intensive therapy and follow-up.

The authors come to the conclusion that ESPEN and EASO, as represented by the expert panel, support the implementation of the proposed SO definition and diagnostic criteria in clinical practice and interventional randomized controlled trials with a focus on determining the effects of particular interventions on SO. Additionally, they actively support validation studies, prospective follow-up research, and secondary analyses of current cohorts with the goal of boosting the body of scientific data required to recognize and treat SO patients.

The authors point out various restrictions, like the absence of uniformity in operational criteria used to define SO and choose SO patients in prior clinical studies, that could have an impact on any field-wide consensus endeavor. The authors acknowledge that the existing claims are therefore expert-based rather than necessarily supported by evidence. Furthermore, for the majority of the parameters listed in this publication, there are currently no widely acknowledged validated sources accessible. The group is also aware that in the vast majority of studies on secondary sarcopenia or secondary SO in patients with cancer, other chronic illnesses, or hospitalized in intensive care units, where younger age may be more prevalent and body composition is likely to be more feasible and relevant than functional assessment, functional parameters have not been the primary outcome of interest. Therefore, they claim that additional study is required to determine how functional factors affect clinical outcomes in SO patients.

Nevertheless, I want to express my gratitude for all of the writers' extraordinary work in establishing the diagnosis and diagnostic standards for SO in this statement. In order to study the predictive value, treatment efficacy, and clinical impact of this SO definition, I hope that many researchers will incorporate the proposed SO definition and diagnostic criteria into clinical practice and conduct interventional randomized control trials in addition to secondary analysis of existing data sets. As a result, there will undoubtedly be more fresh scientific information that is advantageous for patients with SO.

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Footnote

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