

# Considering technique of assessment and method for normalizing skeletal muscle mass

Sarcopenia is defined as loss of skeletal muscle mass accompanied by a reduction in muscle strength or physical performance,<sup>1</sup> may be more severe among elderly individuals<sup>2</sup> and patients with chronic disease such as those with chronic kidney disease (CKD).<sup>3</sup> There is no consensus regarding operational criteria for sarcopenia in patients with advanced pre-dialysis CKD or maintenance hemodialysis. Kittiskulnam *et al.* also reported that muscle mass normalized to height-squared may underestimate sarcopenia particularly in the setting of excess adiposity.<sup>4</sup> Sarcopenic obesity was first defined by Baumgartner, who represents a reduced skeletal muscle mass coupled with an increase in fat mass.<sup>5–7</sup> Sarcopenic obesity specifically was highly prevalent among persons with CKD and not those without CKD.<sup>8</sup> Sarcopenic obesity may have a particularly poor prognosis and associated with an increased risk of death in patients with end-stage renal disease (ESRD).<sup>9</sup> Early detection of sarcopenic obesity in patients on maintenance hemodialysis is therefore of importance. However, overweight or obese individuals whose muscle mass is low relative to their body size may not be defined as sarcopenic when muscle mass is adjusted only for height.<sup>1,10</sup> Furthermore, assessing skeletal muscle mass may be confounded by the presence of edema, particularly in patients with ESRD. Normalization by height alone may underestimate the prevalence of sarcopenia, especially in obese population with excess adiposity or with excess edematous or overhydration in patients with ESRD.<sup>10</sup> Muscle mass adjusted more generally for body size rather than height alone is more strongly correlated with physical function than muscle mass indexed to height-squared.<sup>4</sup> Consequently, some experts have recommended alternative approaches, requiring adjustment for body size among overweight or obese individ-

uals.<sup>11–13</sup> Moreover, in a previous report by Lamarca and colleagues among elderly patients on maintenance hemodialysis, prevalence of loss of muscle mass ranged from 4 to 74% depending on the method of body composition, including anthropometric measurement, bioelectrical impedance spectroscopy and dual-energy X-ray absorptiometry.<sup>14</sup> Hence, it remains unclear what is the best way to assess and normalize the skeletal muscle mass among overweight or obese patients, particularly advanced pre-dialysis CKD or ESRD.

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