



Subcutaneous Fat Tissue: Which Region Is More Appropriate for the Measurement?

To the Editor:

I read with great attention the recently published article by Elfassy and colleagues entitled “Association of Thoracic Computed Tomographic Measurements and Outcomes in Patients with Hematologic Malignancies Requiring Mechanical Ventilation” (1). The study is very interesting and valuable because this is the first study assessing the relationship between body composition and clinical outcomes specifically in patients with hematologic malignancies. Measurements of skeletal muscle and subcutaneous fat cross-sectional area (CSA) can be used as an objective and practical method to evaluate physiologic reserve, which is believed to be an important predictor of intensive care unit outcomes (2).

On the other hand, subcutaneous fat CSA measurements at the level of the carina is not an optimal location for evaluation. Although anatomical identification is easy and high interrater agreement is found, subcutaneous fat measurements in female patients can vary according to the breast tissue density. Subcutaneous fat measurement in male patients without gynecomastia and pectoral muscle measurement can be performed with confidence. There are four descriptors for breast parenchymal density according to the American College of Radiology Breast Imaging Reporting and Data System lexicon. The greater breast density can cause lower values of subcutaneous fat tissue (3). Furthermore, measurements in women also differ compared with the men. So, subcutaneous fat measurements should be performed at lower levels such as T12 or L1 levels, where the breast tissue is not seen (4). Alternatively, authors can measure epicardial fat tissue, which is already found to be associated with lipotoxicity, insulin resistance, and cardiac dysfunction (5). Measurements from lower levels or epicardial fat deposition can give more reliable results.



Reply: Subcutaneous Fat Tissue: Which Region Is More Appropriate for the Measurement?

From the Authors:

We thank Dr. Durhan for the interest in our study (1). We agree that the anatomical region for subcutaneous fat analysis is important and must be carefully selected to ensure validity of the measurements. Although there is rationale to consider that breast tissue could theoretically interfere with subcutaneous fat measurements at the level of the carina, this is not supported by data. Previous research conducted by our group has shown that the subcutaneous fat cross-sectional area (CSA) at the level of the carina is associated with whole-body fat, body mass index

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In conclusion, although I believe that measurements of subcutaneous fat and skeletal muscle CSA can be used as practical and novel surrogate markers of physical frailty in patients with hematologic malignancies, choosing the correct area for the subcutaneous fat measurement would give more accurate results.

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(BMI), and waist circumference in individuals with advanced lung disease (2). Notably, patients with breast tissue at the level of the carina were included in this analysis and we did not find that breast tissue interfered with our analysis of subcutaneous or muscle CSA. Furthermore, there was no difference across three slices at the level of the carina for subcutaneous fat or pectoral muscle CSA between female and male subjects. Similar associations were found with mediastinal fat CSA, where there was no interference from breast tissue, but it is important to highlight that subcutaneous and visceral adiposity stores are not interchangeable (3, 4).

Although it is true that variability exists in breast density and gynecomastia, fibrous and glandular tissue would not be captured in our CSA measurements based on the differences in attenuation (5). Given that only around 10% of women have primarily fatty breast tissue (Breast Imaging Reporting and Database System score A), this may explain why the theoretical increase in subcutaneous fat CSA in these patients has not been shown to influence the overall relationship with BMI (6). In addition, a high proportion of breast tissue in women and gynecomastia in men are only fully appreciated at a level below the carina (7).

To further confirm the validity of measuring subcutaneous fat CSA at the level of the carina, we assessed the correlation between subcutaneous fat CSA and BMI stratified by sex. A strong correlation between these variables was observed in both females ($N = 61$; Pearson correlation coefficient, 0.75; $P < 0.0001$) and males ($N = 95$; Pearson correlation coefficient, 0.76; $P < 0.0001$).

Finally, we would like to highlight the advantage of measuring CSA at the level of the carina due to high reproducibility and ease of identification. There is significant heterogeneity in anatomical regions and tissue selected for CSA analysis in the thorax (8). Our study lends support to previous literature showing that the carina is a valid and reliable site for CSA measurements as a surrogate for body composition.

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Erratum: Care of the Transgender Patient with a Pulmonary Complaint

The authors of this article (1), published in the June 2021 issue of *AnnalsATS* would like to update the corresponding author information. Correspondence and requests for reprints should be addressed to Heather M. Strah, M.D., Division of Pulmonary, Critical Care and Sleep, Department of Internal Medicine, University of Nebraska Medical Center, Omaha, NE 68198-2465. E-mail: heather.strah@unmc.edu. For the convenience of our readers, *AnnalsATS* is replacing the online version of the article with a corrected version.

Reference

- 1 Turner GA, Amoura NJ, Strah HM. Care of the transgender patient with a pulmonary complaint. *Ann Am Thorac Soc* 2021;18:931–937.

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