

Paper Category:	COVID 19 and Sarcopenia and Frailty Diagnosis and Aetiology
Paper Title: (Arial Font; 14 Pt Size)	Deep Learning measurement of total Psoas Muscle Volumes for prediction of sarcopenia on CT scans.
Abstract Body: (Arial Font; 12Pt Size)	<ul style="list-style-type: none"> • Background • Objectives • Method • Results • Discussions and Conclusions
<p>(Maximum word limit - 300 words)</p> <p><u>Background:</u></p> <p>Current methods of determining sarcopenia and assessing muscle volume involve indirect measurements e.g. BMI and grip strength. Imaging however, provides direct quantification of muscle volume.</p> <p>Many patients increasingly undergo CT scans as part of their initial evaluation which can then opportunistically provide further information about body composition with no additional cost.</p> <p>However, muscle volume measurements on imaging has been limited by its labour intensiveness.</p> <p><u>Objectives:</u></p> <p>We developed a Deep Learning (DL) model which can automate the measurement of total psoas volume on CT scans.</p> <p>The CT derived psoas muscle volume provides a reproducible estimate of frailty/functional status.</p> <p><u>Methods:</u></p> <p>Segmentation of the total psoas volume was performed on CT abdomen & pelvis studies by two Radiologists.</p> <p>A total of 650 axial CT images with radiologist segmented psoas were used to build a deep learning model based on Ultralytics YOLOv8.</p> <p>The deep learning (DL) model was used to segment the psoas of 123 patients from a lymphoma cohort.</p> <p>The volume of the psoas muscle was calculated using the pixel area and slice thickness contained within the metadata of the CT images.</p> <p>Total psoas muscle volumes were correlated with patient age, height, weight, body mass index (BMI), lean body weight (LBW) and body surface area (BSA). Correlation was determined using Pearson's correlation coefficient.</p>	

Results:

The median DL generated total psoas volume (PV) was 158.27ml (IQR 105.10 – 190.71).

There were positive correlations between PV and all physical measures including height ($r = 0.60$, $p < 0.001$), weight ($r = 0.47$, $p < 0.001$), BMI ($r = 0.28$, $p = 0.002$), LBW ($r = 0.66$, $p < 0.001$), and BSA ($r = 0.55$, $p < 0.001$), and a negative correlation between PV and age ($r = -0.22$, $p = 0.015$).

Conclusions:

DL radiology model provides total psoas volume as a reproducible biomarker of frailty/sarcopenia.

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