

Radiomic Biomarkers as a Non-Invasive Tool for Assessing Biological Age



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<https://doi.org/10.5770/cgj.26.685>

Dear Editor:

As medical professionals, we understand that aging is a complex process that affects multiple body systems. While chronological age is a well-known biomarker, it is not always an accurate predictor of biological age. The cumulative effects of genetic, environmental, and lifestyle factors determine biological age, which can vary significantly from person to person.⁽¹⁾

Radiomics is a relatively new field of medical imaging in which large amounts of quantitative data are extracted from medical images. This information can be used to create radiomic features, which are then analyzed with machine learning algorithms to identify patterns and relationships between the features and various clinical outcomes. In various types of cancer, radiomic features have been shown to be useful in predicting treatment response, prognosis, and survival rates.⁽²⁾

Researchers have recently begun to investigate the use of radiomic features as a non-invasive biomarker for determining biological age.⁽³⁾ One benefit of this approach is that radiomic features can be extracted from existing medical images, making it a low-cost and easily accessible tool for clinicians.

Structured MRI biomarkers from brain MRI images have been shown in studies to predict age-related differences in cognitive performance.⁽⁴⁾ Other research has suggested that radiomic features extracted from lung CT scans can be used to predict overall survival and disease-free survival in patients with lung cancer.⁽⁵⁾

According to one study, radiomic features extracted from MRI scans can be used to estimate the biological age of the left and right ventricles (LV, RV) and atria (LA, RA), as well as the LV myocardium.⁽⁶⁾ A machine learning model was used to identify 172 statistically significant age gap associations with cardiac aging among the 18,117 participants in the study.

These findings imply that radiomic features can be used to assess biological age in a non-invasive manner. One possible application for this method is in the field of geriatrics. Assessing biological age could assist clinicians in identifying individuals who are more vulnerable to age-related conditions, and in developing targeted interventions to promote healthy aging.

Another area of potential application is clinical trials. In clinical trials of interventions designed to promote healthy aging, biological age could be used as a surrogate endpoint. This could aid in the development of interventions to delay or prevent age-related diseases.

Finally, radiomic biomarkers appear to be a promising non-invasive tool for determining biological age. While more research is required to validate this approach, the preliminary findings are promising. As the population ages, the need for tools to assess biological age and promote healthy aging will grow.

ACKNOWLEDGEMENTS

Not applicable.

CONFLICT OF INTEREST DISCLOSURES

I have read and understood the *Canadian Geriatrics Journal's* policy on conflicts of interest disclosure and declare the following interests and state that there are none.

FUNDING

Not applicable.

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