

A functional age from electronic short physical performance battery to predict frailty status

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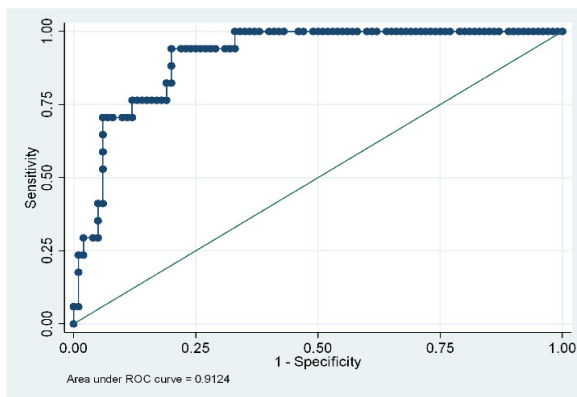
Study: Aim Importance of evaluating frailty status in clinical practice for older adults have been gaining more attentions with cumulating evidence showing its relevance in clinical outcomes and decision makings. We aimed to develop and validate whether a functional age predicted by an electronic continuous short physical performance battery (eSPPB) can predict frailty status in older outpatients of a tertiary hospital.

Methods: We used medical records of 838 patients (aged 51-95 years) who visited geriatric clinic of Asan Medical Center. As a development cohort, we used eSPPB data of 720 patients. For a validation cohort, we used eSPPB data of 118 separate patients who also underwent comprehensive geriatric assessments. Frailty index was calculated by counting deficits of 46 geriatric items including comorbidities, daily functions, mobility, mood and cognition. For functional age, we used balance score (0-4), gait speed (m/s) and stand-up time (sec) for 5 times chair rise.

Results: From the development cohort, we established a functional age of $(83.61 - 1.98 * [\text{balance score}] - 5.21 * [\text{gait speed}] + 0.23 * [\text{stand-up time}])$ by multivariate linear regression analysis with chronological age as a dependent variable ($R^2 = 0.233$). In validation cohort, the functional age positively correlated with frailty index ($R^2 = 0.432$). C-statistics to classify frailty (defined as frailty index ≥ 0.25) was higher ($p < 0.001$) with functional age (0.91) than with chronological age (0.64). A cut-off of functional age of 76.9 or higher maximized Youden's J, with sensitivity of 94.1% and specificity of 80.0%, in screening frailty.

Conclusions: A newly developed functional age using parameters from eSPPB can predict frailty status from comprehensive geriatric assessments.

(A) functional age to predict frailty status by FI



(B) Chronological age to predict frailty status by FI

