Use of the *Freund* Clock Drawing Test within the *Mini-Cog* as a screening tool for cognitive impairment in elderly patients with or without cancer.

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Abstract

Objectives: We aimed to determine an optimal cut-off score for the Clock Drawing Test (CDT), scored by the scale of *Freund*, for efficient screening for cognitive impairment in elderly (cancer) patients within a Comprehensive Geriatric Assessment (CGA) and to compare the *Freund* CDT to the *Mini-Cog*.

Materials and Methods: Data of 221 elderly ($\geq$ 70 y) patients, comprising of an *OncoGeriatric* (*OG*) and *General Geriatric* (*GG*) group, were retrospectively reviewed. All patients were evaluated with both the CDT and Mini Mental State Examination (MMSE) as the gold standard. Receiver Operating Characteristics (ROC) analysis was used to determine diagnostic performance. A pre-established algorithm was applied to retrieve *Mini-Cog* results through a combination of the CDT and the 3-word delayed recall (3-WDR) test (included within MMSE).

Results: Data of 105 *OG* and 116 *GG* patients were evaluated. Potential cognitive impairment (MMSE $\leq$ 23) was detected in 29.5% and 65.8% of patients, respectively. The CDT showed good diagnostic accuracy in the *OG* (0.88±0.03) and *GG* (0.85±0.03) group, based on the Area Under the ROC Curve (AUC $\pm$ SE). CDT (cut-off $\leq$ 4) provided good sensitivity (80.7%) and specificity (81.1%) in the *OG* group and excellent sensitivity (89.6%) and moderate specificity (51.3%) in the *GG* group. Addition of the 3-WDR test, to form the *Mini-Cog*, resulted in similar positive and negative predictive values for the *OG* group and higher negative predictive value for the *GG* group.

Conclusion: These data suggest that the *Freund* CDT, at the cut-off score of $\leq$ 4, is promising for use within a CGA. The *Mini-Cog* might be preferable in the *GG* population.