

Prognostic accuracy of frailty screening methods in advanced chronic kidney disease

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Introduction

Frailty is an independent predictor of adverse outcomes in chronic kidney disease. The reference standard for diagnosing frailty in CKD, the Frailty Phenotype (FP), is a time-consuming evaluation and therefore challenging to use outwith the research environment. Frailty screening methods validated in the general older population have been proposed for use in clinical practice. Recognising the need to validate these methods in patients with CKD, we performed the 'Frailty Assessment in Chronic Kidney Disease' Study [1] that demonstrated the diagnostic accuracy of several frailty screening methods in patients with CKD G4-5 and those established on haemodialysis (G5D). This follow-up analysis evaluates the prognostic accuracy of the studied frailty screening methods.

Methods

Ninety participants with CKD G4-5D were recruited from Nephrology Outpatient Clinics and 2 Haemodialysis Units. Frailty was diagnosed if ≥ 3 of the following FP criteria were present: unintentional weight loss, self-perceived exhaustion, low physical activity, slow walking speed and low grip strength. Pre-frailty was defined as the presence of 1 or 2 criteria. Published recommendations were used to construct a Frailty Index [2], which we termed the CKD Frailty Index. In addition, the following frailty screening methods were evaluated: Clinical Frailty Scale, PRISMA-7, walking speed, hand grip strength and Short Physical Performance Battery. Twelve-month hospitalisation data and survival was recorded.

Results

The mean age of participants was 69 ± 13 years. There was an equal number of male and female participants. One-third of participants were dialysis-dependent. Using the FP, 19 (21%) participants were categorised as frail, 42 (47%) as pre-frail and 29 (32%) as robust.

Hospitalisation data was available for 80 participants. Ten (56%) frail participants had ≥ 1 hospitalisation at 12-months, compared with 10 (27%) pre-frail and 4 (16%) robust participants ($p=0.02$). Four (21%) frail participants died within 12-months of assessment, compared with 4 (10%) pre-frail and no robust participants ($p=0.03$). Participants who had a hospitalisation or who had died within 12-months had higher FP scores ($p=0.02$ and $p=0.01$, respectively).

Categorising participants using suggested cut-offs [1] demonstrated a significant difference in mortality for the following screening methods: Clinical Frailty Scale (≥ 5 : 21% vs. < 5 : 5%, $p=0.03$), PRISMA-7 (≥ 3 : 18% vs.

<3: 0%, p=0.01), walking speed ($\leq 0.8\text{m/s}$: 21% vs $>0.8\text{m/s}$: 3%, p=0.01) and hand grip strength (FP frail: 16% vs. FP non-frail: 2%, p=0.03). Table 1 demonstrates the area under the receiver operating characteristic curve values of FP scores and individual frailty screening method scores comparing their ability to predict 12-month mortality.

Discussion

The Clinical Frailty Scale had the highest area under the curve value of the studied frailty screening methods, comparable to that of the FP, suggesting it is a useful test offering prognostic value. Considering that the Clinical Frailty Scale has also been demonstrated to be an accurate screening tool for frailty, as defined by the FP [1], we recommend its use in patients with advanced CKD and encourage systematic frailty screening programmes within Nephrology services.