

TITLE

Is Finger pinch strength (PS) a simpler alternative to hand grip strength (HGS) for assessing muscle weakness in haemodialysis (HD) patients

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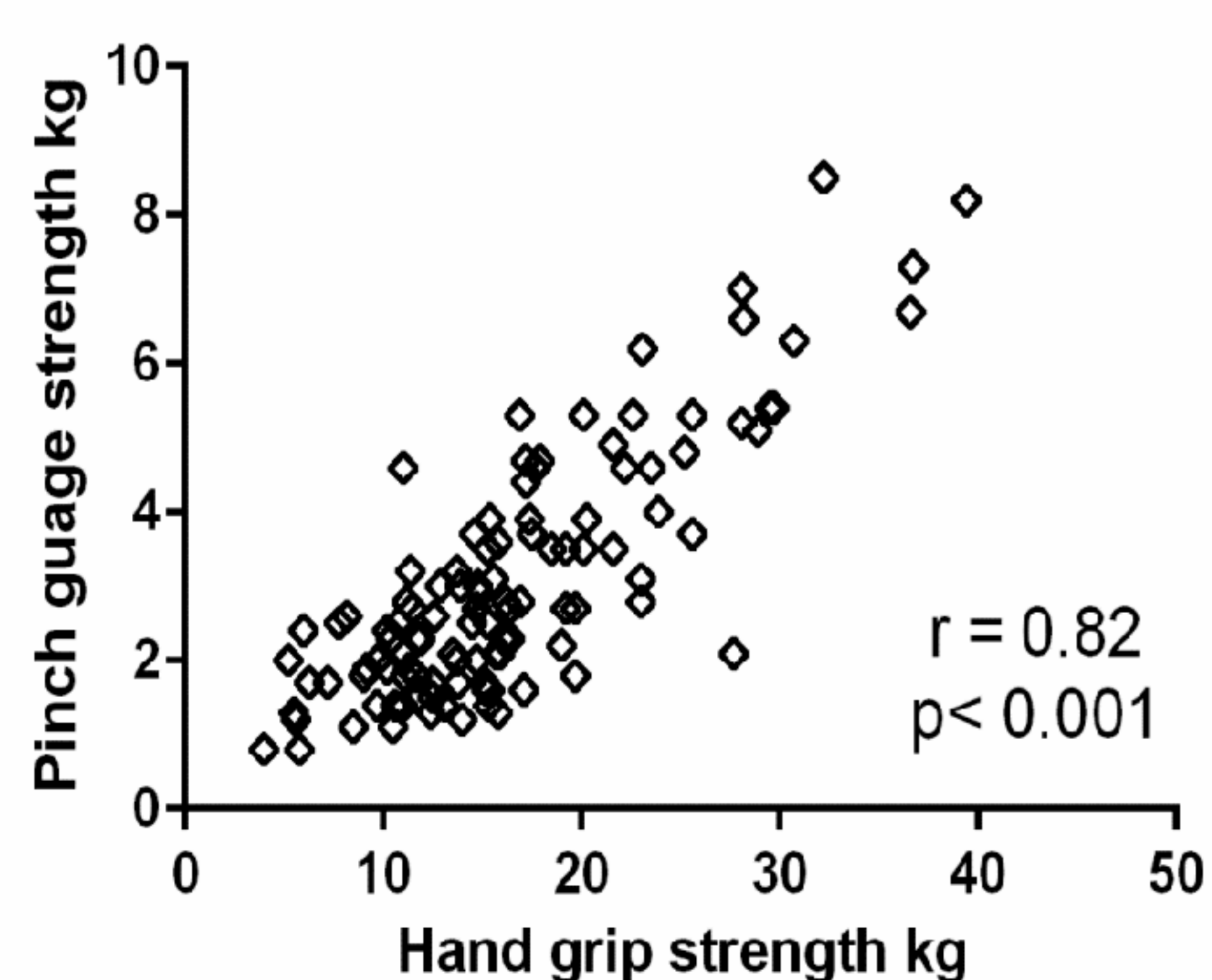
OBJECTIVES

Haemodialysis (HD) patients are at risk of muscle wasting (sarcopenia), and once sarcopenia develops then patients are at increased risk of mortality. As such it is important to be able to screen HD patients for muscle weakness to allow for intervention. Muscle weakness assessed by hand grip strength (HGS) has been shown to be associated with increased risk for death. However HGS requires the patient to be seated with the arm fully extended, and as such cannot be reliably assessed when patients are treated by HD. On the other hand pinch strength (PS), measures the strength of thumb and index finger strength, and can be easily measured when patients are on HD. However PS has not been validated against HGS.

CONCLUSIONS

There was a strong correlation between HGS and PS and as PS is an easier test to carry out and can be done whilst patients dialyse, then PS could potentially be used instead of HGS to measure muscle weakness in HD patients. Furthermore, both HGS and PS are correlated positively with male gender and PFM, while they were negatively correlated with age.

Graphs and Tables



METHODS

HGS and PS were measured in patients attending for outpatient HD. The mean of three measurements was taken, and we compared HGS and PS measurements between arms; access vs non-access and right vs Left arms. We measured body composition using multifrequency bioelectrical impedance (MF BIA) postdialysis. We looked for factors associated with HGS and PS, including Age, Sex, DM, Davies co-morbidity score and grade, vintage, NT-proBNP, C reactive protein (CRP), cholesterol, B2Micoglobulin, Haemoglobin (Hb), body mass index (BMI), Skeletal muscle mass (SKM) percentage of body fat mass (PFM), the ratio of extracellular to total body water (ECW/TBW). Analysis was computed using SPSS 17.

RESULTS

- PS and HGS were measured in 209 HD patients, 69% male, 45% diabetic, mean age 64.2 ± 15.6 yr, median Davies co-morbidity score=1 (IQR=1, 0-5).
- The mean HGS in the non-fistula arm was 16.43 ± 7.13 , compared to a PS of 3 ± 7.13 , $p < 0.0001$.
- There was a strong correlation between HGS and PS, $r = 0.81$, $p < 0.001$.
- There was a significant difference ($p < 0.001$) in PS measured in 125(60%) patients of the cohort between right and left hands (right 3 ± 1.61 vs left 2.62 ± 1.33), and with an ipsilateral arterio-venous fistula (AVF) and the contralateral hand (AVF 2.62 ± 1.36 vs non AVF 3.12 ± 1.62 , $p < 0.001$).
- There was a positive correlation for HGS on linear regression with male gender ($\beta = 0.31$, $p < 0.001$, 95%CI (3.42-8.29)), and PFM ($\beta = 0.14$, 95%CI(0.13-0.23), $p < 0.001$), HGS was negatively correlated with age ($\beta = -.28$, 95%CI(-.23 - -.08)), $p < 0.001$), Davies score ($\beta = -.145$, 95%CI (-2.28 - -.1), $p = 0.031$).
- There was a positive correlation for PS with male gender ($\beta = 0.32$, 95%CI(0.82 - 1.8), $p < 0.001$), PFM ($\beta = 0.13$, 95%CI(0.002-.046), $p = 0.036$), log dialysis vintage ($\beta = 0.18$, 95%CI(0.003-0.01), $p = 0.004$). PS was negatively correlated with age ($\beta = -.275$, 95%CI(-.05 - -.017), $p < 0.001$), DM ($\beta = -.177$, 95%CI(-1.17- -.18), $p = 0.008$), and B2M ($\beta = -.16$, 95%CI(-.060- -.007), $p = .014$).

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