Muscle Performance Following Hip Fracture in the Frail

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Purpose: The outcomes of people who sustain fragility hip fractures is poor; 8.6% die within a month, and 11-15% institutionalized at 6 months. Bed rest studies show acute muscle decline in the first 2 weeks, with patients who are frail and sarcopenic having the worst outcomes. To understand the molecular mechanisms underpinning poor outcomes in frail patients with hip fracture we first need to analyze performance. Our objective was to investigate changes of functional performance following hip fracture, and the correlation of muscle performance with frailty outcomes.

Methods: From the Functioning of Elder Muscle Understanding Recovery (FEMUR) study (IRAS:268635), 139 patients were studied. These patients were aged >65 years with a clinical frailty score (CFS) of ≥4 and sustained a fragility hip fracture. Routine audit personnel prospectively completed the Standardised Audit of Hip Fracture of Europe (SAHFE) form. Additional data collected included subjective (EuroQol 5 Dimensions [EQ5D], Groningen frailty index [GFI], and Rivermead mobility index [RMI]) and objective measures of function (Barthel Activities of Daily Living [BADL], timed up and go test [TUG], hand grip strength). Analysis included Spearman's correlation, Kaplan-Meier survival, and receiver operating characteristic curve analysis.

Results: We demonstrate a statistically significant difference between frailty score and both subjective and objective measures of muscle function, at pre-injury, day 7 and day 90 post-surgery. Patients do not return to their pre-injury levels. Those with a CFS7 do not improve from day 7 in their RMI and BADL scores. Patients with a low grip strength according to the European working group for sarcopenia definitions and unable to complete a TUG test on day 7 have the worst survival (P = 0.006). Completing a TUG test at day 7 post-surgery and BADL score are a good measure to predict discharge home (area under the receiver operating characteristic curve [AUC] 0.788 [95% confidence interval (CI) 0.690, 0.885], P<0.001; AUC 0.807 [95% CI. 0.717, 0.896], respectively).

Conclusion: Functional performance and muscle assessment provides useful prognostic indicators for frailty outcomes. Grip strength, TUG test, and BADL at day 7 are useful indicators for the ability to discharge a patient back to their own home and survival. Further investigation is needed to ascertain the mechanism underpinning decline in muscle function post-surgery.