Clinical outcome study of dysferlinopathy: correlation between MRI fat fraction in lower limbs and clinical outcome assessments over a 3-year period

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The Jain Foundation COS of dysferlinopathy is an international study in genetically confirmed dysferlinopathy patients, with the aim to identify relevant outcome measures to facilitate trial readiness. Due to its wide range of clinical phenotypes and rates of disease progression, an objective marker to quantify disease progression would be ideal. We assessed the application of quantitative magnetic resonance imaging (MRI) as a prognostic tool for these patients. Our aim is to establish whether there is a correlation between fat fraction (FF) in thigh and/or lower leg muscles and clinical outcome assessments (COA) when comparing baseline (BL) values and changes from BL to year 1 (Y1) and to year 3 (Y3). We selected 84 patients from COS1 who had a Dixon MRI of the lower limbs (LL) and at least one of the following COA: time to rise from floor (RFF), time to climb / descend 4 steps (4SC/4SD), time up and go (TUG), time to walk 10m (10MWT), 6 min walk test (6MWT) and North Star Assessment for limb girdle type muscular dystrophy (NSAD) score. Spearman correlation (rs) was performed using SPSS statistics, p value 0.05. We found a significant correlation at BL between LL FF values and all COA, with the highest rs between thigh FF and NSAD (-.675) and 6MWT (-.665). We didn't find any correlations between changes in FF between BL and Y1 and changes in COA during that same period, but we did observe a significant correlation with changes in TUG (.445) and 4SC (.41) between BL and Y3. We observed a significant correlation between changes in thigh FF between BL and Y3 and changes in TUG (.706), RFF (.607), 4SC (.545) and NSAD[HR1] (-.374). No correlations were found when analysing changes in lower legs FF and COA. Our results show that changes in FF of the thigh muscles over one year could predict functional changes at a later stage, in a three-year period, suggesting that MRI could be used to identify dysferlinopathy patients at risk of more severe disease progression in routine clinical care.