Prognostic factors for loss of ability to rise from supine in Duchenne muscular dystrophy (DMD)

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Loss of ability to rise from supine is an important early clinical milestone in DMD. We investigated prognostic factors for time to loss of rise ability in 316 ambulatory boys (median age=7.9 years, range 4.4-19.4 years; 64% on deflazacort, 36% on prednisone) with DMD drawn from four natural history databases (UZ Leuven, PRO-DMD-01 data provided by CureDuchenne, iMDEX, and ImagingDMD). Patients' inability to rise was either explicitly recorded, or inferred based on having a recorded rise from supine completion time greater than 30 seconds. Overall, 119 boys (38%) lost rise from supine ability during over 900 patient-years of follow-up. Cox proportional hazards models for time to loss were investigated with data source and different combinations of prognostic factors. Baseline rise velocity was found to be the strongest prognostic factor when considered individually (pseudo-R^2: 42%). A model including age and baseline steroid type (deflazacort or prednisone) in addition to rise velocity improved prediction slightly (pseudo-R^2: 46%). Further adding timed 4-stair climb and 10-meter walk/run velocities, six-minute walking distance, age, height, weight, BMI and steroid use, improved the model incrementally (pseudo-R^2: 49%). In addition to baseline rise velocity, better 4SC performance, deflazacort use, and younger age at baseline were significantly associated with longer time to loss of rise from supine. A sensitivity analysis incorporating trial placebo arm data generated similar results. These findings suggest that time to loss of rise from supine ability can be well-predicted using baseline characteristics, especially baseline rise velocity. Subject to validation in separate data sources, these findings can inform the design and analysis of clinical trials for treatments that seek to preserve the ability to rise from supine.

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