

The Therapeutic Effects of Forced Aerobic Exercise in Multiple Sclerosis

Statistical Analysis

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Section of Biostatistics
Quantitative Health Sciences/ JJN-3
9500 Euclid Ave, Cleveland, OH 44195

IRB 19-1003: Feasibility study investigating forced and voluntary rate aerobic cycling in persons with multiple sclerosis

Statistical Methods:

Demographics, patient characteristics and exercise parameters will be summarized by mean with standard deviation or median with interquartile range for continuous variables, and count with percentage for categorical variables. Patients will be stratified by exercise groups (FE vs VE).

Changes in motor and non-motor functions from baseline to end of treatment will be examined by paired sample t-tests.

Changes in Klotho level from pre- to post-exercise will be examined by paired sample t-tests, at both first exercise session and last exercise session. Changes in Klotho level from first exercise session to last exercise session will also be examined by paired sample t-tests, at both pre-exercise and post-exercise. Mixed-effect model will be used to examine if there is significant acute change (from pre- to post-exercise) or long-term change (from first to last exercise session) in Klotho level. Patient random effect and exercise group indicator (FE vs VE) will be included in the model. Changes in Neurofilament light (NFL) from baseline to end of treatment will be examined by paired sample t-test.

Effects of exercise parameters on walking outcomes at end of treatment will be examined by linear regressions. Exercise parameters will be in separate models and baseline values of walking outcomes will be adjusted for in the models.

Outcomes measured at end of treatment will be compared between groups using linear regressions. Baseline values of outcomes will be adjusted for in the models.

Changes in exercise parameters over sessions will be examined by mixed-effect models, where session is the independent variable. Patient random effect will be included in the model. Group difference in changes in exercise cadence over sessions will be examined by mixed-effect models, where independent variables include session, group and interaction between session and group. Patient random effect will be included in the model.

We will also compare variables (motor and non-motor functions) between baseline1 and baseline2 using paired sample t-tests.

P<0.05 will be considered as statistically significant.