Introduction and Purpose

- MS commonly results in physical and cognitive disability. Functional improvement of established physical and cognitive deficits has been shown to be possible using telerehabilitation methods to include physical therapy (PT).
- Access to specialized rehabilitation services is limited due to a variety of factors including availability, geographical distance, mobility constraints, transportation difficulties, and financial constraints.
- Telecommunication technology offers the capacity to supervise and direct a PT program remotely through audio and visual real-time communication.

Purpose:
Demonstrate the feasibility and evaluate the efficacy of a telecommunication Physical Therapy (PT)-program for gait/balance and patient-reported outcomes (PROs) for fatigue, confidence, and self-efficacy in individuals with ambulatory deficits secondary to MS.

Methods

Design:
Single-center, prospective, randomized, three-arm, evaluator blinded, 8-week study.

Subjects:
Thirty individuals were included (female 69%, mean age 54.7 years, RMS 60%, SPMS 23%, PPMS 17%, mean EDSS 4.3) and randomized in a 1:1:1 fashion.

Intervention:
- One group (T1): HEP supervised
- One group (T2): HEP plus remote PT supervised via audio and visual real-time telecommunication 2-3 times per week
- One group (PT): site PT at the medical facility 2-3 times per week

Outcomes were measurements of gait, balance and patient reported outcomes (PROs). Selected outcomes were performed with a computerized system (NeuroCom SmartBalance).

- Outcomes (performed at baseline and week 8):
  - Gait measures: EDSS, T2SF, Functional gait assessment (FGA), NeuroCom Smart Balance Master walk tests.
  - Balance measures: Berg balance scale, NeuroCom Smart Balance tests.

- Questionnaires (PROs): Short form-36 (SF36), Fatigue impact scale (MFIS), functional activities balance confidence scale (ABC), and self-efficacy questionnaire (MSSE).

Statistical Analyses:
T-tests (two-tailed) were performed on the mean of the (after-before) differences for each variable grouped by treatment. The raw differences were compared to the means of differences from 0. This was to test if each treatment has a statistically significant effect on the considered variable.
False discovery rate corrected pair-wise t-tests (two-tailed) were performed to test for significant differences across all considered variables across treatments. This was to test if a particular treatment had a statistically significantly different effect on a variable than the other two treatments.
Between these two analyses one can assume if a particular treatment makes a significant impact on the considered variable, and b) is one treatment significantly more impactful on a variable than the other treatments.

Statistical significance was defined as a p value <0.05.
Program used was R Core Team (2016, Vienna, Austria).

Results

All 3 groups exhibited benefit on some of the outcomes compared to baseline (Table). T-PT had statistically significant improvement in FGA and SF36 and a strong trend for MFPS. PT showed benefit in those outcomes and on the SF36. The control group showed improvement on ABC, FGA and Masse but not on the SF36 or SF36p.
Comparison of the mean difference scores pairwise between treatment groups found that SF36m was significantly more improved in the PT group than in control (p=0.0047 FDR corrected). SF36p in the PT group was significantly more improved than in the T-PT and control group. However, we did not find a significant improvement in treatment effectiveness as measured by different PROs.
T-Pt showed benefit equivalent to that of on-site PT except for a specific outcome measured by the SF36p. No significant improvement in treatment effectiveness was identified when compared to the control group. However, PT was found to yield significant improvement in treatment effectiveness in any variable other than SF36p when compared to the control group (Table, Figures 2-6).

While there is no evidence that T-PT is significantly better than the control group customized self-directed home exercise program, there is also little evidence that PT is a significantly better treatment than control or T-PT.

Discussions

- T-PT is a convenient, practical and effective method to perform PT in MS individuals. It is overall equivalent to conventional on-site PT as measured by patient reported outcomes of fatigue, confidence and self-efficacy, and objective measures of gait and balance.
- There is evidence that each treatment strategy is effective in terms of at least two self-reported measures. There may be opportunity for clinics to assess which measures an individual needs addressed the most and prescribe a treatment accordingly. It may also be possible to give more freedom of choice to each patient depending on the level of treatment involvement (s)he feels most comfortable with. Additional research with larger sample sizes is needed to better assess the comparative treatment effectiveness.

Disclosures

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