Computer-Assisted Rehabilitation of Attention in Pediatric Onset Multiple Sclerosis and Attention Deficit Hyperactivity Disorder

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ABSTRACT

Background:
The effect of cognitive rehabilitation in pediatric onset multiple sclerosis (POMS) has been not investigated to date, whereas it is still controversial in attention deficit hyperactivity disorder (ADHD). Objective: to evaluate the effect of a home-based computerized program for retraining attention dysfunction in POMS and ADHD.

Methods:
At the study inclusion, POMS and ADHD underwent an extensive neuropsychological evaluation (NP), including the Symbol-Digit-Modalities-Test (SDMT), Tower of London (TOL), Trial-Making-Test-A (TMT-A), Spatial-Recall Test (SPART) and SPART-delayed (SPART-D). Patients who failed≥2 tests of attention were randomized to specific or nonspecific computerized training (ST, nST) consisting of one-hour sessions, twice a week for three months. The NP was repeated after the completion of the training. A repeated measures ANOVA was performed to compare performance on each cognitive test in patients receiving the ST or nST.

Results:
sixteen (9 females; mean±SD age:15.8±1.7 years) POMS and 20 (2 females; age:11.2±2.5 years) ADHD patients were enrolled. At baseline, in each disease group no differences were found between the 2 treatment arms regarding sex, age, and NP performances. POMS treated with ST, but not those treated with nST, significantly improved their performances on SDMT (ST 24.5±4.6 vs 46.3±6.7;nST 20.5±3.6 vs 20.8±4.1;p<0.0001), TOL (ST 15.8±5.4 vs 30.4±2.5; nST 15.6±6.6 vs 13.8±2.0;p<0.0001), TMT-A (ST 39.4±11.5 vs 31.8±6.6;nST 34.6±9.8 vs 43.8±10.2;p=0.012), SPART (ST 19.3±4.4 vs 25.5±1.7;nST 22.3±2.0 vs 23.1±1.9;p=0.004) and SPART-D (ST 6.8±1.0 vs 8.1±0.8;nST 7.0±1.4 vs 6.1±0.8;p=0.004). In the ADHD group, ST-treated, but not nST-treated, patients showed an improvement for SDMT (ST 17.1±5.5 vs 35.8±7.2;nST 17.4±11.1 vs 22.1±11.4;p=0.004) and SPART-D (ST 6.0±2.2 vs 7.7±1.8;nST 6.9±2.3 vs 6.6±1.2;p=0.04).

Conclusions:
our data show that an attention ST may improve attention dysfunction in both POMS and ADHD. Moreover it seems to have also a beneficial transfer effect on executive functioning, cognitive speed and visuo-spatial memory in POMS, but not in ADHHD.