The Diagnostic Accuracy of the BESTest to Assess Balance in Persons with Multiple Sclerosis

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Introduction and Hypothesis

While research has lead to the discovery of disease modifying medications, individuals with Multiple Sclerosis (MS) continue to experience limitations in physical function related to fatigue, weakness and poor balance. Despite these potential limitations, the majority of persons are ambulatory and active in their communities. As a result, the incidence of falls in this population is over 50%.[1-2] Physical Therapists are able to identify persons at risk for falling; however current physical therapy practice has not significantly reduced the incidence of falls in this population. This may be due to the absence of a balance test capable of identifying the aspect(s) of posture control contributing to imbalance in MS, leading to the use of generic balance rehabilitation programs. The Balance Evaluation Systems Test (BESTest)[3] is designed to assist the examiner in identifying the deficit body system(s) contributing to imbalance and/or falls. The use of the BESTest with persons with MS is limited.[4]

The purpose of this research study was to evaluate the feasibility, reliability and validity of the BESTest to assess balance in individuals with MS, and to compare the sensitivity of the BESTest and the Berg Balance Scale (BBS) to identify persons with MS who are fallers. We hypothesized that the BESTest would be a reliable and valid balance tool, but may be too fatiguing for this patient population.

Methods

This study recruited 20 ambulatory persons with MS during routine visits to an urban university-based MS Clinic.

Consented participants answered several questions regarding age, onset of disease, fear of falling and number of falls in past month.

Disease severity was assessed using the Expanded Disability Status Scale (EDSS).

A single balance assessment was completed using the BESTest and the BBS.

Twelve participants were retested 7-14 days later to examine test-retest reliability of the BESTest.

SPSS v 19.1 used for data analysis

Results

- 100% of participants were able to complete the BESTest
- The BESTest demonstrated strong test-retest reliability [ICC (2,1)= 0.97 p = 0.0]
- BESTest and BBS were highly correlated, r = 0.87, p = 0.01
- Using a cut-score of 45/56, BBS demonstrated poor sensitivity (0.43) to identify fallers
- Using a score of 69%, the BESTest demonstrated moderate sensitivity (0.73) to identify fallers.

Table 1. Participant Characteristics

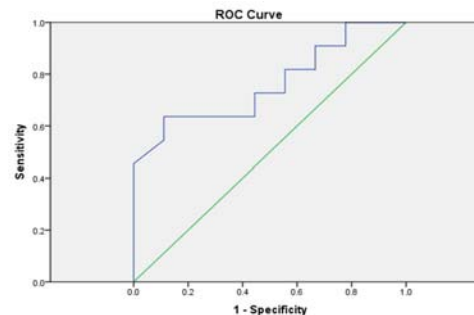| Characteristic	n=20	Mean (Range)	SD
Males (%)	20		
Fallers (%)	45		
Age (yrs)		43.3 (24-61)	10.2
Years since Diagnosis		11.2 (1-25)	7.7
EDSS Score		4.8 (2.0-6.5)	1.8
BESTest Total Score (%)		71.5 (31.5-105)	21.4
BBS Score		47.7 (15-56)	11.4

Figure 1. Receiver Operating Characteristic Plot for the Balance Evaluation Systems Test

Conclusions

Ambulatory persons with MS possess the stamina to complete the BESTest. The BESTest has strong test-retest reliability and is highly correlated with the BBS when used as a measure of functional balance in persons with MS. The BESTest more accurately identified persons with MS with a recent falls history than the BBS.

Clinical Relevance

The BESTest is a reliable and valid assessment of balance for persons with MS. The BBS has a ceiling effect when used to assess fall risk in this population.

Limitations

Limitations for this study include the use of a small sample of convenience and the inability to recruit a larger number of participants to return for a retest.

References

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