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Is The Berg Balance Assessment A Reliable Predictor Of Fall Risk In Older Adults?

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Clinical Scenario: One of my current patients was admitted to the hospital after a history of falling three times within the past two weeks. The patient is 91-years-old and claimed that she had no falls prior to these recent incidents. She had recently relocated to Maine from Texas and has been living with a different son, so had been through quite a few changes in the few weeks prior to being admitted to the hospital. She was discharged to the skilled-nursing facility that I work at, Brentwood Health and Rehabilitation, for further evaluation and rehabilitation to address her falls. Before admission, my patient was using a four-wheeled walker within her home and when she went out into the community and plans to be discharged with the same assistive device. During our evaluation of this patient, we performed a Berg Balance Assessment to get a baseline score on which she scored a 30/56 and was considered a high risk for falling according to the test. After over two and a half weeks of both occupational and physical therapy six times weekly (~2 hours daily), we performed another Berg Balance Assessment to determine if our current plan of care had improved the patient's balance in different scenarios. The patient improved to a 36/56 on the Berg, but was still considered at high risk for falls. This particular patient inspired this CAT because of my interest in the patient's future fall risk.

Clinical Question: Is the Berg Balance Assessment a reliable predictor of fall risk in older adults with a history of falls? (No comparison group)

        P: Older adults with a history of falls
        I: Berg Balance Assessment
        C: N/A
        O: Predictor of fall risk

Clinical Bottom Line:

        The Berg Balance Assessment challenges patients in many different scenarios without the use of their assistive device and we consider the Berg score to determine the risk that a patient may be for future falls. This study is relevant to my patient case because it looks at the Berg Balance Assessment's sensitivity (ability to identify those with balance deficits at risk for falls) and sensitivity (ability to identify those with no balance deficits not at risk for falls). According to this article, the Berg should not be used as a sole identifier of a person's risk for future falls, but rather, an assessment of the patient's living environment and ability to complete their ADLs should be considered in addition to the berg score. In relation to my patient case, I think the Berg can be used as a reliable test of balance in subjects, but should not be the only factor when determining a patient's fall risk. In particular, my patient uses a four-wheeled walker at all times and does seem to be relatively sturdy and balanced when using this device; however, she scores low on the Berg (when not using her assistive device). I do think the improvement of my patient's Berg scores over the past few weeks is clinically important and helps give an objective measure of my patient's overall balance. However, when determining my patient's future risk for falls, I will consider her environment and ability to successfully use her assistive device.

Search History:

        I started my search using Medline-Pubmed and searching for articles only using the terms "Berg Balance Assessment." I knew this was very broad, but I just wanted to get a feel

for what types of articles were published regarding the Berg. I began to narrow my search by adding the terms "predict falls" and "older adults," to see if this yielded any related articles. This ended up with a very useful article that I ended up using, but I decided to continue my search by changing some of the search terms to see if any other results came up.
Below I have listed some of the search terms that I included in my search.

Search Terms	Databases/Sites Searched	Limits Used
Elderly Older adults Falls Berg Balance Assessment/Test/Scale History of falls	Medline-Pubmed Google Scholar	English

Citations: Bogle Thorbahn LD, Newton RA. Use of the Berg Balance Test to predict falls in elderly persons. *Phys Ther.* 1996; 76(6):576-83.

Summary of Study:
Study Design: Prospective Cohort Study

Setting: Life-care communities—The Quadrangle in Haverford, PA and The White Horse Village in Newtown Square, PA

Participants: Any independent-living resident who volunteered was included (71-subjects were initially tested), but five participants who were unable to follow the directions for the test after three repetitions were excluded. No subject was excluded on the basis of age, gender or disability. A total of 66 participants (16 men and 50 women) were included with a mean age of 79.2 years (SD=6.2, range=69-94).

Intervention: Berg Balance Assessment

Outcome Measures: Each participant completed the Modified Activity Index questionnaire, a self-report questionnaire that reports patient's self-perceived activity level, frequency of falls, self-perception of balance, performance of ADLs, and use of an assistive device. In addition, each participant was randomly assigned to a rater (physical therapists with at least one year of experience in the treatment of patients with neurologic disorders) who completed the Berg Balance Assessment (14 subtests with a maximum score of 56). After a brief rest, every fourth participant was reassessed on the Berg Balance Assessment by a different rater to calculate interrater reliability.

Data Analysis: To determine whether the Berg Balance Test is predictive of current and future risk for falls in elderly persons in life-care communities, a chi-square test was done to analyze the relationship between each subject's balance score and their reported frequency of falls. In addition, a multiple regression analysis was run to determine how each factor (i.e. age, gender, activity level, frequency of falls, self-perception of balance, and use of an assistive device) contributed to the score achieved on the balance test. A chi-square test was also used to determine if the Berg Balance Assessment differentiated among subjects based on their use of an assistive device.

Summary of Evidence:
      Sensitivity for the Berg Balance Assessment would indicate the test's ability to

identify a balance deficit in subjects who have decreased balance. According to the evidence, the sensitivity of the Berg Balance Assessment was low when comparing Berg scores with initial fall frequency (53%) and fall frequency at the six-month follow up (53%). This means that the Berg does not identify those who have balance deficits well. Bogle-Thorbahn and Newton attributed the low sensitivity to the relationship between physical impairment and risk for falls. The data showed that the subjects who fell most frequently were those who scored closer to the cutoff score of 45/56, rather than further away. The authors attributed this to the fact that subjects who had poor balance and scored low on the Berg had adopted strategies to minimize their risk for falling, like using an assistive device. The authors concluded that those with the greatest physical impairments were not actually at the greatest risk for falling due to their adopted strategies to maintain their balance.

Another reported statistic in the article was a high specificity of the Berg, which correctly identifies those without a history of falls. The specificity of the Berg when compared to initial fall frequency and fall frequency at the six-month follow up was 96% and 92%, respectively. This finding indicated that those who score above the cutoff score of 45/56 are likely to not fall.

The Berg Balance Assessment also proved to be useful in predicting a person's use of an assistive device with a sensitivity of 76% and the specificity of 94%.
According to the authors, the evidence shed light on the multi-factorial nature of falls. Individuals should be assessed in the environment in which they operate in order to fully determine if a person is at risk for falling. The evidence did not support the use of the Berg to identify fallers, as shown by the low sensitivity; however, did support the use of the test to rule out individuals as non-fallers.

Additional Comments:

One limitation of the study was the sole use of self-report from subjects to report fall history. The researchers did try to help eliminate this limitation by assigning numbers to subjects randomly and also by sending a reminder halfway through the follow-up period with hopes to increase the honesty of responses and help subjects recall accurate fall history. Another limitation of the study was that it was a convenience sample with participants that volunteered to participate in the study. This may have had some bias in the variety of subjects that the study examined and may be a confounding factor in the data. Another limitation of the study is the fact that it only looked at independent-living residence residing in life-care communities. To get a more accurate picture of the elderly population in general, this study could be run with a sample of individuals in all different living situations.

Interrater reliability was determined to be $r_s=.88$ and the study was valid. Subjects were randomly assigned to a rater and each questionnaire had a randomly assigned number as well.

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