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# Normal Pressure Hydrocephalus Misleading as Sarcopenia: A Case Report

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## Introduction

This case report describes an elderly patient who initially had gait disturbance and urinary incontinence that were thought to be caused by sarcopenia but were later discovered to be due to normal pressure hydrocephalus (NPH).

## Case Report

In December 2021, a 75-year-old woman with a history of urgent urinary incontinence experienced a fall in her bathroom. However, she stayed at home without seeking medical attention for eight months, during which time she was only able to move around indoors holding on a support bar. Despite her long rest, her symptoms did not improve, so she visited a local hospital in August 2022, where a thoracic spine MRI revealed a T11 compression fracture with no evidence of cord compression. Subsequently, on December, 2022, the patient visited the department of neurosurgery at Gangnam Severance Hospital, where she was advised that her gait disturbance was not due to a spinal origin. Then, she was referred to the department of rehabilitation medicine for further evaluation and intensive rehabilitation.

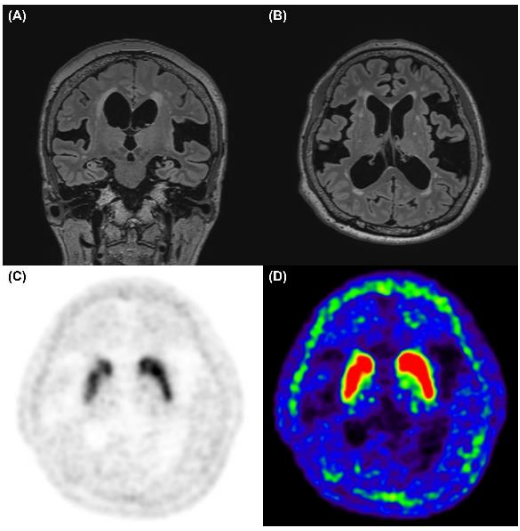
On the day of hospitalization, the patient exhibited a short step and wide base gait pattern upon assessment. Given her past year confined to the room, we suspected that sarcopenia may be the underlying cause of her gait disorder. Then, we conducted the Short Physical Performance Battery (SPPB), the body composition analysis, and handgrip strength tests. As a result, the patient received a low SPPB score of 3 out of 12, indicating poor standing balance (1/4), walking speed (1/4), and ability to sit and stand (1/4). However, body composition analysis showed normal skeletal muscle mass (22.4kg) and a skeletal muscle index (5.9kg/m2) above the sarcopenia standard (5.7kg/m2), and the patient's handgrip strength in the right hand (23.0kg) was also above the sarcopenia standard (18.0kg). Based on the combined results of these tests, we ruled out sarcopenia.

Subsequently, a brain MRI was conducted to rule out any brain disorders, taking into consideration of the exacerbated symptom of urinary incontinence after the fall. It revealed enlarged sylvian cisterns and a tight superior convexity, indicative of hydrocephalus (Figure 1). Two days later, a 50cc cerebrospinal fluid tapping was performed, resulting in a 50% reduction in the time taken to complete the timed up and go test and a 44% improvement in the velocity of the 10-meter walking test (Table 1). Furthermore, to assess normal dopamine uptake, an FP-CIT imaging test was conducted and showed no abnormal findings(Figure 1). These findings support a diagnosis of NPH (Figure 1).

**Table 1. Changes of functional scales after the cerebrospinal fluid drainage.**

| | Before | After |
|---|---|---|
| Timed up and go test (secs) | 20 | 10 |
| 10 meter walking test (meter/secs) | 0.37 | 0.66 |
| Lying and sitting up (secs) | 41 | 38 |

**Figure 1. T2-weighted Fluid Attenuated Inversion Image (FLAIR) Brain MRI which showed moderate ventriculomegaly with enlarged sylvian cisterns; (A) coronal view and (B) axial view, FP-CIT SPECT scans showed no abnormal findings; (C) and (D).**




## Conclusion

NPH is frequently misled as other disorders due to its common occurrence among older patients, especially in elderly patients who have additional factors contributing to gait disturbance. Consequently, it is crucial to exercise extra caution in identifying and managing NPH in such patients.