

Does Delirium Need Immediate Medical Referral in a Frail, Homebound Elder?

Amy Heritage Miller, PT, DPT;^{1,2} Kathleen Kline Mangione, PT, PhD, GCS¹

¹ Department of Physical Therapy, Arcadia University, Glenside, PA

² Home Care Division, Abington Memorial Hospital, Abington, PA

ABSTRACT

Background and Purpose: This case report describes the clinical decision making process of a physical therapist whose examination of a home bound elderly woman led to a referral for hospitalization. We illustrate how the use of a comprehensive systems screen and thorough examination identified a patient with treatable conditions that required medical care. **Case Description:** The patient was a frail 93-year-old woman. She was referred for home-care physical therapy with multiple medical comorbidities and functional decline following a short hospitalization for fall-related injuries. Her function improved after several visits, but upon resuming treatment after a 2-week hiatus, the patient demonstrated major decline in cognitive and physical function. **Outcomes:** The comprehensive systems screen revealed that the patient had increased pallor, loose and frequent bowel movements, urinary incontinence and increased frequency of micturition, confusion and apathy, and extreme fatigue. Her examination showed large declines in scores for Functional Independence Measures, Mini Mental Status Examination, Berg Balance Test, and Timed Up and Go. These results were consistent with indicators for delirium, dehydration, and anemia. The findings were reported to the patient's physician and family members agreed to have the patient evaluated in the local emergency room. **Conclusions:** This case report illustrates how knowledge of the pathologies associated with delirium and thorough examination can assist the physical therapist in making clinical decisions when home-care patients require prompt medical referral.

Key Words: delirium, frailty, home care

INTRODUCTION

The clinical decision making process for medically complex and frail elders is not well-documented in the physical therapy literature. The *Guide to Physical Therapist Practice (Guide)* provides a model that describes the process of patient examina-

tion including history-taking, systems reviews, and tests and measures.¹ The systems review is one area that may be of great importance for the frail elder because it may identify areas in which medical referral is needed. The *Guide* includes the cardiovascular/pulmonary, integumentary, musculoskeletal, and neuromuscular systems and communication/cognition ability in the recommended systems review.¹ However, the impact of the gastrointestinal, urogenital, psychological, and general health systems on daily function in the elderly make these systems also important to screen. The term 'medical screening' has been used to identify potential 'nonmusculoskeletal' origins of pain or dysfunction that require referral for medical examination; and is most often discussed in the context of outpatient practice.^{2,3} But the principles of medical screening and the recommended system review screens could be applied to elderly patients in the home care setting. While acute functional and cognitive changes may be fairly easy to recognize in a frail elder, a comprehensive screen may be needed to identify possible causes of the acute confusion or functional loss. For example, changes in bowel and bladder function or changes in appetite may indicate a change in medical status.⁴ Physical therapists may be unaware of some common pathologies that underlie cognitive and functional changes seen in homebound elders.

In caring for the frail homebound elder the physical therapist often assumes the role of primary care provider. This role includes advising the family and advocating for the needs of the patient within the health care system. The medically complex nature of many elders receiving home care services suggests that a comprehensive systems screen may be warranted to properly manage the patient. The purpose of this case report is to illustrate the clinical decision making process of a physical therapist who conducted a thorough examination of a frail, homebound elderly woman, and then referred the woman for immediate medical attention. The related pathologies that contributed to the patient's cognitive and physical changes are reviewed.

PATIENT DESCRIPTION

The patient, JL, was a 93-year-old woman who was referred for home care physical therapy following a fall. She had lived in her daughter's home for the previous 3 years. The patient was dependent in instrumental activities of daily living (IADL) and required minimal assistance with activities of daily living (ADL). Her past medical history was extensive and included the following: codeine toxicity, myocardial infarction, seizures, hypertension, depression, anxiety, diverticulosis, osteoporosis, renal insufficiency, unspecified memory loss, and degenerative

Address correspondence to: Amy H. Miller, PT, DPT
Department of Physical Therapy, Arcadia University, 450 S
Easton Road, Glenside, PA 19038-3295, Ph: 215-572-8620, Fax:
215-572-2157 (millera@arcadia.edu).

changes of the lumbar spine. Within the 3 years prior to this episode of care, JL sustained a fracture of the pubic bone, had bilateral cataract surgery, experienced a bowel obstruction, was successfully treated with surgery and radiation for rectal cancer, and was hospitalized for anemia, electrolyte imbalances, and for contusions related to previous falls. She took 7 prescription medications and 2 over-the-counter medications for active pathologies. All prescribed medications, dosages, and pathologies addressed are listed in Table 1.

The patient was referred to physical therapy after a 3 day hospital stay for contusions sustained on her face, head, and right shoulder after a fall in her home. She received 6 home care visits over 3 weeks. A complete reexamination was performed at the sixth visit because home care physical therapy was stopped for 2 weeks to allow the patient to accompany her family on vacation. JL's resting blood pressure and heart rate were within normal limits, Mini Mental State Examination (MMSE) score was 24/30, and muscle strength was grossly 3+ /5 to 4- /5. JL was able to answer questions appropriately and carry on short conversations with the physical therapist. Standing balance was very poor, putting her at risk for falls, as indicated by a Berg Balance Test score of 23/56. The family had been educated in falls prevention during physical therapy visits. JL was independent in ambulation with a wheeled walker for 100 to 150 feet, independent in sit to stand transfers, and was able to stand without upper extremity assistance. The objective examination findings during the last home visit prior to vacation are listed in Table 2.

History

Physical therapy was restarted 2 weeks later. An examination was performed including a comprehensive systems review. Upon examination, JL answered direct questions with only 1 word answers, and did not attempt to participate in the history

taking. Prior to the vacation period, JL would engage in short conversation. The daughter reported that towards the end of the 2 weeks of vacation, JL appeared confused. The daughter believed this was due to the change in environment, and that once the patient returned home, her cognition would improve. This expected improvement did not occur. The daughter also stated that JL was not eating or drinking as much as usual, and that she had not received an Epoetin alfa injection for over 2 weeks. JL had become more physically dependent in the last few days of the vacation. The daughter considered taking her mother to the hospital, but JL refused.

Comprehensive Systems Review

A thorough systems review was then conducted. *Cardiovascular/Pulmonary:* Vital signs were taken to screen the cardiovascular and pulmonary systems. Heart rate taken in supine was 92 beats per minute and regular. Blood pressure was 118/50 mm of Hg in supine. Respiratory rate was 30 breaths per minute, and regular. No dyspnea or cough, or peripheral edema was noted. *Integumentary:* The skin was observed and no skin lesions were found. JL appeared more pale than usual. No change in skin turgor or skin quality was observed. *Communication and Cognition:* JL was disoriented to person, place, and time. The patient inconsistently followed 1 step instructions. *Musculoskeletal:* Gross passive range of motion was unchanged, but gross strength was decreased from prior visits. *Neuromuscular:* JL's movements were symmetric, but she exhibited purposeless, random movements in both upper and lower extremities. No tremors were noted. Her eyes were able to focus and track with cueing. The patient demonstrated no changes in pain level. Transfer ability, balance, and mobility required assistance. *Gastrointestinal and Urogenital:* The daughter reported that the patient had no difficulty swallowing, but had not eaten much in the past week. She stated

Table 1. Prescribed Medication Regimen

Prescription Medications			Problem
Generic Name	Brand Name	Dosage	
Amlodipine besylate	Norvasc	10 mg daily	hypertension
Propafenone	Rythmol	150 mg twice a day	ventricular arrhythmia
Alendronate sodium	Fosamax	70 mg once a week	osteoporosis
Epoetin alfa	Epogen	40,000 units subcutaneous approximately every 2 weeks	chronic anemia
Lansoprazole	Prevacid	15 mg daily	heartburn and reflux
Hydrochlorothiazide	Lasix	25 mg daily	hypertension and kidney disease
Paroxetine hydrochloride	Paxil CR	12.5 mg daily	depression and anxiety
Over-the-Counter Medications			
Iron	Slow FE	daily	anemia
Folic acid		1 daily	anemia

Table 2. Examination Findings at Home Visits Before and After 2-Week Vacation

Examination	Last Visit Before Vacation	First Visit After Vacation
Blood pressure: supine (mmHg)	130/60	118/50
Heart rate: supine (bpm)	80	92
Blood pressure: sitting 1 min (mmHg)	130/60	110/50
Heart rate: sitting 1 min (bpm)	80	92
Mini Mental State Examination	24	5
Manual muscle test scores	3+ to 4-/5 bilaterally Symmetric	2 to 3/5 presumed Symmetric motion observed
Tendon responses	Slightly diminished	Slightly diminished
Berg Balance Test	23	4
Functional Independence Measure		
Self care (0-42)	24	6
Transfers (0-21)	15	5
Locomotion (0-14)	9	3
Timed-Up and Go (sec)	50	Unable
Sit to stand (repetitions)	4 consecutive	Unable

that JL's bowel movements had been more frequent, loose and darker in color, and her urination was frequent and darker in color. She reported JL was now incontinent at night and during the past day. *Psychological:* The daughter reported JL had become extremely fatigued and apathetic over the past few days, had periods of increased confusion, and had been up and agitated the previous night. A summary of systems review findings are listed in Table 3.

Tests and Measures

Based on the history and systems review, examination in several areas was warranted. Because of her history of coronary disease, her fall history, and dehydration, orthostatic hypotension was measured. Orthostatic blood pressure change is a systolic blood pressure decline greater than 20 mm Hg or a diastolic decline greater than 10 mm Hg taken at 1 minute intervals after a positional change.⁹⁻¹¹ Blood pressure and heart rate measures were taken in supine and sitting. The patient was not able to stand unsupported at this time. Her blood pressure in supine was 118/50 mm Hg and dropped to 110/50 mm Hg after 1 minute of sitting. Because of the change in her level of attention and arousal, cognition was assessed using the MMSE.⁵⁻⁷ Scores on the MMSE have been correlated with those of other delirium screening instruments.⁸ The MMSE has demonstrated test-retest reliability of .89, and interrater reliability of 0.82.⁶ Her score on the MMSE was a 5/30.

The changes in her neuromuscular system observed in the systems review suggested a possible transient ischemic attack. Tendon responses were checked bilaterally at the biceps, quadriceps, and Achilles tendons and were slightly diminished,

which was unchanged from the previous examination. Muscle performance was assessed by manual muscle testing^{12,13} and the functional test of attempting to rise from a chair without use of arms. Her manual muscle test grades were grossly 2-3/5 throughout upper and lower extremities. She was unable to rise from a chair without moderate assistance.

Balance and functional status were assessed with the Berg Balance Test, the Timed Up and Go, and portions of the Functional Independence Measure. Reliability and validity of these measures have been documented in the literature.¹⁴⁻²⁰ Her Berg Balance Test score was 4/56, she was unable to perform the Timed Up and Go, and required moderate assistance to transfer from sit to stand and to ambulate 2 steps with a walker. Results are summarized in Table 2.

Evaluation

Tests and measurement results prior to vacation were compared to current findings. The decline in mental and functional status, drop in blood pressure with an increase in resting heart rate, the findings of the systems review (Table 3), and JL's past medical history were compared to known risk factors and indicators for delirium, dehydration, and anemia. The physical therapist decided that prompt medical attention was needed and called the patient's family physician.

The family physician was not available and a physician unfamiliar with the patient ordered blood work to be taken at the next scheduled nurse's visit in 2 days. The physical therapist encouraged the family to take the patient to the emergency room for prompt medical attention. The daughter remained reluctant to take JL to the emergency room. She believed a

Table 3. Results of Comprehensive Systems Screen at Reexamination

System	Findings
Cardiovascular	Increase in resting heart rate and decrease in resting blood pressure
Integumentary	Increase generalized pallor
Communication/cognition	Single word responses Disorientation to time, place and person Followed only single step commands
Musculoskeletal	Decrease in strength
Neuromuscular	Assistance needed with all mobility Non purposeful movements
Gastrointestinal	Loose, more frequent, darker bowel movements Decrease in fluid and dietary intake
Urogenital	Frequent and darker in color Incontinence requiring use of protective undergarments for last 24 hours
Psychological	Apathetic Night time agitation
General health	Extreme fatigue

trip to the emergency room would cause further distress and discomfort to her elderly frail mother, who previously indicated that she wanted to die at home. The physical therapist educated JL's daughter on the possible treatable medical conditions leading to this change in function and cognition. The patient's obvious delirium and additional signs and symptoms for anemia, dehydration, and electrolyte imbalance were explained to the family. After this education, the daughter agreed to transport the patient by ambulance to the emergency room.

JL was admitted to the hospital. The medical diagnoses of severe anemia, urinary tract infection, and dehydration were made. Admitting laboratory results for JL were found to be abnormal and are listed in Table 4, with reference to established normal values and disease associations.²¹ JL received blood transfusions, IV antibiotics, and fluids while in the hospital. She was discharged to her daughter's home with follow up nursing, physical therapy, and assistance of a home health aide. Within 3 to 4 weeks the patient had returned to a level of cognition and function equal to levels prior to the delirious episode.

DISCUSSION

This case report describes a comprehensive systems screen that assisted the physical therapist in the decision-making process of medical referral. Declines in functional and cognitive abilities, and changes in clinical indicators for dehydration and anemia were used to encourage the family to seek immediate medical attention. JL was admitted to the hospital and the diagnoses of delirium, dehydration, anemia, and urinary tract infection were made (Table 5).

Delirium

For this patient, the most obvious change was the acute onset of confusion, or delirium. Delirium is a reduced ability to maintain attention to external stimuli and to appropriately shift attention to new external stimuli.²² Delirium includes a reduced level of consciousness; disorganized thinking; rambling speech; disturbances of sleep-wake cycle; disorientation to person, place, or time; and memory impairment. Onset is rapid, occurring within hours to at most 1 day, and the condition may fluctuate.

Table 4. Laboratory Values at Hospital Admission

Variable	Normal Values*	Admission Values	Disease Associations
Hemoglobin	12-16 g/dl	7.8 g/dl	Anemia
Urea nitrogen BUN	8-25 mg/dl	76 mg/dl	Renal disease, dehydration, GI bleed, leukemia, heart failure, shock, urinary tract obstruction
Sodium	135-145 mmol/l	150 mmol/l	Dehydration
Serum creatinine	0.6-1.5 mg/dl	1.9 mg/dl	Renal failure, urinary obstruction, dehydration, hyperthyroidism, muscle disease
*Reference: Rehabilitation Specialist Handbook ²¹			

Table 5. Summary of Risk Factors for Dehydration^{9,29-31}

<p><u>Intrinsic Factors</u></p> <p>Age</p> <p>Cognitive impairment</p> <p>Comorbidity</p> <p>Previous episode of delirium Perioperative or postoperative</p> <p>Immobility/decreased activity Bladder catheter</p> <p>Vision impairment</p> <p>Multiple medications Psychoactive drugs</p> <p>Depression Type and duration of operation: hip replacement Muscular wasting Hearing deficits</p> <p><u>Environmental Factors</u>: extreme sensory experiences, social isolation, stress, unfamiliarity</p> <p><u>Specific Pathologies</u>: Pulmonary disorders, burns; AIDS, hypoxemia, organ insufficiency, infection, abnormal sodium or potassium levels, abnormal serum albumin, malnutrition</p>
<p>Risk Factors present for JL prior to reevaluation are bolded. Risk Factors identified for JL following medical diagnosis are italicized.</p>

ate.²² Delirium is unrecognized in 33% to 66% of cases and has been attributed to a variety of factors including: stereotyping the aging patient, lack of awareness of underlying illness, and inadequate interaction with patients.^{23,24} Delirium has been mistaken for dementia, mood disorders, and functional psychoses.²⁴ The cause of delirium is often multifactorial; 2 to 6 factors may be present in any single case. Routine cognitive testing and use of screening tools is suggested to improve detection.²⁴ Literature suggests that patient outcomes are improved if training in risk factor recognition is performed.²⁵⁻²⁷

JL had a change in mental status; she was disoriented, had disorganized thinking, and exhibited fluctuations in attention. The family attributed the confusion solely to the change in environment, which may have contributed to her delirium. However, her medical history and the findings identified in the systems review indicated more probable and serious contributors to delirium. Risk factors in her past medical history included comorbidity, renal insufficiency, multiple medications, and immobility.

Dehydration

Dehydration is a common risk factor for developing delirium and is one of the 10 most frequent diagnoses reported for Medicare hospitalizations.²⁸ Of more than 10 million hospitalizations involving the elderly, 6.7% had a diagnosis of dehydration that was either the primary diagnosis or concomitant with other diseases such as respiratory illness 28.2%, urinary system infections 24.9%, cardiac disease 21.8%, frailty 20.3%, metabolic disorders 18.8%, gastrointestinal disorders 18.8%,

and cancer 15.7%.²⁸ Adults between the ages of 85 and 99 were found to be 6 times more likely to be admitted for dehydration than those 65 to 69 years of age. Dehydration was defined as “a physiologic state based on an imbalance between intake and loss of fluid and accompanying sodium status.”²⁸

There are a multitude of risk factors for dehydration: deterioration in cognitive status in the last 90 days, failure to eat, failure to take medications, urinary tract infections within the last 30 days, diarrhea, dizziness, fever, internal bleeding, vomiting, weight loss ($\geq 5\%$ in last 30 days), insufficient fluid intake, use of diuretics, sedatives, nonsteroidal anti-inflammatory medications, laxative abuse, decreases in mobility and motor control, history of previous episodes of dehydration, and swallowing and communication problems.^{9,29} These risk factors should alert health care providers to the possibility of inadequate hydration. Age related changes that can compound the risk factors include decreased perception of thirst,³⁰ decreased sensitivity to taste,²⁹ alterations in thermoregulation,³¹ decreased ability to concentrate urine, decreased plasma flow, and decreased vasopressin release.²⁹ Table 5 provides a summary of risk factors for dehydration. JL’s past medical history included many of these risk factors and age related changes, highlighted within Table 5. She had previous episodes of dehydration, a history of renal insufficiency, and she used diuretics and an antidepressant. She exhibited decreased mobility and memory deficits. The comprehensive systems review allowed the physical therapist to identify additional risk factors. JL recently decreased her fluid intake, while experiencing diarrhea. She was vacationing in a warm climate, had further decline in mobility, and experienced

a deterioration of cognitive status. Her medical history and signs identified in the systems review suggested a high risk for dehydration. JL's daughter was educated about the large number of risk factors for dehydration exhibited by her mother.

Tests and measures were used to confirm the possibility of dehydration. Clinical indicators of dehydration severity in elderly patients were studied in 55 men and women (mean age of 82). Seven indicators correlated best with dehydration severity: tongue dryness, longitudinal tongue furrows, dryness of mucous membranes of mouth, upper body weakness, confusion, speech difficulty, and sunkenness of eyes. However, some findings such as skin turgor may be unreliable. Dry mucus membranes may be misleading as many elderly are mouth breathers or are on anticholinergic medications.¹¹ Abnormal declines in orthostatic blood pressure may be a sign of dehydration, but pharmacological beta-blocking, pace-makers, or cardiac conduction changes may limit the value of heart rate monitoring in the elderly population.⁹ Additionally 20% to 30% of all community dwelling elderly have documented orthostatic blood pressure changes.³² JL was taking anti-arrhythmic medication and demonstrated fear and difficulty standing for greater than 30 seconds, so this measure was difficult to assess. Resting blood pressure was however decreased, and heart rate increased from values measured consistently prior to the vacation period. JL also demonstrated other significant clinical indicators including confusion, upper body weakness, and tongue dryness. Knowledge of dehydration risk factors, and JL's past medical history, along with clinical indicators found during the systems review and examination were incorporated into the clinical decision making process to recommend transfer to the emergency room.

Admitting laboratory reports for JL found sodium levels to be 150 mmol/L. This value classified her with hypernatremic dehydration, which is the most common form of electrolyte imbalance encountered and is noted by sodium levels >145mmol/L.⁹ Sodium levels for JL at hospital discharge were 136 mmol/L.

Anemia

A second potential cause of delirium for JL was anemia. Anemia has been reported to be a predictive factor for delirium in a surgical intensive care unit setting.³³ Prevalence of anemia increases with age, and among those 85 years and older, 17% of the women and 28% of the men are reported to have anemia.^{34,35} Aging itself is suggested to be an intrinsic factor in the development of anemia, possibly through age related dysregulation of certain proinflammatory cytokines.^{35,36} Anemia is related to changes in cognitive status^{33,37} and decline in physical performance.³⁷⁻³⁹ Anemia is a symptom of many other disorders, such as dietary deficiency, acute or chronic blood loss, congenital defects of hemoglobin, diseases of bone marrow, chronic inflammation, and infectious or neoplastic disease,³⁶ and may itself cause dysfunction of multiple organ systems from chronic hypoxemia. Clinical manifestations generally attributed to anemia include vague symptoms such as fatigue. As anemia

becomes more severe, signs and symptoms include weakness, dyspnea on exertion, easy fatigue and pallor or yellowness of the skin, especially the palms and fingernails.⁴⁰

The World Health Organization defines anemia as a hemoglobin concentration below 12g/dL in women and below 13g/dL in men. Borderline anemia is defined as a hemoglobin level within 1g/dL above criteria.⁴¹ From their study of 633 community dwelling women age 70 to 80, Chaves et al suggests hemoglobin of 12.0 g/dL might be a suboptimal criterion for defining anemia in older women, as hemoglobin currently perceived as mildly low and even low normal might have adverse effect on mobility function.³⁸

JL had not received an epoetinal alfa injection for over 2 weeks. Again, awareness of JL's history and current medication regimen (epoetinal alfa injections every 2 to 3 weeks), evaluation of general pallor noted during the systems review, and the decline in cognitive and physical function indicated the possibility of anemia. These findings were reported to the physician on call, and explained to JL's daughter, additionally helping the daughter to come to the decision to have JL transported to the hospital for medical examination. Admission laboratory studies reported hemoglobin concentrations for JL to be 7.8 g/dL.

SUMMARY

A frail and medically complex homebound elderly woman had physical and cognitive changes that were identified and measured during a home physical therapy visit. In the role as primary care provider in the home care setting, the physical therapist needs to incorporate a comprehensive systems review, a thorough physical therapy examination, and knowledge of risk factors and clinical indicators for common medical conditions. For JL, use of this information led to the clinical decision that prompt medical attention was indicated. By reporting the objective findings to the patient's physician and explaining these findings to the family, the patient received the necessary medical care for return to the community.

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