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Serving People With Disabilities



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# Medicine & Health RHODE ISLAND

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## Commentaries

### Negative Hallucinations [April Fool's]

Negative symptoms have attracted increasing attention in the study of schizophrenia for the past 20 years. Hughlings Jackson first categorized neurological phenomena into negative and positive classifications a century ago. Positive symptoms are generated by over-activity of a brain region, such as seizures, tremors and other involuntary movements. Negative symptoms are generated by under-activity of brain regions, as with stroke, brain tumors or other mass lesions or injuries producing weakness, reduced movement, aphasia or reduced sensation. Schizophrenia, to the unsophisticated observer, produces odd behavior caused by hallucinations, delusions, loosened and illogical associations, all considered positive phenomena because they are additional, abnormal thoughts, whereas the negative phenomena of reduced spontaneity, reduced pleasure, reduced thoughts, blunted emotions, reduced social interactivity are considered negative symptoms. Positive symptoms respond much better to antipsychotic medications, leaving the negative symptoms as the most disabling in schizophrenia, along with certain cognitive changes that have also not been amenable to therapy. One can obviously extend the same concept to bipolar disorder, with mania resulting

from positive and depression from negative emotional energy.

The concept of a negative hallucination, however, was introduced in the psychoanalytic literature with a single paper published in the last issue of a standard German analytic journal, closed by the Nazis. I see a lot of patients who have hallucinations since the drug treatment of **Parkinson's disease (PD)** causes hallucinations in about 30%, and delusions in about 10%. Sadly, I probably induce more psychotic symptoms than any other single doctor in New England. The hallucinations are quite stereotypic. The drugs typically cause visual hallucinations of people, animals or sometimes inanimate objects such as trucks, cars and statues, that are free of emotional content. However, a previously unrecognized phenomenon in the world of drug-induced hallucinations was described to me by a patient. He told me that he sometimes *didn't* see things that *really were there*. He considered these hallucinations in reverse. He would see two people when three were visiting. He would hear his children but not his wife even though he knew she was there and was yelling at him. The description was an almost verbatim copy of the von Fischenbach paper in *Der Fortschreiten Psychoanalitik*. "I very clearly saw my two adult sons, who were visiting from out of town. I then asked when their mother, my wife, was returning, which surprised them because she was standing with them."

Having never encountered this before, I explored it with the patient and his wife. She reported that he had been "ignoring" her intermittently for many months, ever since his last increase in a dopamine agonist. When we lowered the dopamine agonist, he got stiffer and slower and preferred to be more mobile and not see his wife so much, so we increased it. It was not clear that he had other negative hallucinations, although he claimed that he got a traffic ticket for going through a

red light that he said wasn't actually there.

I began to ask all my PD patients taking medications about their not seeing or hearing things that they should have. About 30% reported frequently not seeing their spouse, the most common negative hallucination, or not hearing things, again, most commonly the spouse. Many reported not seeing stop signs when driving, items at the supermarket or hearing the spouse ask them to do errands, such as picking up items at the market.

In studies outside of PD, negative hallucinations are very common, and have a gender predominance in males, starting in prepubescent boys, and increasing. They are much more common in married men than unmarried. The psychiatric literature distinguishes between "positive amnesia" and "negative amnesia." This terminology is confusing because "negative amnesia" refers to memories not made whereas "positive amnesia" refers to memories that have been suppressed. They have generally not been commented upon or much studied due to their overlap with inattention, the **confabulatory syndrome of minor memory failure (CSMMF)**, sometimes called "CRS" (can't remember sh\_\_) in the lay world, and outright lying (malin-gering). This wide differential diagnostic list makes epidemiological studies inaccurate. In addition certain authorities doubt the existence of negative hallucinations. The issue has been brought before the Supreme Court, but the question of whether this explanation can be invoked as a defense, has not been answered since the Court has ruled on very narrow grounds, carefully avoiding taking a stand on an issue not fully resolved by psychiatrists.

DSM V\* RT 43b (Diagnostic and Statistical Manual, Fifth revision, abbreviated version, Revised Translation, 43 rd rendition, b supplement) defines a negative hallucination as a "suppressed perception" of a clearly perceivable sensory input that is due to synchronized over-activity of the brain which is not epileptic. It is deemed a "possible but not proven symptom." Thus, a hearing-impaired person would not have a negative hallucination on not hearing a sound that is below the auditory threshold. A person who perceived a crowded intersec-

**Table. Differential diagnosis of negative hallucinations**

Amnesia
Inattention
Lying
Sensory impairment
Sensory overload
Conversion
Illusion/distortion

tion while driving but did not see a stop sign might have had a negative hallucination, or might simply have been day-dreaming, or not paying attention.

To test the hypotheses that negative hallucinations exist, and that they are caused by over-activity of particular brain regions, we performed **functional magnetic resonance imaging (fMRI)** scans on PD patients who were taking medications and thought to have negative hallucinations. Subjects were scanned while taking their medications and exposed to their spouse or a spouse stand-in, who was part of a group of three, the two others being strangers. Each read a standardized script and the patient, was asked to describe the scene visually and to recall

what was said. Only 10% of subjects with reported negative hallucinations had them during the study, so that only 4 subjects could be used. Each one of these showed increased fMRI activity in the supplementary visual cortex of Brodmann's area 121, suggesting an over-activity, as hypothesized.

While this result concerns only 4 subjects, and requires confirmation, it nevertheless should be sufficiently convincing that skeptical readers will at least consider the possibility that negative hallucinations exist. The implications of this finding are widespread.

Happy April Fool's.

— JOSEPH H. FRIEDMAN, MD

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Conflicts: In addition to the potential conflicts posed by my ties to industry that are listed, during the years 2001-2009 I was a paid consultant for: Eli Lilly, Bristol Myers Squibb, Janssen, Ovation, Pfizer, makers of each of the atypicals in use or being tested.

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## Oh, How the Mighty Have Fallen

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**Stroke remains one of the major causes of disability and death** in the United States. It is a terrifyingly sudden and unwelcome visitation. It swiftly deprives its victims of control over limb muscles and even consciousness. Speech is commonly impaired during the acute phases of the illness. Patients with stroke often identify their disease as an attack from the outside rather than a festering, internal impairment. Historically, stroke has frequently been considered by its victims as a punishment rather than a human affliction provoked by natural causes.

The United States Public Health Service estimates that about 795,000 Americans experience a new or recurrent stroke each year. In 2001 the Service initiated a broad surveillance program, enlisting 195 hospitals in Massachusetts, Georgia, North Carolina and Illinois to track the prevalence, demographic features, secular trends and risk factors preceding the disease. And in the course of these studies, some 56,969 patients with stroke, 18 years or older, were studied.

What findings did this surveillance program generate?

First, the most obvious: Stroke remains a major impediment to the health of Americans. Second, it continues to be an affliction primarily of the elderly with a median age of onset at 72 years. It is slightly more common in women (53.3%) but only because more women than men survive to live beyond the age of 70.

What prior risk factors increase the likelihood of stroke? A history of hypertension (high blood pressure) is the most predictive risk factor, encountered in 73% of stroke victims. Other past events that increase the likelihood of future stroke include a previous or transient stroke (31%), a history of diabetes mellitus (28%), a history of coronary artery heart disease (28%), a history of cigarette smoking (18%) or a history of atrial fibrillation (15%). The typical stroke patient in this study carried between two and three of these risk factors; and about one-fifth of this population of close to 57,000 patients were burdened with four or more of these risk factors.

Stroke, of course, is not a single disease but many etiologically

unrelated disorders involving, in one way or another, the arterial blood vessels leading to or within the brain. The commonest pathologic lesion causing stroke is a functional narrowing or occlusion of a major cerebral artery thus depriving brain tissue of its needed oxygen-carrying blood supply. About 56% of patients fell within this diagnostic category. An additional 22% had an insufficient blood supply but only transiently so (called a transient ischemic attack or TIA) with a strong likelihood of functional recovery. About 14% had a massive intracranial hemorrhage not caused by any preceding head injury. This disorder has sometimes been called apoplexy. The remaining 8% were clinically ill-defined.

In decades past, a diagnosis of stroke carried a dismal prognosis with hospitals providing little beyond supervised bed-rest, supportive therapy and diligent nursing care. Patients lingered for weeks and were prone to develop secondary pneumonia, other internal infections and bed sores. Inpatient medicine has advanced considerably since then and stroke patients now are routinely treated to prevent these complications. Furthermore, advanced anti-thrombotic therapies are employed to reverse some of the cerebral damage. And rehabilitation services, including speech therapy, occupational therapy and physiotherapy are diligently prescribed to speed the recovery of the patients and to hasten their resumption of a full life in the community.

And the outcome of all of these medical, nursing and rehabilitative interventions? The in-hospital stay, instead of interminable months is now measured in days: an average of 6 days in this study. And instead of an acute mortality rate of over 35% in the past and most of the survivors then relegated to nursing homes, the survey recorded a mortality rate of 6.8%, 40.2% transferred to a rehabilitation center, nursing home or hospice and the remainder, about 53%, returning to their homes. A substantial improvement over the outcome data from a half-century ago.

As educational programs in preventive medicine have influenced an increasingly large population, the prevalence of stroke is gradually diminishing. Smoking-cessation programs,

adoption of prudent diets, medications to lower high blood pressure and other pharmacological interventions, are clearly influencing the frequency of this devastating illness.

The 20<sup>th</sup> Century witnessed an awesome shift in how the medical profession confronted stroke: From a silent bedside vigil with no meaningful interventions other than prayer and solace for the grieving family, to its current armamentarium of drugs and purposeful nursing and rehabilitation measures leading to an overall reduction of the disease; and a significant improvement in outcome when the disease does arise.

How frequent was stroke (sometimes called cerebrovascular disease) in the first half of the 20<sup>th</sup> Century? Consider these grim facts: Most great political leaders of those past decades who had not succumbed to assassination, dementia or the per-

ils of war, died of stroke. This sad list includes, amongst many others, V.I. Lenin, Woodrow Wilson, Warren Harding, Franklin D. Roosevelt, Winston Churchill and Richard Nixon.

— STANLEY M. ARONSON, MD

*Stanley M. Aronson, MD is dean of medicine emeritus, Brown University.*

#### **Disclosure of Financial Interests**

Stanley M. Aronson, MD, and spouse/significant other have no financial interests to disclose.

#### **CORRESPONDENCE**

e-mail: SMAMD@cox.net

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## **Rehabilitation Medicine: Serving People With Disabilities**

*Jon Mukand, MD, PhD*

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**Almost 13 % of non-institutionalized** Americans between the ages of 21 and 64 (about 22.3 million people) reported a disability in the 2007 **American Community Survey (ACS)**. This means that in Rhode Island there are about 87,000 people with disabilities, as defined by three questions. First, are there any permanent conditions such as severe vision impairment or a limitation in at least one basic activity such as walking? Second, due to a physical, mental, or emotional condition, is there a mental disability (e.g. learning, memory, concentration) or a disability with self-care? Third, is there a disability with vocational or community activities such as with shopping?<sup>1</sup>

There are many causes of disabilities. Less than 15% are congenital, because most occur later in life.<sup>2</sup> More than six million Americans are survivors of a stroke,<sup>3</sup> more than 400,000 live with multiple sclerosis,<sup>4</sup> and more than 325,000 suffer hip fractures annually.<sup>5</sup> My perspective on disability is that of a medical director and rehabilitation medicine consultant at the **Southern New England Rehabilitation Center (SNERC)**, a joint venture of Rhode Island Hospital and St. Joseph Health Services of RI. The center treats people with strokes, spinal cord and brain injuries, multiple trauma, hip fractures, amputations, and neurologic conditions such as MS, Parkinson's, and poly-neuropathies.

Disability is a struggle; I admire my patients, their families, and their medical caregivers as they contend with the challenges. One of the most common impairments is with mobility. In the US about a million people use wheelchairs.<sup>2</sup> The widespread use of mobility devices, and the economic implications, are evident in television advertisements that promise freedom of movement — with full coverage by insurance companies. Unfortunately, on occasion the profit motive overcomes the clinical needs of patients, as described in the article on wheelchair mobility by therapists Stacey Johnson and Colleen Fitzsimmons. Disabilities often lead to physical problems that require careful assessment in the context of the psychosocial situation and architectural barriers in the home and community. It is essential to perform a detailed assessment of musculoskeletal and neurologic function, skin integrity, posture, trunk control, sitting tolerance, mobility, and activities of daily living. Assessing previous equipment helps determine what special features are medically indicated, or not. Finally, the therapists order the equipment in coordination with physicians to ensure that there are no problems with insurance coverage. (People with disabilities often deal with financial issues; health care problems are the most common reason for declaring bankruptcy in America.) Only by evalu-

ating these diverse factors, as these skilled therapists have done for many of my patients at SNERC, can one provide the optimal mobility equipment for people with disabilities.

As an occasional consultant and referring physician for Sargent Rehabilitation Center, I have observed and treated children as they received rehabilitation for traumatic brain injuries. One of my most tragic patients is Tori Andreozzi, a world class karate champion who was severely injured when a drunk driver crashed into her. Tori continues her odyssey of recovery, in spite of severe neurologic deficits. In 2006, almost 13,500 people were killed in alcohol-related traffic fatalities, accounting for one-third of all U.S. car collisions. Almost 1,800 children who were fourteen and younger were killed by motor vehicles, and 17% of these deaths were related to alcohol.<sup>6</sup> Tori was featured in Rhode Island newspapers and her mother, Cathy, is an advocate for the prevention of alcohol-related injuries. Her therapists at Sargent Rehabilitation Center continue their treatments. Marilyn Serra and Colleen McCarthy describe the center's impressive model for pediatric rehabilitation.

One of the consequences, as well as a major cause, of disabilities is falls. In the United States, there is one death and 183 emergency department visits for fall-related injuries among older adults every

hour.<sup>7</sup> Among elderly people, 60% of fatal falls occur at home, 30% in public places, and 10% in health care institutions.<sup>8</sup> One third of older adults fall each year, and 20-30% of this group suffer moderate to severe bruises, fractures, and head injuries.<sup>9</sup> Fractures commonly occur in the spine, forearm, leg, ankle, pelvis, upper arm, and hand. Falls can often be prevented, by understanding risk factors and implementing strategies to reduce their impact and incidence, as discussed in the article I co-authored with Patricia Wolfe and Christine Lourenco.

Hip fractures are common orthopedic injuries due to falls, with an annual incidence of 325,000 in the United States. The consequences are devastating for elderly patients: a one-year mortality rate of 18-33% and in-hospital mortality of 2.7%.<sup>5</sup> Many of the patients at SNERC have disabilities related to hip fractures, and many have risk factors for osteoporosis. Vitamin D deficiency is a relatively common problem that increases the risk of abnormal calcium metabolism. (I generally prescribe a loading dose of 50,000 units of Vitamin D and then regular doses of calcium/Vitamin D, along with a recommendation to follow up with the primary care physician for a bone density test and medications as indicated.) Greg Sawyer and Craig Lareau, two orthopedic surgery residents at Brown University, discuss surgical approaches and rehabilitative issues for these complex patients. One of the most common complications in this population is **venous thromboembolic (VTE)** disease, and requires careful attention in the peri-operative phase.

Almost all people with disabilities are at high risk of VTEs early in their course and require prophylactic measures. This is especially true of patients with multiple traumatic injuries. During occasional rounds with the Trauma Surgery program at Rhode Island Hospital, I have seen that trauma surgery requires a deep understanding of anatomy, physiology, and pharmacology. If these severely damaged patients survive, the difficult process of rehabilitation starts in the Trauma ICU. Shea Gregg and his colleagues in the trauma program have authored an interdisciplinary article on the complex rehabilitation for these shattered patients.

Once patients with disabilities have received their medical and surgical care in the acute care hospital, they may require intensive inpatient rehabilitation at a center such as mine (SNERC). With Jeanne Stowe, the center's Director of Case Management, I co-authored an article on several clinical and medico-administrative issues. The admission criteria as well as the review process for inpatient rehabilitation have become more complicated, but we continue treating patients with disabilities due to a variety of neurologic and orthopedic conditions. At SNERC, we enjoy working with our medical/surgical colleagues on behalf of people with disabilities, who are featured in this special issue on rehabilitation.

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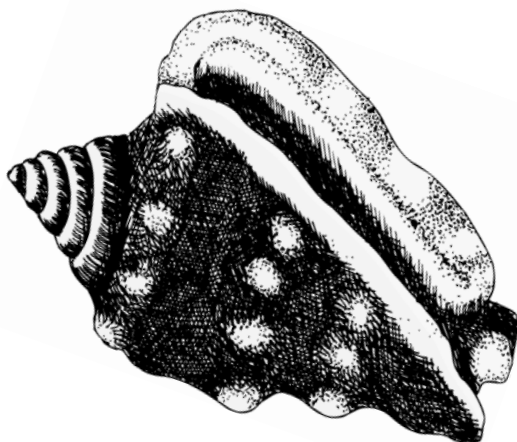
*Jon Mukand, MD, PhD, is Medical Director, Southern New England Rehabilitation Center, and Clinical Assistant Professor, Rehabilitation Medicine, The Warren Alpert Medical School of Brown University, Boston University Medical School, and Tufts University Medical School.*

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## CORRESPONDENCE

Jon Mukand, MD, PhD  
Southern New England Rehabilitation Center  
200 High Service Avenue  
North Providence, RI 02904  
phone: (401) 456-3939  
e-mail: [jmukand@saintjosephri.com](mailto:jmukand@saintjosephri.com)





# Rolling the Right Way: The Physician's Role In Wheelchair Prescription

*Stacey Johnson OTR/L, ATP, and Colleen Fitzsimmons MS, PT*

**Ms. Rholing, a 45-year old mother of 2** with primary progressive multiple sclerosis, presented to the wheelchair clinic at Southern New England Rehabilitation Center for evaluation of her mobility status. Two years ago, with a prescription from her well-intentioned doctor, this unfortunate woman obtained a simple power chair that no longer meets her needs. Like 177,000 other Rhode Islanders, Ms. Rholing has Medicare as her primary insurer.<sup>1</sup> Due to her physician's lack of awareness of stringent Medicare guidelines and documentation requirements, she is now precluded from obtaining a new, more appropriate, wheelchair. In an era of advanced medical technology, wheelchair prescription remains a misunderstood and undervalued service. Had Ms. Rholing initially been evaluated at a wheelchair clinic by a team of experts including a physical therapist, an occupational therapist, and a qualified medical supplier, the outcome would have been much different. In this article we offer a model for a comprehensive wheelchair and mobility evaluation. Ideally, the evaluation should include:

- Medical history
- Current medical issues
- Psychosocial history, including architectural/community barriers
- Musculoskeletal structure/function
- Neurologic structure/function
- Postural assessment
- Functional mobility/activities of daily living
- Skin integrity/sitting tolerance
- Equipment history
- Trial of new equipment

Once this process is concluded, the therapists formulate a detailed letter of medical necessity, highlighting the required equipment and justification for each component. This letter is forwarded to the medical supplier and the referring physician for review and signature. Given the progressive nature of Ms. Rholing's diag-

nosis, a skilled clinic team would have prescribed an adaptable wheelchair with advanced electronics and seating options, capable of addressing the client's deteriorating functional capacities. Medicare expects that a wheelchair base will meet the client's needs for a minimum of five years. During that time, Medicare will reimburse upgrades but historically has not approved an entirely new seating system.

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## With the latest Medicare documentation requirements for specialized manual and power wheelchairs, the burden of proof lies with the referring physician.

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With the latest Medicare documentation requirements for specialized manual and power wheelchairs, the burden of proof lies with the referring physician. These guidelines, intended to alleviate fraud and abuse, were implemented as a result of a 350% increase in Medicare payments for power wheelchairs from 1999-2003.<sup>2</sup> Last year, Medicare denied 80% of audited power wheelchair requests because of the lack of compliance with documentation requirements.<sup>3</sup> For power mobility devices, like the one needed by Ms. Rholing, Medicare requires the following specific process for approval. The referring physician writes a prescription for a wheelchair assessment, which enables the client to attend a specialty seating and positioning clinic. After equipment recommendations are finalized, the referring physician must perform a face-to-face "mobility evaluation" to document the client's functional capabilities and challenges on a typical day.<sup>4</sup> The report generated from this visit must reflect the following:

- Reasons why patient's current mobility equipment is no longer effective
- Impact of mobility limitations on **mobility-related activities of daily living (MRADL)** within the home
- Cognitive and physical capabilities to utilize the recommended power mobility device
- Rationale for why a less costly device (cane, walker, manual wheelchair, scooter) would not meet the client's needs<sup>5</sup>
- A statement that the physician has "reviewed and agrees with the PT/OT evaluation"

This equipment prescription process may seem tedious, but it is crucial in order to serve patients with a variety of disabilities. The level of detail outlining mobility limitations must be specific to the home environment. Medicare will not reimburse equipment necessary for use exclusively outside of the home.<sup>6</sup> MRADLs are defined as toileting, feeding, grooming, dressing, and bathing.<sup>6</sup> For instance, if the client is incontinent due to her inability to mobilize to the bathroom in a timely fashion, Medicare will approve an appropriate device. However, if the patient is functional within the home but limited with community mobility to access her pharmacy or grocery store, a request for a power mobility device of any type would be denied.

Medicare further requires the physician to complete a "seven element order" for the power mobility device.<sup>7</sup> Many medical suppliers provide a template for the physician's convenience. This form can be completed quickly and easily by the doctor or office staff and must include: beneficiary's name, detailed description of device, date of completion of the face-to-face exam, diagnosis/conditions warranting the need for the mobility device, length of need (lifetime), physician's signature with NPI # and the date of physician's signature. Once the progress notes from the face-to-face exami-



nation, signed wheelchair clinic evaluation, and the seven element order are received by medical suppliers, they will send a "detailed written order" outlining the specific equipment recommendations, with associated HCPCS codes, to the physician for signature. All of this documentation is time-sensitive as the medical supplier only has 45 days to gather this information. It is therefore imperative that all requests for documentation are immediately completed and returned.

Once the physician's role is complete, the supplier must ensure that the prescribed equipment is medically necessary as outlined by Medicare guidelines, verifying that the documentation and justification are complete. The equipment is then ordered and delivered. The supplier bills for the equipment electronically, with coded item descriptions corresponding to equipment and filed documentation.<sup>8</sup> Medicare cannot be billed until the user receives the equipment. Medicare also reserves the right to audit the patient's file at any time to verify supporting documentation, and may withdraw reimbursement from the supplier if guidelines are not met. Therefore the supplier, who cannot repossess the client's equipment, takes on a sig-

nificant financial risk in providing expensive power wheelchairs to clients without proper documentation or true medical need. Whether Medicare is the primary or secondary insurer, the same documentation requirements are necessary. Most other insurers are starting to follow these same guidelines. Unlike Medicare, other insurers will actually review the supporting documentation and issue a prior authorization, allowing the supplier to provide the equipment without risk.

The seating clinic at Southern New England Rehabilitation Center seeks to streamline the process for physicians and clients, ensuring that people like Ms. Rholing will receive the most appropriate and cost-effective wheelchair. At the outpatient clinic at Saint Joseph Hospital for Specialty Care, the PT and OT staff are Assistive Technology Professionals and have provided specialty evaluation services for seating and positioning for the past decade.

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*Stacey Johnson OTR/L, ATP, is a staff occupational therapist and Assistive Technology Professional.*

*Colleen Fitzsimmons MS, PT, is a Clinical Manager of Rehabilitation.*

*Both are at the Southern New England Rehabilitation Center.*

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## CORRESPONDENCE

Stacey Johnson, OTR/L, ATP  
Southern New England Rehabilitation Center  
21 Peace Street  
Providence, RI 02907  
Phone: (401) 456-4177  
e-mail: [sjohnson@saintjosephri.com](mailto:sjohnson@saintjosephri.com)

# Pediatric Rehabilitation Day Treatment For Children With Brain Injury and Neurodevelopmental Disorders

*Marilyn F. Serra, MS/MEd, CCC/SLP, and Colleen McCarthy, BASW*

**The pediatric rehabilitation literature** offers many studies on models of care for autistic children with medical, behavioral and psychiatric co-morbidities as well as adolescent brain injury victims with cognitive and physical impairments.<sup>1,2</sup> This article describes a day treatment program at a comprehensive outpatient medical rehabilitation center specializing in neurological disorders. Sargent Rehabilitation Center has an adolescent **traumatic brain injury (TBI)** unit and a private day school for children with special needs who are diagnosed primarily with **autism spectrum disorder (ASD)**.

Legislative federal and state initiatives in maternal health, child care, and education have defined the need to develop community systems and delivery service

models for children with special needs, which includes TBI and ASD.<sup>3,4,5,6,7</sup> Developing a continuum of care to address the severe problems of these children has challenged medical, psychosocial, rehabilitation, and education professionals. Likewise, selecting appropriate programs of service has challenged families, physicians, public/private referrers, and purchasers of service.

More than one million children in the US suffer closed head injuries annually, with acute and persistent impairments.<sup>8</sup> With an incidence of ASD of 1 per 150 births, the prevalence of childhood autism in the US could reach 4 million in the next decade.<sup>9</sup> Although school systems have traditionally not focused on rehabilitation, the continuum

of public and private programs should provide levels of care based on the severity of the condition.

## PHILOSOPHY, FEATURES, AND THE PYRAMID OF TRANSITIONAL CARE

Sargent Rehabilitation Center's programs for children and young adults are offered six hours daily, 230 days a year. Both the TBI and ASD programs are located in specially equipped rehabilitation settings, with vocational training areas. Clients are treated as "whole persons" who live with their families in the community. The impact of a clinical problem will often arise or change with developmental stages. Care needs to be readily accessible, coordinated, and continuously provided by an experienced interdisciplinary team.

The core interdisciplinary teams for both the brain injury unit and day school include a pediatrician who is a bridge between the family and/or specialty care physicians and the interdisciplinary team. A nurse monitors ongoing medical conditions. Other team members include a physical therapist, occupational therapist, speech/language pathologist, social worker, behavior analyst, and special educator for daily, coordinated therapies. When students are age 14, transitional and vocational specialists join the team. Neuropsychology and audiology are available to assess impairments and guide treatments. Service teams for these complex clients should have clinical experience and expertise<sup>10</sup> with an analytic

The family, attending physicians, referring source, and reimbursement agency

The first test of functional achievement is at the In-Clinic level. A controlled environment with optimal intensity of services is intended to achieve and maintain maximum independence in the learning or re-learning of cognitive, communication, self-care, mobility, and socialization skills. The Step-Down level assesses the stability of functional achievement in environments that simulate the real world as well as trials in the actual

The diagram is a large triangle representing the progression of medical education. The left side is labeled 'Pre-clinical' at the top and 'Post-graduate' at the bottom. The right side is labeled 'Post-graduate' at the top and 'Pre-clinical' at the bottom. The top vertex is labeled 'Admission' and the bottom vertex is labeled 'Exit'. Inside the triangle, there are two horizontal lines representing 'Transitional Steps' and 'Transitional Community'. The text 'Transfer' appears twice, once on each side of the triangle, indicating the transition between the two levels. The text 'Transitional Steps' is located between the two horizontal lines, and 'Transitional Community' is located below the bottom horizontal line. The text 'Pre-clinical' and 'Post-graduate' are located on the left and right sides of the triangle, respectively. The text 'Admission' and 'Exit' are located at the top and bottom vertices, respectively. The text 'Transfer' appears twice, once on each side of the triangle, indicating the transition between the two levels.

Pre-clinical

Post-graduate

Admission

Exit

Transfer

Transfer

Transitional Steps

Transitional Community

community. Training can be returned to In-Clinic services to improve stability with ADLs and education. The Community Entry level moves functional achievement from simulated and actual trials to performance in the actual community with decreasing interventions and assistance. Final measures establish the application of maximum levels of independence achieved to returning to district schools, living at home and preparing for employment. The following case demonstrates some of these principles.

Susan was a 17-year-old high school student who had wanted to be a teacher when she was an unrestrained passenger in a rollover vehicle accident. She was unresponsive, required intubation, and had a Glasgow Coma scale of 4. Radiologic studies revealed diffuse axonal injury and a subarachnoid hemorrhage. Her complicated month-long hospital stay included G-tube placement.

She received intensive rehabilitation for 4 weeks and was referred to the Sargent Rehabilitation Center Adolescent Brain Injury Unit. Susan was admitted to the Program for 5 days/week. At admission she presented with moderate-severe deficits with memory, cognitive processing speed, complex attention and executive function.

She also had moderate left neglect, impaired left upper extremity function, and decreased range of motion and strength in left lower extremity. Her speech/cognitive therapy, occupational therapy, physical therapy and psychological counseling were conducted in individual and group sessions with a focus on cognitive and executive function. After one month, Susan demonstrated carryover of some memory strategies and her self-monitoring and self-cueing skills (i.e. double-checking her work) had improved. As a result, educational services were initiated, including 4<sup>th</sup>-5<sup>th</sup> grade math, reading, science and social studies. Through the interdisciplinary and collaborative model of education and rehabilitation, at the end of 5 months, Susan's academic testing indicated she had gained 2 ½ years. Susan continued to make progress. Ten months into the program she read at the 8<sup>th</sup> grade level. She continued to require therapy for memory and executive function in order to stabilize these areas. When Susan was 18 years old, she was transferred to the transitional step down level of care,

with vocational services. Given her goal to be a teacher, she worked with her teachers and therapists on activities as such a basic lesson plan and resume writing. The vocational specialist worked on interviewing skills while the speech therapist worked on pragmatics. Ultimately Susan used her lesson plan to read to a Sargent Center day school pre-school child and then to the entire classroom. After this success, her program was transitioned to community re-entry.

At this level of care, Susan went to a community day care to work with young children.

This included helping them with clothing, snacks, lunch, and reading to them. Back in the clinic, 1 day/week she continued to work on activities such as job applications. Less than two years after the accident, Susan was hired as a teacher's aide in a local school department and has not missed a day of work.

In conclusion, the pyramid of transitional care provides a rehabilitation model for neuro-developmental disorders and traumatic brain injury. Clients are transferred through a pyramid of care levels from intensive clinical services to functional ADL training in order to return to community living. A key element to this model is establishing stability of function by regularly adjusting the type and intensity of interventions. Level of care decisions are based on achievement measured against predicted performance. Each client is evaluated on a scale of functional achievement that can ultimately be applied to productive living in the community. The model itself continues to be a work in progress.

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*Marilyn F. Serra, MS/MEd, CCC/SLP, is President-CEO.*

*Colleen McCarthy, BASW, is Vice-President, Programs and Professional Service.*

*Both are at the Sargent Rehabilitation Center.*

## Disclosure of Financial Interests

The authors and spouses and significant others have no financial interests to disclose.

## CORRESPONDENCE

Marilyn F. Serra, MS/MEd, CCC/SLP  
Sargent Rehabilitation Center  
800 Quaker Lane  
Warwick, RI 02818  
Phone: (401) 886-6600  
E-mail: mserra@sargentcenter.org



# The Assessment and Prevention of Falls

Patricia I. Wolfe, PT, MS, Christine Lourenco, SPT, Jon Mukand, MD, PhD

**Children fall often during their first few** years of life, but as we age the incidence of falls declines with improvements in our gait pattern, our base of support, and our center of gravity. During the later years of life, however, we enter the same state of unsteadiness that was present during the early years. In the United States, there is one death and 183 emergency department visits for fall-related injuries among older adults every hour.<sup>1</sup> Falls affect people of all races and genders and can often be prevented with the correct interventions. By understanding falls' risk factors, we can implement strategies to reduce their impact and incidence.

Falls have long been examined as a leading cause of hospital admissions in the older population. For adults 65 years old or older, 60% of fatal falls happen at home, 30% occur in public places, and 10% occur in health care institutions.<sup>2</sup> Tinetti has defined a fall as "a sudden, unintentional change in position causing an individual to land at a lower level, . . . other than as a consequence of sudden onset of paralysis, epileptic seizure, or overwhelming force."<sup>3</sup> One of every three adults over the age of 65 meets these criteria each year, and 20-30% of this group suffer moderate to severe injuries including bruises, fractures and head injuries.<sup>4</sup> In 1996 there were 340,000 admissions for patients over 65 year of age with hip fractures, a number that is projected to grow to over 500,000 admissions in 2040.<sup>5</sup> Other common fractures resulting from falls are those of the spine, forearm, leg, ankle, pelvis, upper arm, and hand.<sup>6</sup> Many people who fall, even those without fractures, develop a **fear of falling (FOF)**, which increases the likelihood of recurrent falls.<sup>7</sup> FOF is defined as "low perceived self-efficacy at avoiding falls during essential, non-hazardous activities of daily living."<sup>3</sup>

It is important to identify both extrinsic and intrinsic risk factors to address preventive strategies. Extrinsic factors that we can influence are footwear, pathways, and assistive devices. Those at risk for falls should wear shoes with sufficient support to avoid ankle instability, as well

as a good quality grip for the ground surface. Clear pathways and appropriately adjusted assistive devices are essential for those at **risk of falling (ROF)**. Extrinsic factors that cannot be avoided and require caution include glare, slippery surfaces, or optokinetic effects such as escalators.

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## Balance tests help to assess the impact of multiple factors.

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An intrinsic factor that greatly increases the risk of falling is muscle weakness, especially in the ankle flexors and knee extensors, which produces gait and balance deficits. Abnormal blood pressure, heart rate, and heart rhythms can greatly affect balance and lead to a higher ROF. With some conditions, the ability of reflexes to act appropriately is impaired. The use of multiple medications also increases fall risk, especially more than four medications that include psychotropics, sedatives, antihypertensives, antiarrhythmics or diuretics. Other intrinsic risk factors are arthritis, advanced age (>75), fear of falling, and depression. During a history and physical examination, certain findings are associated with a higher fall risk. Cataracts, macular degeneration, or glaucoma may cause poor vision. If patients complain of arthritis, especially of the foot, a podiatry evaluation may be helpful. Patients with diabetes may have reduced sensory function due to neuropathies, and nerve conduction studies may be indicated. For impaired proprioception, a vitamin B12 level should be checked. A history of a stroke or Parkinson's disease is associated with hip fractures. Bladder dysfunction, especially nocturnal frequency and incontinence, can lead to falls. Anxiety and depression should be addressed with judicious medication management. Orthostatic changes in blood pressure and pulse should lead to a reassessment of medications and an evaluation for dehydration.

A brief mental status examination may reveal delirium or dementia. Cardiac findings may require follow-up with an EKG and a Holter monitor. Generalized muscle weakness may be due to thyroid dysfunction. These are a few examples of how a physician's evaluation may help reduce a patient's risk of falls.<sup>8</sup>

Balance tests help to assess the impact of multiple factors. Vision, posture, movement time, strength, **range of motion (ROM)** and the environment are all important when performing a balance test. An ideal balance test should discriminate between who is at risk of falling and who is not. Other criteria for an optimal test include high validity, inter-rater reliability, adaptability, and sensitivity to change.

The Sit To Stand test is a reliable measurement of lower extremity strength that can be utilized as both an outcome measure and a therapeutic exercise. In this timed repetitive test, the patient crosses his or her hands over the chest and goes from sitting in a chair with no arm rests to standing. The patient is timed for 5 repetitions, with average times of 11.4, 12.6, and 14.8 seconds for patients in their sixties, seventies, and eighties, respectively.<sup>9</sup> The test can be modified for frail patients by using a chair with arm rests.

Another reliable test is the Tinetti Assessment, which rates a patient's gait and balance. A score less than 19, out of a maximum of 28, indicates a fall risk. The reliability of the test was demonstrated when agreement was found between two or more professionals on over 85% of test items, and those that did not agree varied by less than 10%.<sup>3, 10</sup>

The Functional Reach test is performed using a yardstick fixed to a tripod. The patient stands next to it with the feet flat on the floor and reaches straight out. Next, the patient leans forward and reaches as far as possible without taking a step or lifting the heels off the floor. The therapist measures the distance of reach with both maneuvers. If the difference is under 6 inches, the patient is at high risk of falling; a difference

of 6-10 inches places a patient in the moderate risk category.<sup>8</sup> Another easily administered and reliable test is the **Timed Up and Go (TUG)** test, in which the patient stands up from a chair with armrests and walks to a target 3 meters away. Assistive devices may be used during this test; and they should be noted in the test results. If an individual takes 14 or more seconds to complete the test, there is a risk of falls. If the subject takes greater than 30 seconds, it indicates that the subject has significant impairments in ADLs.<sup>11</sup>

The **Four-Square Step Test (FSST)** is unique in that it involves stepping over low objects (2.5 cm) and movement in four directions. A pattern of four squares is laid out on the floor, and the patient walks clockwise from one square to the next three and then counterclockwise back to square one, all while facing the same direction. A score greater than 15 seconds is associated with a risk of falls. Although risk assessments are usually performed at outpatient clinics, the Stratify Assessment is an accurate inpatient instrument. The five areas of the test are scored with a 1 if present and 0 if not. These areas include a previous fall resulting in a hospital stay; agitation, visual impairments, high toilet frequency, and impaired transfer/bed mobility status. A score of two or more indicates a risk of falls. The strongest predictors of falling are a previous fall and impaired transfer/bed mobility.

After assessing fall risk, we must focus on preventive strategies. The easiest to prescribe, but often the most difficult to follow, are lifestyle changes such as increasing walking, minimizing caffeine intake (caffeine leads to urinary frequency, causing people to get up at night), treating visual impairments, and maintaining body weight. If a patient weighs less than at the age of 25, the ROF increases due to possible reductions in bone density as well as muscle mass.<sup>8</sup> A patient's diet, especially vitamin intake, can seriously affect the ROF. A double blind study of 122 elderly women in a long term care facility showed that vitamin D supplements added to calcium lowered the ROF and improved musculoskeletal function.<sup>12</sup>

Another intervention is a program to strengthen the lower legs through treadmill walking and resistance exercises

of the knees and ankles. It is also important to focus on flexibility. For example, stretching the gastrocnemius and soleus muscles improves ankle plantarflexion, and stretching the tibialis muscles improves ankle inversion and dorsiflexion. Flexibility of the quadriceps and hamstrings for the knee and the hamstrings and iliopsoas for the hip are also important. Other areas that may be improved are coordination and postural stability. Exercises such as bridging, sit to stand, braiding, and forward stepping can aid with coordination. Weight shifting, trunk stabilization, sitting on a balance ball, and exercises that promote trunk rotation can also improve postural stability. These exercises can be performed at home or in a local fitness center, but physical therapy intervention is ideal. A randomized trial of patients after a hip fracture compared a **home exercise program (HEP)** to one supervised by a rehabilitation physical therapist. Compared to the HEP group, the supervised group had better strength, balance, gait speed, physical function, and quality of life.<sup>13</sup>

Another program for patients after a hip fracture is aquatic therapy. The buoyancy of water is ideal for patients with weight-bearing restrictions, severe pain, and postural instability. For instance, in chest-deep water the patient only supports 25% of the body weight.

Balance retraining can decrease the ROF. An optimal approach is to challenge the patient's balance and postural stability by engaging the visual, vestibular, and somatosensory systems. Balance trainer systems provide visual feedback for proper posture and their game-like activities increase patient interaction. These exercises help proprioception, stabilization, range of motion, and weight shifting. Another approach is through Tai Chi, an Eastern exercise with emphasis on balance, weight shifting, coordination, and postural training. Tai Chi has been found to decrease blood pressure, FOF, and the risk of falling.<sup>14</sup>

Education about safe environments is an effective strategy for the home or assisted living community. Clear travel paths and the removal of trip hazards such as appliance cords and throw rugs can minimize falls. Handrails and grab bars ensure a safe path. Educating patients about home adaptations can also

be beneficial. In a study of facilities with patients who had fallen, physical therapists and other medical staff provided education on wheelchair and other assistive devices, medical management, gait analysis and an exercise program. Facilities that implemented the program reported a significant decrease in recurrent falls.<sup>12</sup>

Given the aging population, the incidence of falls, and the resulting complications, we must use our professional skill to implement preventive measures in our communities and clinical settings. We must use reliable risk assessment measures, repeat them as a patient's status changes, and then choose the best intervention strategies for each person.

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Patricia I. Wolfe, PT, MS, is Director, Rehabilitation Services, Rhode Island Hospital and Hasbro Children's Hospital.

Christine Lourenco, SPT, is a student in the physical therapy program at Northeastern University.

Jon Mukand, MD, PhD, is Medical Director, Southern New England Rehabilitation Center, and Clinical Assistant Professor, Rehabilitation Medicine, The Warren Alpert Medical School of Brown University, Boston University Medical School, and Tufts University Medical School.

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Jon Mukand. Speakers' Bureau: GlaxoSmithKline.

#### CORRESPONDENCE

Patricia I. Wolfe, PT, MS  
Rhode Island Hospital  
593 Eddy St.  
Providence, RI 02903  
Phone: (401) 444-8613  
e-mail: Pwolfe1@lifespan.org

## Hip Fracture Surgical Treatment and Rehabilitation

Craig Lareau, MD, and Gregory Sawyer, MD

Approximately 325,000 people will have a hip fracture each year in the United States.<sup>1</sup> In elderly patients, they result in a one-year mortality rate of 18-33% and in-hospital mortality of 2.7%.<sup>1</sup> Hip fractures are more common in patients with pre-existing cardiac disease, chronic renal failure, diabetes mellitus, stroke, malignancy, and chronic obstructive pulmonary disease,<sup>2</sup> which also are major factors in the recovery process. Many patients experience a significant functional decline and inability to perform activities of daily living (ADLs).<sup>1</sup> Therefore, rehabilitation is a vital component of the patient's recovery in order to regain the previous functional level, whether as an independent community ambulatory or a full-assist nursing home resident. Only 14% of hip fracture patients return home after their hospital course;<sup>1</sup> the rest require some level of inpatient rehabilitation.

The population of individuals older than age 65 is expected to grow from 35 million to 77 million between 2000 and 2040.<sup>3</sup> Although hip fracture rates are declining in this age group—due to bisphosphonates, calcium and Vitamin D intake, weight-bearing exercises, and better prevention of falls<sup>4</sup>—the annual number of hip fractures will undoubtedly rise based upon changing demographics.

#### CLINICAL PRESENTATION/WORK-UP

Hip fracture patients are typically older than age 65, with a mean age of 85.<sup>1</sup> They usually present after a fall with

complaints of pain on the affected side and an inability to ambulate. The affected limb is often shortened and externally rotated due to the muscular forces on the fracture fragments. Radiographs confirm the diagnosis, with standard views including an AP Pelvis and AP and lateral of the affected hip. Rarely is a CT or MRI needed to make the diagnosis. MRI can identify occult fractures in the patient with persistent pain and inability to ambulate with normal radiographs.<sup>5</sup> Once the diagnosis has been established, a discussion with the patient, family, and orthopedic surgeon should take place to determine the course of action. Currently, the vast majority of hip fractures are treated operatively with surgical techniques depending upon the fracture pattern. Rarely, in an elderly patient with

multiple serious medical co-morbidities, non-operative treatment may provide the best outcome.

#### NON-OPERATIVE MANAGEMENT AND REHABILITATION

Non-operative treatment involves either early mobilization or a period of bed rest and/or traction followed by progressive weight-bearing. This is usually reserved for two subsets of patients. First, for patients with severe co-morbidities, the risks of the procedure and anesthesia outweigh the benefits. Second, for patients who are non-ambulatory or bedridden at baseline, fracture fixation will not improve their ambulatory status. Nevertheless, some centers prefer to operate on this population for improved pain control. Because about 90% of hip fractures are



Figure 1.



Figure 2.

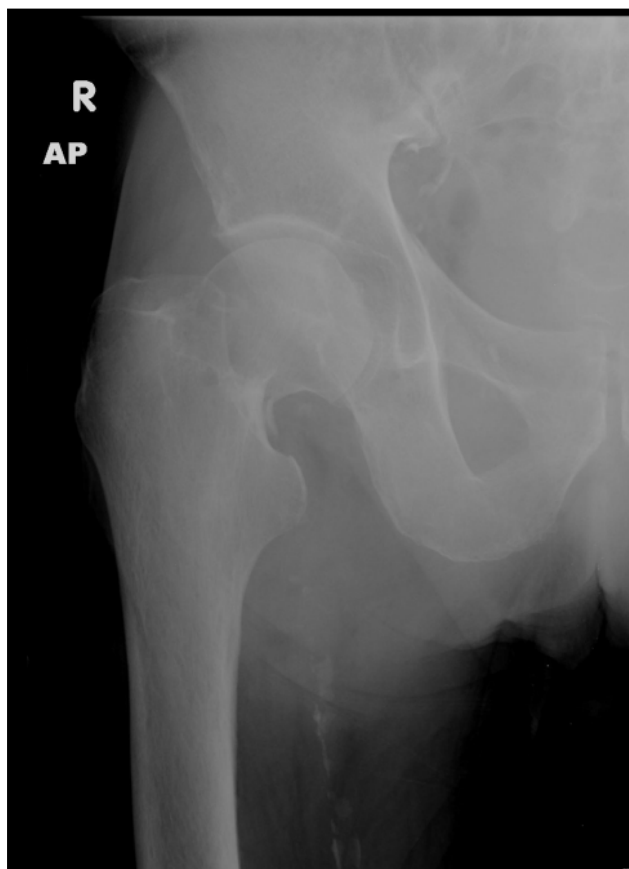


Figure 3.



Figure 4.

managed operatively,<sup>6</sup> the literature regarding the success of non-operative management is limited. In a recent study, mortality was 2.5 times higher with bed rest compared to operative treatment.<sup>6</sup> Since the non-operative cohort tends to have a higher morbidity, an accurate comparison is difficult; it is unclear whether the difference in mortality is due to patient factors or choice of treatment. Mortality with non-operative treatment is higher with bed rest, compared to early mobilization, because of an increased incidence of complications such as venous thromboembolism. Interestingly, this study showed no significant difference in mortality between patients treated with surgery and those managed non-operatively, but with early mobilization.<sup>6</sup>

## OPERATIVE MANAGEMENT AND REHABILITATION

### Femoral Neck Fractures

Approximately 50% of all hip fractures are at the femoral neck, typically due to a direct fall onto the greater trochanter.<sup>7</sup> These fractures are classified based on the degree of displacement (Fig-

ure 3), and this impacts the type of surgical fixation. The three major types of surgical fixation for this fracture pattern are *in situ* fixation, hemi-arthroplasty, and total arthroplasty.

#### a) In Situ Fixation

This technique is chosen for impacted, minimally displaced fractures. The surgical technique consists of the placement of three large cannulated screws across the fracture site into the femoral head. (Figure 2) Weight-bearing status after this procedure is surgeon-dependent. Classically, patients were instructed to be touch-down weight bearing with a walker for approximately 8-12 weeks. However, many older patients are unable to comply with this and are allowed weight-bearing as tolerated with a walker.<sup>8</sup> Rehabilitation should focus on gait training and strengthening, without requiring any precautions.

#### b) Hemi-arthroplasty

This technique consists of surgical replacement of the proximal femur (Figure 4) and is chosen for displaced femo-

ral neck fractures in relatively low demand patients. The most common surgical approaches for a hemi-arthroplasty are lateral and posterior. The lateral approach involves splitting the hip abductors and precautions include no active abduction against resistance, no adduction past neutral, no external rotation and no extension. The posterior approach involves releasing the short external rotators of the hip and then repairing these muscles. Posterior precautions consist of no hip flexion >90 degrees, no adduction past neutral, and no internal rotation beyond neutral.<sup>9</sup> Post-operatively, regardless of the surgical approach used, patients can bear weight as tolerated on this stable prosthesis. The overall dislocation rate is approximately 3%, with an increased risk with the posterior approach.<sup>10</sup> There was no significant difference in the dislocation rate between unipolar and bipolar hemi-arthroplasties.<sup>10</sup> Rehabilitation needs to follow the set precautions to avoid dislocating while performing strengthening, gait training, range of motion exercises and ADLs.





Figure 5.



Figure 6.

### c) Total Hip Arthroplasty

This technique is primarily used for the elective replacement of hip joints affected by degenerative joint disease. However, it also plays a role in femoral neck fractures in active elderly patients with pre-existing hip arthritis. The approaches used are the same as previously described, with the same precautions. Classically, it was thought that total hip arthroplasty was associated with higher dislocation rates than hemi-arthroplasty, but recent studies have shown no significant difference.<sup>11, 12</sup>

### INTERTROCHANTERIC HIP FRACTURES

This pattern makes up the other 50% of hip fractures in the elderly population.<sup>7</sup> The fracture line runs between the greater and lesser trochanter (Figure 5), a well-vascularized area of the hip, reducing the risk of non-union and osteonecrosis compared to femoral neck fractures.<sup>7</sup> As a result, this fracture can be treated with internal fixation, opposed to the hip replacements for displaced femoral neck fractures. The two main

surgical techniques for this fracture type are cephalomedullary nailing and a sliding hip screw with side plating.

#### a) Cephalomedullary Nail

This fixation technique consists of placing an intramedullary rod down the femoral shaft in combination with a sliding hip screw directed into the center of the femoral head. (Figure 6) The surgical technique involves several small incisions along the lateral thigh and requires no post-operative precautions. Patients are typically permitted weight bearing as tolerated, although difficult fracture patterns may warrant non-weight-bearing or partial weight-bearing status. Rehabilitation focuses on gait training, strengthening, and range of motion.

#### b) Sliding hip screw with side plate

This surgical technique consists of a stabilizing side plate along the lateral aspect of the proximal femur in conjunction with a sliding hip screw into the femoral head. This requires a small incision along the lateral proximal femur, for

placement of the side plate. No post-operative precautions must be followed. Once again, patients are typically made weight-bearing as tolerated, although difficult fracture patterns may require limited weight-bearing initially. Rehabilitation focuses on gait training, strengthening, and range of motion.

### POST-OPERATIVE COMPLICATIONS

It is essential to consider the complications associated with operative versus non-operative treatment. These potential complications in the context of patient factors will determine whether operative fixation is appropriate. The goal of treatment, whether operative or non-operative, is to minimize the likelihood of complications based on a patient's underlying comorbidities. Complications associated with surgical management of hip fractures include, but are not limited to, cardiopulmonary arrest, wound infection, acute blood loss anemia, damage to surrounding blood vessels or nerves, **venous thromboembolism (VTE)** and anesthetic complications such as aspiration and pneumonia. In general, hip

arthroplasty to treat fracture is associated with almost a ten-fold higher rate of peri-operative mortality compared to elective hip arthroplasty for degenerative joint disease.<sup>13</sup> Complications associated with non-operative management and bed rest include VTE, pneumonia, and decubitus ulcers.

Post-operative pain control is often challenging in the elderly hip fracture patient. These patients are often in moderate to severe pain and require narcotic pain medications to allow participation in post-operative rehabilitation programs. Pain control also plays a role in the prevention of complications. For example, a patient in significant discomfort will often be tachycardic, putting an additional strain on the cardiac system. Narcotic pain medications have multiple side effects, especially with elderly patients, including constipation, urinary retention, respiratory depression, and acute delirium.<sup>9</sup> Oral narcotics such as Percocet or Vicodin provide adequate pain control and may need to be scheduled before therapy. In patients who are sensitive to narcotics, a combination of Toradol and Tylenol can be used, although these medications also have side effects in the elderly patient.

The timing of surgical fixation in hip fracture patients is a debated topic. Some studies show an increase in mortality when surgery is delayed greater than four days,<sup>14</sup> while others show no significant difference in mortality before 48 hours and later.<sup>15</sup> Surgical fixation should occur when the patient is deemed medically fit to undergo a procedure.

## CONCLUSIONS

As the mean age of the world's population rises, the prevalence of hip fractures will increase. The elderly patient group, in which this injury most frequently occurs, typically has multiple medical comorbidities, making their pre-operative and post-operative (or non-operative) care both challenging and rewarding. Hip fracture care requires surgical and medical teamwork to optimize outcomes and facilitate the return of the patient to his or her pre-injury level of function.

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*Craig Lareau, MD, is a resident in orthopedic surgery.*

*Gregory Sawyer, MD, is a resident in orthopedic surgery.*

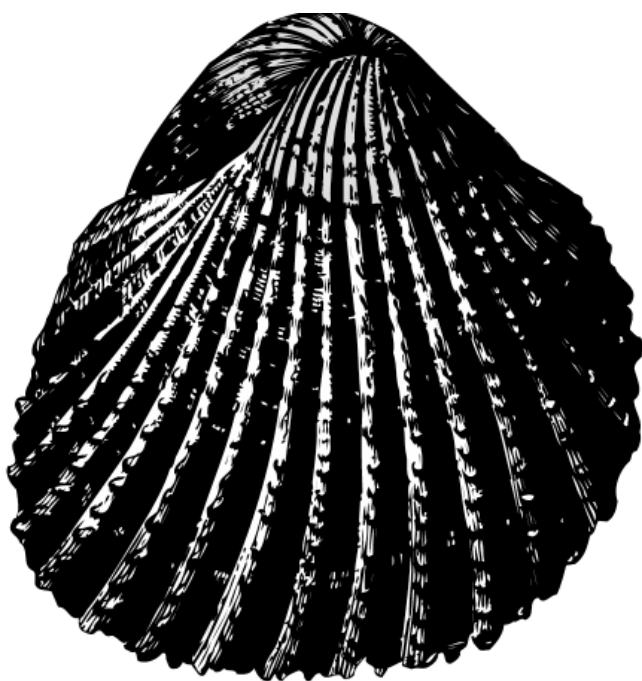
*Both are at The Warren Alpert Medical School of Brown University/Rhode Island Hospital.*

## Disclosure of Financial Interests

The authors and their spouses/significant others have no financial interests to disclose.

## CORRESPONDENCE

Craig Lareau, MD  
Department of Orthopedic Surgery  
Rhode Island Hospital  
593 Eddy St.  
Providence, RI 02903  
e-mail: Craig\_Lareau@brown.edu



# The Multiply Injured Trauma Patient: Resuscitation, Rehabilitation, Recovery

Shea C. Gregg, MD, Daithi S. Heffernan, MD, AFRCSI, Jason T. Legere, PT, Helen M. Lilly, RN, BSM, CCM, Annah Kinsler, MSW, LCSW, Amy B. Muschiano, MS, CCC-SLP, Moira K. McDonnell, MS, CCC-SLP, Kelly L. Tober, OTR/L, Amy L. Smith, MS, OTR/L, David T. Harrington, MD, FACS, Charles A. Adams, Jr. MD, FACS

**A 73-year-old man who fell off a ladder presented to the emergency department with tachycardia, hypotension, and a fractured pelvis. His pelvis was wrapped for stability, two liters of intravenous fluids were administered. CT scans revealed rib fractures, spine fractures, and a splenic injury, but shortly thereafter, the patient had a sudden decrease in his blood pressure and required blood transfusion. Trauma surgeons performed an emergency splenectomy and pre-pelvic hemostatic packing while orthopedic surgeons performed external fixation of the pelvis for temporary stabilization. His abdomen was left open, dressed with a temporary negative pressure dressing, and he was taken to the trauma intensive care unit for resuscitation and re-warming.**

*Two days later, the patient underwent abdominal closure and definitive pelvic fixation. His post-operative complications included delirium, ventilator-associated pneumonia, and prolonged respiratory failure requiring a tracheostomy. By the time the patient was able to participate in rehabilitation, he demonstrated impairments in memory, ability to perform self-care, and basic mobility. In conjunction with the surgical teams, physical and occupational therapists built a treatment plan which included bracing the spine fracture, activities of daily living retraining, and therapeutic exercises for balance and muscle strengthening. Ten days after the commencement of therapy, the patient stood up for the first time, was able to follow simple commands, and was more oriented in speech. The patient's prolonged intubation led to abnormal swallowing which required several speech pathologist evaluations and ongoing education for safe swallowing strategies. One month after the original trauma, the patient could eat a regular diet. While the patient's family watched him recover, social workers provided support. After multiple meetings between the patient and his family, the case manager,*

*and the medical team, he was discharged to an acute rehabilitation facility one month after he was admitted.*

In 2006, the Centers for Disease Control and Prevention (CDC) reported that over 29 million people in the United States suffered non-fatal injuries and more than 179,000 people died as a result of traumatic injuries.<sup>1</sup> Last year, the trauma team at Rhode Island Hospital, the busiest level one trauma center in southern New England, treated 5,512 patients.

The management of the multiply injured patient begins in the field with first responders and continues into the hospital with an initial evaluation and treatment plan overseen by the trauma team. After stabilization, the patient's age, injury pattern, and co-morbidities dictate management. As in our patient, this may require intensive care admission, use of invasive monitoring devices, and surgical intervention. Once the patient's injuries have been addressed and his/her physiologic and mental status stabilize and improve, the trauma team will manage the medical aspects of care while rehabilitation begins.

Ideally, an interdisciplinary trauma team consists of doctors, nurses, therapists, technicians, social workers, case managers, and other support staff. The following is a description of each team member's contributions.

## **BEGINNING THE ROAD TO RECOVERY: THE ROLES OF THE SPECIALIZED REHABILITATION THERAPISTS**

On a national level, in the year 2000, 50 million injuries resulted in an estimated \$326 billion in lost productivity.<sup>2</sup> This lost productivity highlights the importance of rehabilitation therapies. Like medical specialists, physical, occupational, and speech-language pathologists offer different skills and work together to treat multiple disabilities in trauma patients.

## **Physical Therapy**

The physical therapist receives most of the consults for impaired function and is a key contributor to the rehabilitation of a patient. An initial evaluation begins with a complete patient exam by system (i.e. cognitive, musculoskeletal, neurologic, cardiopulmonary, etc.) followed by chart evaluation documenting the activity limitations set forth by the treating teams. Based on the deficits, treatment is individualized. As the patient progresses, the therapist will recommend a discharge plan. The patient may receive rehabilitation in an acute, sub-acute, or skilled nursing facility depending on the expected duration, disability, and ability of the patient to participate. If outpatient therapy is suggested, the nature and number of treatments per week is recommended. These recommendations along with the patient's overall medical stability help determine the patient's eventual destination.

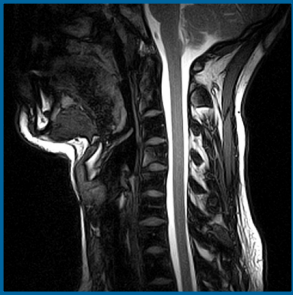
## **Occupational Therapy**

Along with the loss of productivity, traumatic injuries usually impair basic **activities of daily living (ADLs)** such as dressing, hygiene, or feeding. Occupational therapists provide treatment to restore independence in these tasks and maximize both cognitive and functional outcomes. These therapists define the specific impairments and help patients regain the cognitive, perceptual, and motor skills to perform them. In addition to self-care, the patient's responsibilities to family members, home safety issues, and community integration are addressed. Treatment may include range of motion or strengthening exercises, splinting, and task-oriented exercises. Occupational therapists also provide burn rehabilitation, complex wound care, and cognitive rehabilitation after a head injury. As with physical therapy, continuation of services may occur in various settings.

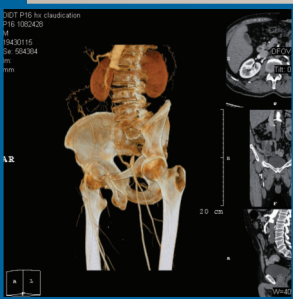


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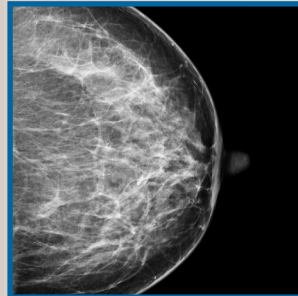
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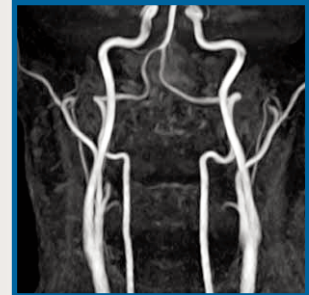
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## **Speech/Swallow/Cognitive Therapy**

Certain trauma patients may need the **speech-language pathology (SLP)** department. Among severely head injured patients, 60-90% may have dysphagia,<sup>3</sup> and other affected populations include those with prolonged intubation, direct neck trauma, and the elderly.

These clinicians will focus special attention towards head injury-related disability, facial trauma, prolonged intubations, tracheostomies, respiratory insufficiency, previous communication disorders, and burns. When dysphagia is suspected, patients are carefully observed swallowing substances with various consistencies to determine aspiration risk. Patients may need radiographic evaluations (modified barium swallow) or exams allowing direct visualization of vocal cord motion to fully delineate swallowing disorders. Cognitive and communication impairments in trauma patients are assessed with tests of language abilities, memory, executive functions, and voice. Treatment plans may include assistive communication devices (i.e. word boards, computerized devices, etc) and/or cognitive exercises for memory or social interaction.

## **SUPPORTING THE PATIENT AND FAMILIES IN THE HOSPITAL: SOCIAL WORK**

Traumatic injury is always unexpected, and **Post-Traumatic Stress Disorder (PTSD)** and depression may persist in patients for months after the initial trauma.<sup>4</sup> For this reason, early assessment and support are intertwined through the social work department. At Rhode Island Hospital, a social worker is always available to interact with patients and families both in the emergency department and as inpatients.

The initial interview includes a psychosocial evaluation, focusing on a patient's relationship with family, employment, circumstances surrounding the trauma, and social supports. Other issues may include the patient's loss of control, loss of independence, neurological problems, PTSD screening, changes in self-image, and end-of-life care. Following one or more meetings with a patient and/or family, interventions may include either actions (e.g., referral to community resources, hot lines, safety plans for domestic violence) or ongoing supportive counseling. The latter can help a

patient to verbalize emotions in confidence and develop coping mechanisms. If a patient needs formal psychiatric treatment, the social worker can notify psychiatry.

## **DISCHARGE PLANNING: MATCHING NEEDS TO RESOURCES**

Discharge planning begins as soon as a patient is stabilized and rehabilitation needs are identified. The case managers at Rhode Island Hospital serve as the liaison between the primary care team, specialty teams, therapists, families, insurance agencies, rehabilitation facilities, and the patient. Following a chart review to determine specific needs, the patient and/or family are interviewed to set goals for rehabilitation and recovery. These goals may include physical, social, work-related, financial, and family expectations. Following the initial evaluation, the case manager consults with the care team to assemble a discharge plan that provides continuity of care and optimizes patient outcomes while remaining conscious of resources available.

Trauma patients have a unique set of discharge planning issues. First, the mechanism and the circumstances surrounding the injury are very important: Was this work related? Did substance abuse play a role? Is there an ongoing criminal investigation? Is it safe for the patient to return to his/her dwelling? Secondly, many patients sustain multiple injuries and the degree of functional loss with the expected duration of disability must be considered when arranging care. In the event of long-term disability, the impact on family support and financial resources must be assessed early to avoid surprises, both short- and long-term. Finally, from a public health perspective, inpatient beds are a community resource. As patients recover, it is imperative to arrange their safe discharge and optimally utilize outpatient services to ensure that those who need inpatient care may continue to receive it in an efficient manner.

## **RHODE ISLAND REHABILITATION RESOURCES: ARE THERE ENOUGH?**

Last year alone, the trauma service at Rhode Island Hospital discharged over 2000 patients. Although many required only home discharge with follow-up, the more complex patients may have required any or all types of therapy services including wound care, nursing assistance, and respiratory care. With increasing numbers of services required, representatives

from the different care facilities will come to evaluate patients in order to match their particular resources with the needs of the patient. Many of these facilities are staffed with physicians and therapists whose primary focus is rehabilitation and they are vital to bridging the gap between the inpatient and outpatient experiences.

As can be expected in the acute trauma population, several obstacles impede a patient's discharge with service requirements. One of the more common issues comes from one of the most fundamental challenges to the health care system: lack of health insurance. This issue does not affect acute medical decision making, but in the event of absent or limited insurance coverage, the ability to supplement or apply for new coverage to cover out-of-hospital services is problematic. Delays may occur due to paperwork processing or waiting periods "necessary" to approve care. Lapses in coverage can prolong hospitalizations for some patients, sometimes to the point of rehabilitating and recovering enough in the inpatient setting to take care of themselves at home. With rising unemployment in Rhode Island, lack of health care coverage may contribute to rising inpatient hospitalization costs, when patients may benefit most from insurance covered outpatient services. Other concerns facing trauma patients include limited specific types of rehabilitation services in the state. As previously reported,<sup>5</sup> patients with severe head injuries and certain spinal cord injuries (i.e. above the C6 level) often have to be treated at specialty facilities outside Rhode Island, which can delay discharge. With many of these out-of-state rehabilitation facilities offering services to maximize function, time spent in the inpatient setting is not optimal for the recovery process. Overall, most patients have access to a variety of rehabilitation services in RI, but efforts should be directed to help those whose injuries or finances limit their ability to receive available rehabilitation services.

## **SUMMARY**

The care of the acutely injured patient requires a multidisciplinary approach from the moment of injury through rehabilitation and reintegration into society. In addition to the doctors and nurses providing many aspects of the acute and chronic medical care, the rehabilitation component is delivered by several skilled specialists focused on maximizing functional outcomes.



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Shea C. Gregg, MD, is Assistant Professor of Surgery, Division of Trauma & Surgical Critical Care, The Warren Alpert Medical School of Brown University.

Daithi S. Heffernan, MD, AFRCSEd, is Assistant Professor of Surgery, Division of Trauma & Surgical Critical Care, The Warren Alpert Medical School of Brown University.

Jason T. Legere, PT, is a Physical Therapist, Rhode Island Hospital.

Helen M. Lilly, RN, BSM, CCM, is a Clinical Case Manager, Rhode Island Hospital.

Annah Kinsler, MSW, LCSW, is a Clinical Social Worker, Rhode Island Hospital.

Amy B. Muschiano, MS, CCC-SLP, is a Speech-Language Pathologist, Rhode Island Hospital.

Moirra K. McDonnell, MS, CCC-SLP, is a Speech-Language Pathologist, Rhode Island Hospital.

Kelly L. Tober, OTR/L, is an Occupational Therapist, Rhode Island Hospital.

Amy L. Smith, MS, OTR/L, is an Occupational Therapist, Rhode Island Hospital.

David T. Harrington, MD, FACS, is Associate Professor of Surgery, Residency Program Director, and Director, Rhode Island Burn Center, The Warren Alpert Medical School of Brown University.

Charles A. Adams, Jr, MD, FACS, is Chief, Division of Trauma & Surgical Critical Care, The Warren Alpert Medical School of Brown University.

## Disclosure of Financial Interests

The authors and their spouses/significant others have no financial interests to disclose.

## CORRESPONDENCE

Shea C. Gregg, MD  
Rhode Island Hospital  
593 Eddy St.  
Providence, RI 02903  
Phone: (401) 444-0369  
e-mail: sgregg@lifespan.org

# Inpatient Rehabilitation Services: Regulatory Changes

Jeanne Stowe, MBA, RN, NHA, and Jon Mukand, MD, PhD

Inpatient rehabilitation facilities (IRFs) operate in a changing environment. First was the transition from the reimbursement system of the 1980s and 1990s to our current Prospective Payment System. Along with that came the challenges of educating and re-educating staff and patients about achieving optimal outcomes within prescribed periods of time. Now the paradigm is shifting once again. This time the shift is more clinical rather than fiscal. Although the following discussion specifically applies to patients with Medicare coverage, the new guidelines set the standard within the industry for all patients.

In 2009, the Centers for Medicare and Medicaid Services (CMS) rescinded HCFA Ruling 85-2, "Medicare Criteria for Coverage of Inpatient Hospital Rehabilitation Services," 50 FR 31040 (July 31, 1985) as corrected at 50 FR 32643 (August 13, 1985). Some regulations remain unchanged. Patients can be considered acute rehabilitation candidates if they can be expected to make significant functional gains in a reasonable time.

They must require intensive and interdisciplinary care from rehabilitation clinicians, including twenty-four-hour rehabilitation nursing and either physical or occupational therapy along with speech therapy. Patients should have the potential to return to the community, not a skilled nursing facility (SNF). Medical management, typically by a primary care doctor, is required, as well as close supervision by a rehabilitation physician. Inpatient rehabilitation should be reasonable and necessary, with the patient's needs unable to be met at a SNF or outpatient facility. The 60% Rule for IRFs, which determines the DRG-exempt status of the unit or facility, is based on 60% of patients falling within one of 13 diagnostic categories (CMS-13). Ischemic or hemorrhagic strokes, late effects of stroke, hypertensive encephalopathy, and diseases of cerebral arteries and venous sinuses, e.g. amyloid, are eligible diagnoses. Brain injuries may include benign and malignant neoplasm, meningitis, encephalitis (and its late effects), toxic encephalopathy, traumatic injuries/concus-

sions; complications of medical and surgical conditions (encephalopathies) are also considered qualifying diagnoses. Among various qualifying neurologic conditions are neuropathies (e.g. B12, GBS), mononeuritis multiplex, radiculopathies, plexopathies, and myopathies. Patients with complications related to worsening of Parkinson's, multiple sclerosis, muscular dystrophies, motor neuron diseases, and post-polio syndrome can also be considered. Spinal cord injuries, either traumatic or those related to myelitis, neoplasms, or infections still qualify for acute rehabilitation, as do hip fractures at the neck and/or head of the femur, the acetabulum, or in the subtrochanteric area. Amputations may be vascular, traumatic, or due to infections, but residual limb complications are also included in the CMS-13. Joint replacements may qualify, but only if they are bilateral, or if the patient with a single replacement is morbidly obese (BMI  $\geq 50$ ) or if the age is  $\geq 85$ . Major multiple trauma is an important category that obviously requires intensive rehabilitation, as are major burns.



On occasion, patients with arthritic conditions may benefit from inpatient rehabilitation, but only if their functional status has declined and they have not benefited from outpatient therapy. These include polyarticular rheumatoid arthritis, psoriatic arthritis, seronegative arthropathies, and systemic vasculitides with joint inflammation. Osteoarthritis at two or more major weight-bearing joints (e.g. elbow, shoulder, hip, knee) is another qualifying condition.

A co-morbidity from the 13 diagnostic categories *and* a significant decline in function, e.g. a de-conditioned patient with pneumonia who has a stroke, is also acceptable for inpatient rehabilitation.

More changes to the Medicare Benefit Policy were issued on October 23, 2009 for IRF admissions and discharges on or after January 1, 2010 that focus on establishing a patient's clinical ability to meet criteria for the medical necessity of inpatient rehabilitation. CMS states that only the rehabilitation physician is qualified to decide if the patient meets criteria for medical necessity and is stable enough for three hours of therapies per day. As a result, one cannot establish medical necessity by using diagnostic screens such as the CMS-13 categories mentioned above. A comprehensive pre-screening process must be completed and documented within 48 hours of the admission. A licensed or certified clinician, such as a nurse or therapist, who is designated by the rehabilitation physician, may collect the information for the Pre-Screening Evaluation. Then the rehabilitation physician must revise that evaluation to determine if the patient meets the threshold of medical necessity by:

- Requiring the active and ongoing intervention of multiple disciplines, one of which must be Physical Therapy or Occupational Therapy;
- Requiring at least 3 hours of therapy at least 5 days per week;
- Being capable of actively participating in and benefiting from the program;
- Requiring medical supervision from the rehabilitation physician as evidenced by face-to-face visits at least 3 times per week and;

- Requiring an intensive and coordinated interdisciplinary approach provided by the rehabilitation team.

In addition to medical necessity criteria, any patient admitted to an IRF must have a discharge plan to return to the community, not a nursing facility. The evaluation period or a trial of inpatient rehabilitation is no longer allowed to determine whether the patient is appropriate for the IRF. All these criteria must be evaluated and documented, if present, at the time of the pre-admission screening for the rehabilitation physician to make the decision about admission. Furthermore, the physician must re-assess those findings with a post-admission physician evaluation that confirms the pre-admission findings. If the patient's condition changes between the pre-admission screen and the actual admission, and the patient no longer meets admission criteria, the rehabilitation physician must document that change and make discharge arrangements within three days.

There are also new requirements regarding Interdisciplinary Care Plans and Team Meetings. The rehabilitation physician must develop the plan of care within 72 hours of the admission to the rehabilitation center. This plan is further evaluated during team meetings, now required weekly, in contrast to the previous requirement of every two weeks. These meetings must have the documented attendance of a rehabilitation nurse, a licensed therapist from each discipline treating the patient (PT, OT, SLP), a social worker and/or case manager, and a rehabilitation physician. At these meetings, staff discuss the patient's rehabilitation needs, solve various clinical and psychosocial problems, and plan the interdisciplinary rehabilitation program. An estimated length of stay is based on the patient's status, prognosis for further improvement, and available care at discharge.

In addition to being familiar with these changes when considering acute rehabilitation for patients, physicians may want to consider access to emergency services in the IRF. Rehabilitation patients often have multiple co-morbidities and exceptionally high acuity, so proximity to

diagnostic and emergency services can be life-saving. Another consideration is accreditation by **CARF International**, (formerly the **Commission for Accreditation of Rehabilitation Facilities**), which advocates for people with disabilities and has reviewed the program. Finally, although the regulations have become more complicated, programs should continue to focus on the needs of disabled patients by providing high quality rehabilitation services.

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*Jeanne Stowe, MBA, RN, NHA, is Director of Rehabilitation Case Management.*

*Jon Mukand, MD, PhD, is Medical Director, Southern New England Rehabilitation Center, and Clinical Assistant Professor, Rehabilitation Medicine, The Warren Alpert Medical School of Brown University, Boston University Medical School, and Tufts University Medical School.*

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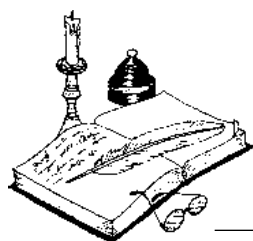
Jeanne Stowe, MBA, RN, NHA, and spouse/significant other have no financial interests to disclose.

Jon Mukand. Speakers' Bureau: GlaxoSmithKline.

## CORRESPONDENCE

Jon Mukand, MD, PhD  
Southern New England Rehabilitation Center  
200 High Service Avenue  
North Providence, RI 02904  
phone: (401) 456-3939  
e-mail: [jmukand@saintjosephri.com](mailto:jmukand@saintjosephri.com)





# Physician's Lexicon

## A Testimony To Virility

The testis (its diminutive is testicle) inherits names derived from classical Latin.

A *testum*, in Latin, defines a pot or earthen vessel or even a shell. Thus, the *Testacea* represent an order of invertebrates with hard shells. The Latin, *testamentum* means a covenant, a scriptural text or a declaration of one's intent or will (and thus to be testate is to have left a valid will; and intestate, on the other hand, defines one without a will). The Latin, *testis*, means a witness; and the English word, testify, defines one who bears witness. Related words, in English, include protest, protestant, detest and testimony.

The etymological relationship between testis, the organ, and testimony, the solemn witness to the truth, rests, argumentatively, upon an older custom

when testifying before a Roman court of law, that required the witness to grasp his genitals when swearing his oath of veracity.

The word, witness, on the other hand, is from Old English, *wit*, meaning endowed with knowledge and thus giving rise to such English words as wisdom, wizard, half-witted and witless (one without knowledge.)

The Greek root for the male genital organ is *orchis*. And thus the orchid has been so named because of the resemblance of its bulbous roots to the organ, testis. In keeping with medical nomenclatural tradition, the Greek term of an organ is employed in naming pathologic conditions or surgical interventions while the Latin counterpart, is used for anatomic designations. (Thus, inflammation of the testis is named orchitis and surgi-

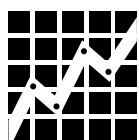
cal removal of the testis is called orchiectomy.)

The Aztec (Nahuatl) word for the alligator pear is *ahuacatl*, and also their word for the testis. This, in Spanish, became *aguacate* and then *avocado*, meaning the alligator pear and a synonym for the testis.

Epididymis represents the Greek prefix, *epi* – (meaning upon or over) and *didimus*, Greek meaning twin, referring to the twin nature of testes.

There are a number of English words that resemble the *orchi*- root but are derived from different, unrelated sources. Orchestra stems from a Greek word for dance and orchard from the Latin, *hortus*.

– STANLEY M. ARONSON, MD



RHODE ISLAND DEPARTMENT OF HEALTH  
DAVID GIFFORD, MD, MPH  
DIRECTOR OF HEALTH

## VITAL STATISTICS

EDITED BY COLLEEN FONTANA, STATE REGISTRAR

### Rhode Island Monthly Vital Statistics Report Provisional Occurrence Data from the Division of Vital Records

Underlying Cause of Death	Reporting Period			
	April 2009	12 Months Ending with April 2009		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	213	2,444	232.6	3,065.0
Malignant Neoplasms	196	2,250	214.1	6,207.5
Cerebrovascular Diseases	29	403	38.4	687.0
Injuries (Accidents/Suicide/Homicide)	38	548	52.2	8,753.5
COPD	35	483	46.0	337.0

Vital Events	Reporting Period		
	October 2009	12 Months Ending with October 2009	
	Number	Number	Rates
Live Births	1,018	12,257	11.5*
Deaths	843	9,601	9.0*
Infant Deaths	(9)	(83)	6.8#
Neonatal Deaths	(7)	(65)	5.3#
Marriages	683	6,296	5.9*
Divorces	251	3,023	2.8*
Induced Terminations	352	4,258	347.4#
Spontaneous Fetal Deaths	26	735	60.0#
Under 20 weeks gestation	(19)	(654)	53.4#
20+ weeks gestation	(7)	(81)	6.6#

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.

(b) Rates per 100,000 estimated population of 1,050,788

(c) Years of Potential Life Lost (YPLL)

**Note:** Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

\* Rates per 1,000 estimated population

# Rates per 1,000 live births



# Images In Medicine

## Nonbacterial Thrombotic (Marantic) Endocarditis

Carlos J. Esteva, MD, Ronald A. DeLellis, MD, Lauren Hartman, MD

**A 19-year-old man with aplastic anemia** underwent a matched unrelated bone marrow transplant. He later developed severe complications including graft versus host disease, cytomegalovirus, aspergillus, herpes zoster and H1N1 influenza infections and dialysis dependant renal failure. His mental status fluctuated during his hospital stay and he required intensive support for multi-organ system dysfunction. Shortly after a CT scan, he was noted to have an episode of sudden chest pain following which he became unresponsive with unreactive pupils. Resuscitative measures were started, but after no response, efforts were terminated and the patient was pronounced dead.

Autopsy demonstrated cardiomegaly with biventricular hypertrophy and severe narrowing of the coronary arteries. Scattered areas of myocardial necrosis with surrounding foci of myocytolysis were present in the left ventricle. There was also evidence of nonbacterial thrombotic (marantic) endocarditis of the mitral valve.

### NONBACTERIAL THROMBOTIC (MARANTIC) ENDOCARDITIS

In **nonbacterial thrombotic endocarditis (NBTE)** small sterile vegetations deposit on the leaflets or cusps of the cardiac valves, usually along the lines of closure. The vegetations are multiple and commonly measure less than 3mm in size. They are most frequently seen on the atrial surfaces of the mitral valve (Figure 1) but can be present on the atrial surfaces of the tricuspid valve and the ventricular surfaces of the aortic and pulmonary valves. Microscopically the vegetations consist of collections of fibrin and platelets that are loosely adherent to the valves. (Figure 2)

NBTE was previously known as marantic endocarditis, from the Greek *marantikos*, meaning “wasting”. It is found most frequently in patients with advanced malignancy (predominantly adenocarcinomas), but can be present in patients with sepsis or burns, indwelling pulmonary artery catheters, disseminated intravascular coagulation, or acquired immune deficiency syndrome. Endothelial damage and a hypercoagulable state are important etiologic factors. The vegetations are not associated with a local inflammatory response, and the clinical manifestations are usually those resulting from systemic embolization.

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*Carlos Esteva, MD, PGY1, is a Resident in the Department of Pathology, Rhode Island Hospital and the Warren Alpert Medical School of Brown University.*

*Ronald DeLellis, MD, Pathologist-in-chief at the Rhode Island Hospital and The Miriam Hospital and Professor and Associate Chair of the Department of Pathology and Laboratory Medicine at the Warren Alpert Medical School of Brown University.*

*Lauren Hartman, MD, PGY4, is a Resident in the Department of Pediatrics, Rhode Island Hospital and the Warren Alpert Medical School of Brown University.*

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### CORRESPONDENCE

Carlos J. Esteva, MD  
cesteva@lifespan.org



Figure 1.

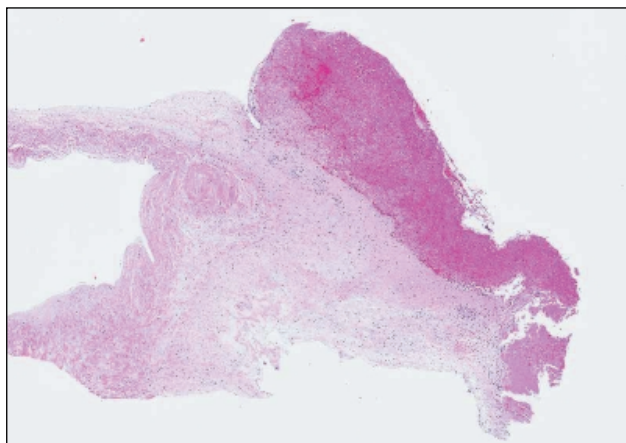
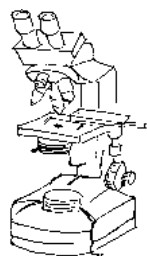


Figure 2.



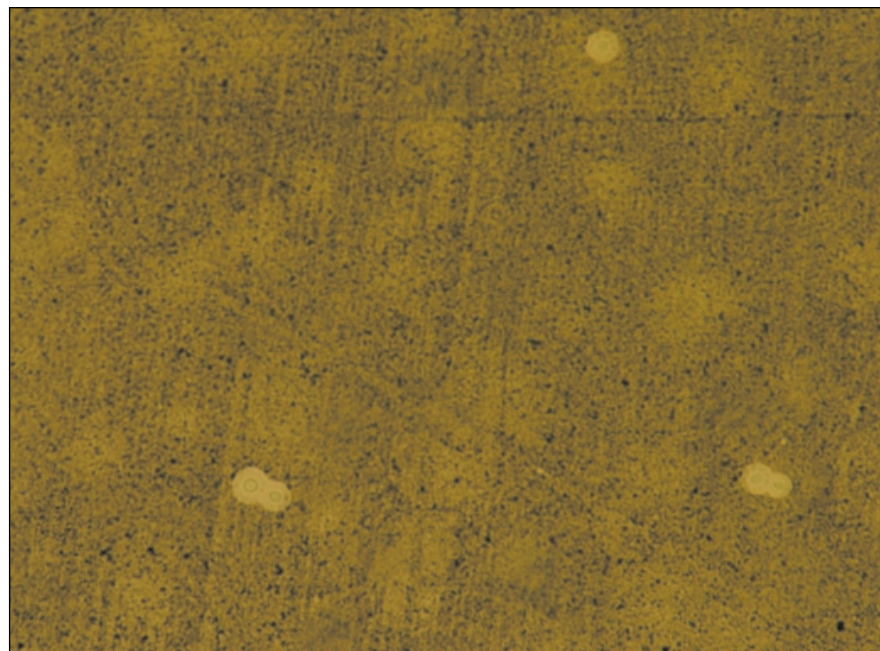
# The Creative Clinician

## Probing Past a Seizure

Dalila Zachary, MD, Arvind Shekar, MD, Cecile Letourneau, MT (ASCP), Marguerite Neill, MD

**A 45 year-old man from the Ivory Coast was brought to the hospital after a witnessed grand mal seizure.** A mild headache for the past 2 months had been gradually worsening along with subjective fevers, mild photophobia and minimal neck pain. Mild papilledema had been recently noted on an outpatient ophthalmologic evaluation and the patient was scheduled to follow-up with his primary care physician for further work-up. The patient had no underlying medical conditions and no history of seizures. He had lived in the United States for 5 years since emigrating from West Africa. There had been an unintentional 5 lb weight loss over the past 2 months. He denied intravenous drug use.

On admission, the patient was afebrile and his physical examination was remarkable only for decreased neck flexion and slight photophobia. The neurological examination was normal except for papilledema. A CBC was normal except for mild lymphopenia; serum electrolytes, renal and liver function tests were normal. A urine toxicology screen was negative. A CXR was unremarkable. CT (with and without non-ionic IV contrast), MRI (with and without gadolinium) and MRV of the brain showed no abnormalities, and an EEG was normal. Blood cultures were negative. Examination of CSF showed 100 leukocytes, (79% lymphocytes and 21% monocytes), protein 67 mg/dl, glucose 11 mg/dl. The opening pressure was not recorded. A gram stain showed large budding yeast forms; an India ink preparation is shown below. *Cryptococcus neoformans* was isolated from CSF culture; the CSF cryptococcal antigen titer was >1:256.



India ink. Wet mount of CSF showing yeast forms of *Cryptococcus*.

A diagnosis of cryptococcal meningitis was made. Treatment with amphotericin B lipid complex (Abelcet) and flucytosine was started as well as valproic acid (Depakote). An HIV serology was positive; the CD4 count was 6/microL and viral load 20,349 copies/mL. After completing a 14-day induction course of anti-fungal therapy, consolidative treatment with fluconazole (Diflucan) was started. He had no further seizures. Anti-retroviral therapy (ART) with efavirenz, emtricitabine and tenofovir (Atripla) was started as an outpatient two weeks after hospital discharge, as well as trimethoprim/sulfamethoxazole (Bactrim) as prophylaxis for *Pneumocystis jirovecii* and toxoplasmosis. Serotyping by the Centers for Disease Control and Prevention showed that the isolate was not *C. neoformans* serotype B or C (var. *gattii*).

### DISCUSSION

Among HIV-infected patients with CNS infection with cryptococcus, this infection was the AIDS-defining illness in 60%. This infection rarely occurs with CD4 T-lymphocyte counts greater than 100/microL. Symptoms typically begin in an indolent fashion over a few weeks; the three most common are fever, malaise, and headache.<sup>1</sup> Seizures are a very rare clinical presentation of CNS cryptococcosis. In addition, CNS cryptococcosis produces a wide variety of MRI appearances including dilated Virchow-Robin spaces, leptomeningeal enhancement, focal enhancing lesions, focal lesions and hydrocephalus; however, a normal MRI does not exclude the diagnosis.<sup>2</sup>

The portal of entry most often is the lung. In the immunocompetent host, inhaled yeast are met by alveolar macrophages and killed in the resulting granulomatous inflammation. In immunocompromised hosts, infection in the lungs may not be halted and may directly progress to dissemination to the meninges or other organs. In some hosts, pulmonary infection may be halted but not eliminated and viable yeast may remain dormant. Reminiscent of the pathophysiology of tuberculosis, infection may recrudesce later under conditions of immune compromise with resulting dissemination to the CNS.<sup>3</sup>

Definitive diagnosis is by isolation from CSF; detection of cryptococcal capsular antigen is useful because it is quick, quite sensitive, and the titer can be measured during treatment and follow-up. Because the burden of organisms is usually high in AIDS patients, an India ink preparation from the CSF is frequently positive. India ink is a colloidal



dal suspension of carbon that is mixed in equal parts with the patient's CSF and then examined microscopically on high power under a coverslip. The yeast forms displace the carbon particles and are distinguished from lymphocytes and erythrocytes by the doubly contoured cell wall surrounded by the clear halo of the polysaccharide capsule.

*C. neoformans* can be classified into 5 serotypes (A, B, C, AD and D) which differ in their prevalence, geographic location and somewhat, their spectrum of clinical manifestations. Serotypes A (*var. grubii*) and D (*var. neoformans*) are the most common worldwide while serotype C (*var. gattii*) is rare in all localities.<sup>4,5,6</sup> In the USA and in AIDS patients, the vast majority of isolates are serotype A (*var. grubii*). In sub-Saharan Africa serotypes A, D, and AD are most common.

There are limited data relating the severity of CNS infection to the infecting serotype, and in most cases the host defense responses determine the clinical manifestations. However, some clinical presentations may depend on the serotype of the infecting strain. For example, in areas of the world with infections from different serotypes, cerebral cryptococcomas, hydrocephalus, increased intracranial pressure, and cranial neuropathies were found more commonly with serotypes B (*var. neoformans*) and C (*var. gattii*).<sup>7,8</sup> These observations suggest that some serotypes may have a greater propensity for invasion of brain parenchyma rather than limiting infection to the meninges alone. Serotyping is not performed routinely mainly because it does not inform decisions about treatment of cryptococcus infection; however, it may give insight into the virulence of a particular infection and might suggest where the primary infection was acquired.

The prognosis for patients diagnosed with AIDS-associated CNS cryptococcosis has improved dramatically over the past two decades, particularly when antifungal agents are combined with antiretroviral therapy.<sup>9</sup> Guidelines for the treatment of CNS cryptococcosis<sup>10</sup> in adults recommend aggressive management of high opening pressures with repeated lumbar punctures. Therapy includes induction with intravenous amphotericin B (a lipid formulation can be used) plus oral flucytosine for 14 days or longer depending on the patient's presenting prognostic factors. This should be followed by a consolidation and maintenance phase with fluconazole which can be given orally. Fluconazole alone should not be used for induction in HIV-infected patients, even in less severely ill cases, because relapse rates are unacceptably high.

Our patient had either serotype A (*var. grubii*) or D, and we do not know whether he had newly acquired infection in the US or relapse from a latent infection acquired previously in Africa. He initially did well and improved on his dual treatment regimen for both HIV infection and cryptococcus. His anticonvulsant was changed from valproic acid to levetiracetam. The patient then stopped taking levetiracetam because he said it was making him dizzy. Then, 8 weeks after initial presentation, he had a seizure. CSF examination showed cryptococci on Calcofluor stain but the culture was negative. His fluconazole dose was increased to 800 mg daily and the anticonvulsant was changed to phenytoin. Because of the potential drug interaction between phenytoin and efavirenz (a component in Atripla), the anticonvulsant was changed back to valproic acid two months later. In follow-up after seven months, he had had no further seizures. An HIV viral load was unde-

tectable and his CD4 count had risen to 97/microL. His CSF had 87 leukocytes, (76% lymphocytes, 7% neutrophils and 17% monocytes), protein 199 mg/dl, glucose 26 mg/dl, and CSF cryptococcal antigen titer was 1:256. Cryptococci were not seen on stain and culture was negative. He remains on valproic acid, fluconazole 800mg daily, Atripla, and trimethoprim/sulfamethoxazole. Valproic acid can be tapered off after 6 months of seizure-free activity and complete immune reconstitution (defined by CD4 T-lymphocyte counts greater than 200/microL). Whether fluconazole can eventually be stopped in AIDS patients is controversial. Some practitioners would consider discontinuing fluconazole after one year of complete immune reconstitution. Others would recommend lifelong treatment. A decision regarding this patient's fluconazole will be made after one year of treatment. He will require lifelong treatment of his HIV infection.

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*Dalila Zachary, MD, is a second year fellow in Infectious Disease.*

*Arvind Shekar, MD, is a second year resident in Internal Medicine.*

*Marguerite Neill, MD, is Associate Professor of Medicine.*

*All are with the Warren Alpert Medical School of Brown University.*

*Cecile Letourneau, MT (ASCP), is Assistant Director of the Microbiology Lab at Memorial Hospital of Rhode Island.*

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## CORRESPONDENCE

Marguerite A Neill, MD  
Division of Infectious Diseases  
Memorial Hospital of RI  
111 Brewster St  
Pawtucket, RI 02960  
e-mail: Marguerite\_Neill@brown.edu



## ADVANCES IN PHARMACOLOGY

### An Evidence-Based Update On Vitamins

*K. Kelly Orr, PharmD, and Anne L. Hume, PharmD, FCCP, BCPS*

In the United States, dietary supplements include vitamins, minerals, amino acids, herbal and nonbotanical products such as melatonin, as well as certain types of foods. Vitamins remain the most common type of dietary supplement used by otherwise healthy adults. Vitamins are available as single entity products, mixtures such as B complex or antioxidant products, **multivitamins** (MV) which frequently contain 10 or more vitamins, and **multivitamin multimineral** (MVMM) which may include over 20 different vitamins and minerals. This article summarizes the evidence on the use of multivitamin and single vitamin products among healthy individuals without documented deficiencies.

#### MULTIVITAMIN PRODUCTS

An estimated 35% to 50% of Americans regularly take MVMM products,<sup>1,2</sup> even though vitamin and mineral deficiencies are uncommon among otherwise healthy adults, with the exception of vitamin D and iron. Use is most common among women, older adults, and nonhispanic whites and frequently for the purpose of preventing chronic diseases. Other predictors of use include having higher levels of education, physical activity, and overall healthier diets. In fact, studies demonstrating modest health benefits may actually represent unmeasured healthy behaviors.

Many studies have evaluated the potential benefits of MV or MVMM products. One recent study, using data from the clinical and observational trials of the Women's Health Initiative, identified vitamin use at baseline and at follow-up visits over 8 years. Use of MV, MVMM, or high-dose multivitamin supplements was not associated with reduced risk of eight common cancers, **cardiovascular disease** (CVD), or total mortality.<sup>3</sup> Although other clinical trials, such as the Physicians' Health Study II, are evaluating the effects of MV use on cancer, CVD, eye disease, and cognitive status, little evidence supports the use of MV or MVMM products in otherwise healthy adults.

#### VITAMIN A

The best evidence for the use of vitamin A, as beta-carotene, is for the prevention of age-related macular degeneration. The **Age-Related Eye Disease Study** (AREDS) Research Group has recommended an antioxidant combination including 15 mg beta-carotene in individuals over 55 years of age who are at risk of developing macular degeneration. Other components in the AREDS formulation include vitamin C, vitamin E, zinc, and copper.<sup>4</sup>

Although a diet of fruits and vegetables rich in vitamin A has been associated with a reduction in cancer risk, two earlier cancer prevention trials identified safety concerns with beta-carotene supplements. The **Alpha-Tocopherol, Beta-Carotene** (ATBC) Cancer Prevention Study Group and **Beta-Carotene**

and **Retinol Efficacy Trial** (CARET) found an increase in lung cancer and overall mortality in current or former smokers taking beta-carotene and/or vitamin A (retinyl palmitate).<sup>5,6</sup> Several "eye health" formulations omit vitamin A and are marketed specifically towards current and former smokers.

Consumers should be aware of the potential adverse effects from excess vitamin A consumption. In doses over 50,000 IU, acute toxicity may manifest as headaches, blindness, increased intracranial pressure, nausea, vomiting, and lack of muscular coordination. Because vitamin A exposure may result in craniofacial, cardiovascular, and central nervous system malformations, pregnant women should not consume more than 5,000 IU per day. In addition, other evidence in adults suggests higher retinol concentrations may be associated with reduced bone mineral density and an increased risk of hip fracture by impairing the effect of vitamin D on calcium absorption.<sup>7</sup>

Vitamin A is in many **over-the-counter** (OTC) products not commonly associated with vitamins. Original Airborne Zesty Orange contains 2,000 IU vitamin A (retinyl palmitate) to be taken up to three times daily as needed. Airborne Triple Pack Zesty Orange, has 5,000 IU vitamin A (retinyl acetate) in each tablet, to be taken every 3 hours as needed with no daily maximum dose stated. This could result in ingestion of 40,000 IU of vitamin A in a 24 hour period, approaching levels of acute toxicity. Neither formulation warns about the risk of vitamin A toxicity, nor that current and former smokers should avoid its use, although pregnant and breastfeeding women are cautioned not to use the product.

#### VITAMIN C

Vitamin C, in high dosages, continues to be promoted for its role in immune function and the common cold. The **Food and Drug Administration** (FDA) has warned manufacturers against making unlawful marketing claims for OTC products in combination with vitamin C, citing insufficient substantiating data. Vitamin C may be legally marketed to "support a healthy immune system" or other structure-function claims. The prevention and treatment of cold symptoms at 200 mg or more daily has been observed only in people experiencing extreme climates or in athletes, such as skiers, marathon runners, and soldiers in subarctic temperatures.<sup>8</sup> As for a way to prevent, or treat, cancer, a recent review of 38 trials of vitamin C (or vitamin E) for cancer prevention or treatment found little evidence to support its use for this purpose.<sup>9</sup>

Although safe, diarrhea, nausea, vomiting, heartburn, gastrointestinal cramping, flushing, headache, or insomnia can occur with acute administration of several grams vitamin C. Frequent high dosages of 2 grams daily may cause urinary oxalate stones; urate and cysteine stones have also occurred with long-term use.<sup>10</sup>

## VITAMIN D

Research on vitamin D has demonstrated potential benefits beyond the prevention of osteoporosis. Better considered a hormone, vitamin D consists of ergosterol and 7-dehydrocholesterol (provitamin D3). Multiple cells express vitamin D receptors, including osteoblasts, muscle cells, ovarian and prostate cells, circulating monocytes, pancreatic islet cells, and many others. Vitamin D deficiency may be present among adults of all ages, not only frail older adults living in nursing homes. Among healthy older adults living independently, the incidence of unrecognized vitamin D deficiency may reach 40% to 50%.

Small clinical trials and many observational studies have identified a range of potential health benefits with vitamin D, although few are supported by evidence from large clinical trials. Several meta-analyses have reported that supplemental vitamin D in dosages between 700 IU and 1000 IU are associated with a reduction of about 20% in the risk of falling in older adults. The administration of dosages less than 700 IU of vitamin D have not been associated with this potential benefit. In addition, individuals with vitamin D concentrations of 82 nmol/L or higher had a 50% lower incidence of colorectal cancer than those with concentrations of 30 nmol/L or less in one meta-analysis. A case-control study from the Women's Health Initiative reported that concentrations of vitamin D below 31 nmol/L were associated with a significantly increased risk for invasive colorectal cancer.

The optimal intake of vitamin D remains controversial. New dietary recommendations for vitamin D in adults are expected in 2010 from the Institute of Medicine. Although vitamin D toxicity is quite rare, clinicians should recognize that many different OTC products now contain vitamin D. For example, some glucosamine products include vitamin D in their formulations. A consumer who consumes many different types of OTC products may be getting 1000 IU of vitamin D daily from each product.

In October 2008, the American Academy of Pediatrics and the Institute of Medicine recommended doubling the adequate intake of vitamin D 200 IU to a minimum of 400 IU per day for infants, children, and adolescents. The changes reflected the growing evidence that vitamin D intake will have lifelong benefits in maintaining bone health as well as playing a potential role in the prevention of chronic diseases, such as cancer. Although rare, cases of rickets are reported in the United States, especially with the re-emergence of breastfeeding, and can be both prevented and treated by supplemental vitamin D.<sup>11</sup>

## VITAMIN E

At least 10% of adults use 400 IU or more of vitamin E as alpha-tocopherol daily, although evidence for the prevention of cancer, CVD, and cognitive decline is lacking. Major randomized, controlled trials do not demonstrate favorable clinical outcomes with vitamin E. The ATBC trial, Women's Health Study, **Heart Outcomes Prevention Evaluation (HOPE)** study, and Physician's Health Study II found no difference in cardiovascular events or mortality. In the HOPE-TOO study, patients taking vitamin E had an unexpected 13% increase in heart failure.<sup>12</sup> Data regarding vitamin E and the prevention of cancer is inconsistent, with most trials showing no benefit.

Both HOPE-TOO and Women's Health Study did not demonstrate a reduction in the risk of cancer. The **Selenium and Vitamin E Cancer Prevention Trial (SELECT)** also report no reduction in prostate cancer in relatively healthy men. The DATATOP study showed that vitamin E had no effect on progression of Parkinson's Disease. Two high quality trials of vitamin E reported no benefit in patients with Alzheimer's disease or mild cognitive impairment.<sup>13</sup>

Although dosages of 100 mg to 800 mg vitamin E (approximately 150 to 1,200 IU) are taken without adverse effects, both the ABTC study and the Physician's Health Study II reported hemorrhagic stroke. The use of high dosages of vitamin E should be discouraged in patients taking antiplatelet or anticoagulant therapies, as well as other dietary supplements with antiplatelet properties.

## VITAMIN K

Vitamin K is now frequently a component in MV and MVMM formulations, especially those promoted as "senior formulas" or for "bone health." Combination calcium and vitamin D products also commonly include vitamin K 20 mcg to 80 mcg per tablet. Vitamin K has been added because observational studies suggested a decreased risk of fractures associated with higher dietary intake. Clinical trials from Japan have also reported reductions in fracture risk using pharmacologic dosages of menaquinone-4. The activity of osteocalcin depends on the gamma-carboxylation of three glutamate residues by vitamin K. Vitamin K may also affect osteoprotegerin, a cytokine that binds RANKL, potentially inhibiting the maturation of osteoclasts and decreasing bone resorption. Despite the evidence with vitamin K and osteoporosis, patients taking warfarin should recognize the potential for an interaction, especially if multiple products containing larger amounts of vitamin K are being taken.

## PYRIDOXINE, FOLIC ACID AND CYANOCOBALAMIN

Pyridoxine, folic acid, and cyanocobalamin frequently are used in combination to prevent or self-treat CVD. While studies have evaluated the effect of these vitamins on reducing homocysteine concentrations, the evidence does not support a reduction of cardiovascular disease or mortality in otherwise healthy adults. The American Heart Association does not recommend B vitamin supplementation beyond that obtained from a balanced diet for reduction of risk in heart disease and stroke.<sup>14</sup>

For cancer prevention, findings are mixed. Folic acid supplementation in a multivitamin and dietary consumption both show a reduction in colon cancer, however studies evaluating risk with other cancers find no relationship. A recent study from Norway, where there is no fortification of food, has raised concerns about folic and vitamin B12 in patients with underlying ischemic heart disease. A significant increase risk of cancer and overall mortality was related to supplementation.<sup>15</sup>

The strongest evidence for supplemental folic acid 400 to 800 mcg daily is in prevention of neural tube defects as part of preconception planning. Those at high risk, such as women taking anticonvulsant medications, are recommended to take 4 mg daily. The US Preventive Services Task Force advises providers to recommend folic acid to all women of childbearing age since dosages of 400 to 800 mcg daily are not harmful.<sup>16</sup>



Pyridoxine in dosages of 10mg to 25mg every 8 hours has provided relief of nausea and vomiting during the first trimester, particularly in women with severe symptoms. The American College of Obstetrics and Gynecology continues to recommend pyridoxine, with or without doxylamine, as a first-line option.<sup>17</sup>

## RIBOFLAVIN

Riboflavin is used as a method of migraine prophylaxis at dosages up to 400 mg per day. A placebo-controlled double blind study in adults found riboflavin significantly reduces frequency and duration of migraines, while another small trial found it equal to beta-blockers in preventing attacks. More studies are needed to fully understand the extent of its efficacy, although its safety profile is quite favorable. At this dosage, patients may experience frequent urination, change in urine color to yellow or orange, or diarrhea. It may be used as a second-line agent for migraine prevention.<sup>18, 19</sup>

## NIACIN

Consumers use niacin, or nicotinic acid, to treat elevated lipid levels. Older, large clinical trials have shown that niacin may reduce cardiovascular events and overall mortality when used in pharmacologic dosages between 1000mg and 4000 mg daily. At these dosages, **low density lipoprotein (LDL)** cholesterol levels are decreased by 5% to 25%, while triglycerides are reduced by 20% to 50%. Unlike statins, niacin also increases **high density lipoprotein (HDL)** cholesterol by 15% to 35%.

A review of OTC niacin preparations found “no flush” products contain inositol hexaniacinate, a prodrug of nicotinic acid, that gradually hydrolyzes therefore reducing flush. Its peak concentration of nicotinic acid is low compared with other formulations and no clinical studies have demonstrated its effectiveness for the treatment of dyslipidemias. OTC extended-release formulations of niacin offer ease of dosing and less flushing, although simple self-care measures can be applied to the less expensive immediate-release products to help reduce this. These include slowly titrating dose, administration after meals, avoiding hot drinks or alcohol, or incorporating aspirin 81 mg 30 minutes prior to niacin.

Niacin is inappropriate for the self-treatment of dyslipidemia. Hepatotoxicity is more common with extended-release preparations which require close monitoring. Other adverse effects include headache, nausea, vomiting, peptic ulcer disease, and diarrhea. Patients with diabetes who take 4.5 grams daily for 5 weeks had an average increase of plasma glucose by 16% and hemoglobin A1 C by 21%. Daily dosages of 2.5 grams or less increase plasma glucose by 4% to 5% and hemoglobin A1 C by 0.3% or less. Effects are dose-dependent and patients with diabetes should be monitored carefully. The risk of hyperuricemia occurs at dosages greater than 2 grams daily, and individuals with a history of severe gout should avoid niacin completely.<sup>20</sup>

## PRODUCT QUALITY

Dietary supplement content is dependent upon the product and is not regulated by the FDA. If a supplement is warranted, consumers should look for products with US Pharmacopeia Verification or Consumer Labs Quality Seal. These in-

dependent agencies test for labeled ingredients and lack of contaminants within the product. Note: these seals do not indicate efficacy or safety of that particular supplement.

## SUMMARY

American adults take many types of vitamin supplements, despite limited evidence of their efficacy, especially in preventing chronic diseases such as cardiovascular disease and cancer. Supplements contain significant amounts of vitamins when consumed from multiple sources. Excess consumption of some vitamins may have detrimental health effects. Use of MMVM products appears to be safe; however, clinical outcomes have not been established. Although vitamin D and preconception folic acid may be appropriate for self care, a health care provider should monitor other vitamin supplements for disease prevention, such as niacin. Beyond supplementation as treatment for vitamin deficiencies, evidence is lacking.

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K. Kelly Orr, PharmD, is Clinical Associate Professor of Pharmacy, College of Pharmacy, University of Rhode Island.

Anne L. Hume, PharmD, FCCP, BCPS, is Professor of Pharmacy, College of Pharmacy, University of Rhode Island.

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The authors and spouses/significant others have no financial interests to disclose.

## CORRESPONDENCE

Kelly Orr, PharmD  
College of Pharmacy  
University of Rhode Island  
14 Lower College Road  
Kingston, RI 02881  
Phone: (401) 874-5522  
E-mail: KellyO@etal.uri.edu



## Post-Hospital Transitions: Special Considerations For Individuals With Dementia

*Gary Epstein-Lubow, MD, Ana Tuya Fulton, MD, Rebekah Gardner, MD, Stefan Gravenstein, MD, Ivan W. Miller, PhD*

**Transitions of care refers to the actions involved in coordinating care for patients as they move through the health care system.** The clinical goal during a transition is to communicate the care most-recently received and the needs for aftercare and beyond. Communication across settings and practitioners is paramount, as is the patient's and family's understanding of the illnesses and clinical requirements for ongoing management.

Several post-hospital transition programs have demonstrated reductions in rehospitalization and lower costs for medical patients.<sup>1-4</sup> The focus of these programs has been the medical discharge and "hand-off" process; interestingly, most studies have excluded individuals with cognitive impairment. Only recently have tailored aftercare services focused on comprehension of discharge instructions<sup>5</sup> and other vulnerabilities<sup>6</sup> that individuals with cognitive impairment may have following medical hospitalization.<sup>7</sup>

The vulnerable population of cognitively impaired individuals has a heightened need for coordinated aftercare. Perhaps most demonstrative is the psychiatric hospitalization for behavioral disturbance in dementia; this situation requires complex aftercare for many reasons: 1) cognitive impairment limits the ability of the patient to participate; 2) dementia-related behaviors may result in active resistance to aspects of the post-hospital plan; 3) in-hospital improvement in dementia-related behaviors may be in-part or in-full due to behavioral or environmental interventions rather than pharmacotherapy, and communication of these interventions across settings can be cumbersome; 4) co-morbid medical and psychiatric care needs may require multiple specialty consultants and associated treatments may have cross-specialty effects; 5) federal, state and institutional policies may impose unforeseen barriers regarding access to specific aftercare services; and, 6) family caregivers often lack the resources (time, economic, cognitive or emotional, and additional family members) to triage follow-up tasks and solve new dilemmas.

Evidence suggests that individuals with cognitive impairment are at heightened risk for both medical and psychiatric hospitalizations. Psychotic disorders in a large Medicare sample comprise the second-highest rate of 30-day rehospitalization (24.6%), just behind heart failure (26.9%).<sup>8</sup> For elderly psychiatric inpatients, cognitive functioning is predictive of overall functioning,<sup>9</sup> and social factors,<sup>10</sup> including family functioning,<sup>11</sup> are predictive of rehospitalization. One recent report suggests that acute care and critical care medical hospitalization is associated with a future diagnosis of dementia.<sup>12</sup>

Additional evidence highlights economic concerns regarding individuals with dementia. Alzheimer's disease is the fifth-leading cause of death for Americans over 65 and its death rate has been rising.<sup>13</sup> An estimated \$148 billion annually is attributable to Alzheimer's disease, not including \$94 billion in non-compensated services provided by family caregivers.<sup>13</sup> The top 10% of Medicare beneficiaries with all-cause dementia account for 50% of all dementia-related Medicare costs;<sup>14</sup> and the driving factors in the high-utilization of health care by individuals with dementia are inpatient and emergency treatment.<sup>14,15</sup>

Improving transitional care for patients with cognitive impairment may have benefits beyond the patient and health care system. Family caregivers also suffer risks related to care-recipient hospitalizations. In 1999, Schulz reported a 63% higher mortality risk for stressed spousal caregivers.<sup>16</sup> In other studies, caregivers report worse health than non-caregivers,<sup>17</sup> engage in fewer health-promoting behaviors<sup>18</sup> and have worse medication compliance.<sup>19</sup> Caregiving for a hospitalized patient is an independent risk factor for caregiver death and dementia caregivers have the highest risk,<sup>20</sup> possibly due to poor self-care combined with distress while faced with dementia-related behavioral problems in care recipients.<sup>21</sup>

The process of improving transitional care may be particularly cumbersome when the patient has cognitive impairment. Consensus guidelines (2009) regarding best-practice for medical hospital aftercare, based on input from more than 30 stakeholder representatives at the 2007 **Transitions of Care Consensus Conference (TOCCC)**,<sup>22</sup> recommended, by order of importance:

1. All transitions must include a transition record.
2. Transition responsibility must be established.
3. Clinicians' communication must be coordinated so that post-hospital treatments can be delivered.
4. The patient and family must be involved in ownership of the transition record.
5. A communication infrastructure must exist.
6. Timeliness must be considered.
7. Medical communities and institutions should adopt national standards regarding transitions of care.

Though the TOCCC guidelines were developed without specific attention to dementia, the recommendations are relevant. The first step, as applied to post-hospital dementia care,

is increased use of a formal transition record. A transition record, shorter than the complete discharge summary, contains essential elements as detailed in the TOCCC report,<sup>22</sup> including:

- Principal diagnosis and problem list;
- Medication list including over-the-counter medications, allergies, and drug interactions;
- Emergency plan and contact number and person;
- Treatment and diagnostic plan;
- Prognosis and goals of care;
- Test results/pending results;
- Clear identification of the medical home and/or transferring coordinating physician/institution;
- Patient's cognitive status;
- Advance directives, power of attorney, and consent;
- Planned interventions, durable medical equipment, and wound care; and,
- Assessment of caregiver status.

For examples, see the University of Colorado Health Sciences Center's Care Transitions Program: <http://www.caretransitions.org/index.asp>, or Rhode Island's Continuity of Care form: <http://www.health.ri.gov/forms/continuityofcare/Form.pdf>.

When preparing a transition record or other hospital discharge documents for individuals with dementia, special considerations may include:

- Identify the primary caregiver(s) for the patient;
- Determine if the caregiver understands all discharge instructions;
- Assess the caregivers' and patient's resources and capacity to complete the discharge instructions;
- Consider visiting nursing for medical as well as mental health follow-up for individuals returning home;
- Schedule follow-up appointments with both psychiatric and medical providers;
- Include a plan for management of potential behavioral disturbance; and,
- Give particular attention to safety concerns.

In Rhode Island, Quality Partners of Rhode Island, the Medicare Quality Improvement Organization for RI, was one of 14 states awarded a Medicare contract to expand the National Patient Safety Initiative to include a care transitions component: the Safe Transitions Project. The interventions focus on patient discharge from the hospital. Goals include improving communication across healthcare settings; making systematic changes in hospitals, nursing homes, and home health care agencies to promote more coordinated transitions; and teaching patients to better self manage their medical conditions, with the ultimate goal of improved clinical outcomes and reduced hospital readmission rates.

Quality Partners has two patient level interventions targeted at Medicare Fee-For-Service patients: Coaching and Project RED (Re-Engineered Discharge).<sup>23</sup> The Coaching intervention is anchored on Coleman's four pillars—medication

self management, use of a personal health record, timely follow up, and recognition of red flags that should prompt more urgent evaluation<sup>1</sup>—and occurs primarily in the patient home. Project RED utilizes a computerized educator animation, is done in the hospital prior to discharge, and uses the **National Quality Forum (NQF)** discharge checklist. Both Coaching and Project RED are individualized to each patient.

Patients coached by Quality Partners have an improved 30-day re-hospitalization rate compared to patients who are offered coaching but decline. These patient-level interventions are also designed to train staff in the hospitals and the community to eventually replace the Quality Partners team, with an aim toward sustainability. Quality Partners projects' initial design was to not enroll participants with clear cognitive impairment; however, experience with the interventions has allowed inclusion of selected individuals when a capable caregiver is directly involved.

For more information on the Safe Transitions Project, and other projects at Quality Partners please visit their website: <http://www.qualitypartnersri.org/>.

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*Gary Epstein-Lubow, MD, is the Assistant Unit Chief in Geriatrics at Butler Hospital and Assistant Professor in the Department of Psychiatry and Human Behavior.*

*Ana Tuya Fulton, MD, is the Chief of Internal Medicine at Butler Hospital and Assistant Professor in the Department of Medicine, Division of Geriatrics.*

*Rebekah Gardner, MD, is Senior Medical Scientist Quality Partner, and Assistant Professor in the Department of Medicine.*

*Stefan Gravenstein, MD, MPH, CMD, FACP is Clinical Director, Quality Improvement Quality Partners and Professor in the Department of Medicine, Division of Geriatrics,*

*Ivan W. Miller, PhD, is the Director of the Psychosocial Research Program at Butler Hospital and Professor in the Department of Psychiatry and Human Behavior.*

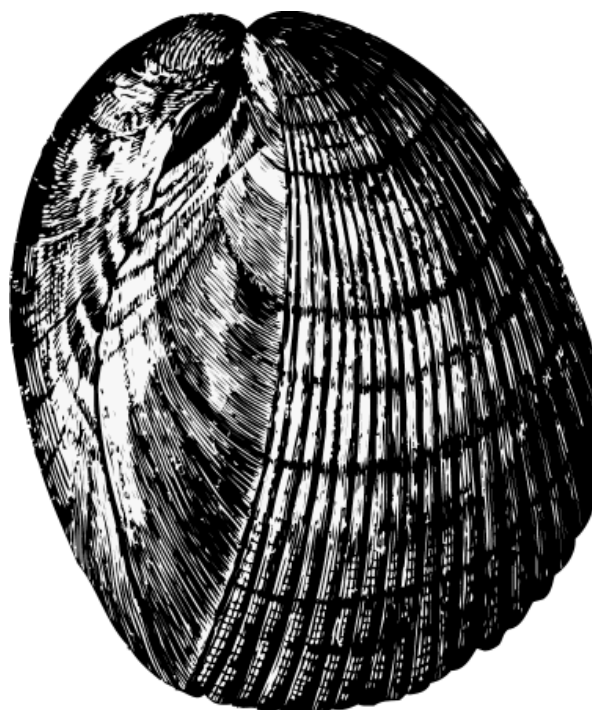
*All are at the Warren Alpert Medical School of Brown University.*

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### NINETY YEARS AGO, APRIL 1920

Frederic J. Farrell, MD, in "Clinical Neuropathology and its Value in General Practice," remarked: "The personality of an individual is often times an obstruction to his general welfare."

Arthur H. Ruggles, MD, in "The Need of Mental Hygiene in Rhode Island," described the role of the Rhode Island Society for Mental Hygiene in promoting mental health and raising the standards of care for patients.

One Editorial, "Post-Graduate Work in Local Hospitals," remarked that in other states, spurred by the American Medical Association, hospital staffs had introduced post-graduate "courses for professionals," but "Such a movement has made very little or no headway here in Rhode Island for very obvious reasons, chief among them being the fact that none of our hospitals are teaching hospitals or connected to medical schools."

A second Editorial, "A Children's Hospital," noted that while professionals recognized the need for one, "It has remained for the laity to recognize the urgent need of such an institution."

### FIFTY YEARS AGO, APRIL 1960

Lester L. Vargas, MD, Frank Merlino, MD, William P. Corvese, MD, Frank B. Cutts, MD, Elihas Saklad, MD, Clarence H. Soderberg, MD, Constantine Georas, MD, Joseph S. Karras, MD, Kenneth B. Namian, MD, and Daniel Moore Jr, MD, in "Extracorporeal Circulation in a Community General Hospital," described the preliminary report of a study, started at Rhode Island Hospital, June 1958, on the "...early experimental and clinical experience using a pump-oxygenator for open-heart surgery." Of 19 animals subjected to "survival experiments," 5 died during the procedure.

Lt. Ralph L. Nachman, MC (USNR), in "Diet and the Abdominal Crisis in Essential Hyperlipemia," noted that 90 cases were reported in the literature. He described the case of a 25 year-old man, treated with steroids and a low fat diet.

Armand D. Versaci, MD, in "Surgical Treatment of Malignancies of the Eyelids," said: "Adequate treatment implies complete eradication of the tumor and preservation of the lid function" – sometimes difficult to achieve.

O.D. Cinquegrana, MD, in "Licensure of Physical Therapists," argued in favor of the legislation.

### TWENTY-FIVE YEARS AGO, APRIL 1985

In a Guest Editorial, "Health Care in Rhode Island," Governor Edward D. DiPrete pointed to a "staggering" \$1.88 billion spent annually in the state, or \$1500 per capita. To stem these costs, in 1968 Rhode Island enacted certificate-of-need legislation (the first in the nation), implemented global hospital budgeting (with "maxicaps" which limit increases in hospital budgets, negotiated annually by hospital and major insurers), and welcomed the first federally certified HMO in the nation.

Robert J. Canny, Executive Director, Hospice Care of RI, contributed "Hospice Care Benefits under the Medicare Program." He noted that Hospice Care of RI was the first certified Medicare program in New England.

Michael L. Friedland, MD, Harry Ward, MD, Edward G. Wittels, MD, Zalmen A. Arlin, MD, in "A Monocytic Leukemoid Reaction: A Manifestation of Preleukemia," noted: "...the sequence is a manifestation of the iatrogenic potential of cancer therapies." The case concerned "a 55 year-old woman with disseminated adenocarcinoma of the breast...She presented for her scheduled visit with painful lesions of herpes zoster."



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