FOCUS ON
Rehabilitation

Heads Up:
MEETING THE CHALLENGE OF BEHAVIORAL SEQUELAE FOLLOWING TRAUMATIC BRAIN INJURY
BY NEIL N. JASEY, JR., M.D.

THE EFFECTS OF TRAUMATIC brain injury (TBI) have been the subject of increased public discussion and scientific scrutiny following a surge of research on military personnel exposed to combat and blast injuries, and on athletes engaged in contact sports. Among the chronic and debilitating symptoms that can result are neurobehavioral disturbances, which often impair a patient’s ability to function in everyday life as well as in the workplace and in social relationships. But a variety of pharmacological, behavioral and environmental interventions can help reduce patient limitations and improve rehabilitation outcomes.

A HOST OF POTENTIAL PROBLEMS
Behavioral disturbances are ubiquitous in brain injury populations. Agitation in particular is observed in approximately 35 to 55 percent of TBI patients. It can manifest simply as motor restlessness or, in more severe forms, as yelling and irritability; rarely does it present as violence toward self or others. Although underlying contributors vary, agitation is more likely to develop in individuals who experience post-traumatic amnesia, as the inability to recall previous information or lay down new memories frustrates patients and impairs orientation. Furthermore, patients often experience pain as a result of their injury but may have a decreased ability to communicate about their discomfort, which leads to distress. Overstimulation from the environment—such as increased noise, bright lights or commotion in the room—also causes some individuals to act disruptively.

Other behavioral disturbances, many of which are comorbid with agitation, include impulsivity, disinhibition, affective lability and lack of awareness to one’s environment. Depressed mood or anxiety is also typical. Finally, a wide range of sleep disturbances, like insomnia, poor sleep maintenance and breathing disorders, is highly prevalent across brain injury populations and can contribute to behavioral issues.

(continued on page 2)
Intervention for neurobehavioral symptoms should be multifaceted and include consideration of pharmacological, environmental and behavioral approaches. One of the first steps is to treat any easily addressed underlying issues exacerbating the primary concern—for example, chronic pain caused by other injuries such as a rib or long bone fracture. In such cases, merely giving a longer acting analgesic, like a fentanyl patch, can yield drastic improvements. Medication may also be beneficial for stabilizing and regulating the sleep-wake cycle, promoting the deeper stage 4 sleep, which is usually deficient after TBI.

But pharmacotherapy has a place beyond that of just controlling pain and sleep. Propranolol is the most widely studied and empirically supported medication for agitation. Although benzodiazepines, GABA agonists and antipsychotics can be used to regulate behavior in psychiatric populations, they are discouraged for TBI because they can impair recovery from brain injury by inhibiting neuroplasticity and, in some persons, cause a paradoxical reaction that increases agitation. As a second-line option, antiseizure prescriptions, like Depakote or Neurontin, may be beneficial. One new medication, Nuedexta, approved by the Food and Drug Administration for pseudobulbar affect, has been shown experimentally to reduce agitation and appears to be particularly helpful in decreasing perseverative behaviors in patients with TBI. Further studies are ongoing to clarify its utility.

Treatment should also include minimizing overstimulation in the patient’s environment. Transfer inpatient rehabilitation sometimes comes directly from the intensive care unit, which is replete with constant noise, people and activity. During therapy, clinicians might dim the lights in the gym or work with the individual in a smaller, less distracting treatment setting. Staff and family should be asked to speak in a low volume and avoid overcrowding the room with visitors. Getting patients with TBI into a more controlled, quiet and stable environment, along with reestablishing a natural sleep cycle, can produce vast improvements.

Finally, neuropsychological interventions teach patients and families how to better inhibit and regulate their reactions. This involves using redirection techniques to reduce perseverative thoughts and behaviors, and helping individuals learn how to replace problematic behaviors with more appropriate ones they can use when situations become stressful. Outpatient psychotherapy for depression, anxiety and other mood disturbance also may be warranted and allow patients to develop better coping skills.

The key to successfully addressing behavioral sequelae of TBI is to consider a person’s situation holistically. Agitation or other behavioral issues may not necessarily be attributed to the head injury itself but rather to other factors, like infection. This helps inform faster, more appropriate treatment.

At Kessler Institute for Rehabilitation, a cross-discipline, team-based approach is utilized to ensure everyone is working in concert to address the symptoms consistently. Behavioral Rounds are conducted by therapists, nurses and psychologists to identify strategies for patients as well as clinicians. For instance, staff are educated about how to efficiently approach and interact with affected individuals, such as using disengagement techniques rather than trying to argue with a person who is adamant in his or her misguided belief. Kessler clinicians also thoroughly review medications for all new admissions from acute care. Adjustments to some classes, such as sleep, make for easy targets of intervention.

Behavioral disturbances can stymie progress in rehabilitation and reduce quality of life for patients and their caregivers. Symptoms are treatable but require early recognition, awareness of contributing factors that also might necessitate intervention, and a multidisciplinary approach that thoroughly and consistently implements evidence-based care.
ICD-10: WHAT’S IN STORE FOR YOUR HOSPITAL

On Oct. 1, the long-awaited ICD-10-PCS diagnostic coding system, an update of the International Classification of Diseases, went live. The ICD-10 replaces ICD-9, which has been in use in the U.S. since 1979. Most countries adopted the ICD-10 years ago; indeed, the U.S. is the last industrialized nation to move toward the new coding system.

ICD-10 is designed to provide greater specificity and information about medical conditions and the quality of care provided for all patients, not just those on Medicare or Medicaid. There’s no question that it’s more complex; on the inpatient side, we will now be dealing with 87,000 codes compared with 4,000 in ICD-9. This has numerous ramifications for inpatient rehabilitation hospitals and units (IRH/U’s) and physicians. Specifically:

- It requires more clinical information to code accurately.
- It makes capturing information from the referring hospital more important.
- It may require more physician and support staff time.
- There is a greater risk for coding errors during the transition and learning period.

The implementation of ICD-10-PCS also has very serious implications regarding 60 Percent Rule compliance. This is a Centers for Medicare and Medicaid Services (CMS) requirement that at least 60 percent of an IRH/U’s admissions in a cost reporting period fall into one or more of the 13 specified clinical conditions in order to qualify for payment under Medicare’s inpatient rehabilitation prospective payment system. Confusion, mistakes and mismapping errors from CMS as ICD-9 codes were transferred to ICD-10 codes increase the risk that patients will not be counted as presumptively compliant and that facilities will be in noncompliance or require a manual record review to prove compliance.

However, ICD-10 also provides an important opportunity to improve the quality of care we deliver. Simply put, the more we know about a patient’s clinical circumstances from the referring hospital and our own evaluation, the greater our understanding of the patient’s potential capacities. This detailed understanding should enable us to assess treatment modalities over time in a more specific manner. For instance, in stroke cases, we will now know the specific location of the stroke and the cause. Code 163.331, for instance, tells us that the patient had a cerebral infarction due to thrombosis of right posterior cerebral artery. A leg fracture will now be coded as to whether it is open or closed and displaced or nondisplaced, among other specifics.

The use of ICD-10 will also enhance our ability to use the International Classification of Functioning, Disability and Health (ICF), the framework for describing and organizing information on functioning and disability. Since this coding system is essentially an extension of the ICD-10 system, facilities that already use it will find improved capabilities and access to deeper information about their patients and programs of care.

Although there was much angst about what would happen in October when the new system went live (some likened it to the Y2K changeover), it appears to have been a smooth transition for most providers, at least so far. Of course, it’s possible that the coming months may reveal problems with either provider coding or the data system used to record and transmit claims information.

One issue of concern is that while CMS is providing physicians with a one-year immunity for coding audit penalties, no such equivalent exists for hospitals. That’s something advocacy organizations are trying to remedy.

The bottom line is that ICD-10 may initially have more risks than rewards, but it does have an upside. And, after all, we have no choice but to “get with the program.”
Life in Balance

VESTIBULAR REHABILITATION HELPS PATIENTS MOVE FORWARD WITH THEIR LIVES

By JIM CINBERG, M.D., FACS, AND JOSEPH CACCAVO, JR., P.T.

Vestibular conditions are characterized by frequent, ongoing symptoms of feeling off balance; positional or movement-related dizziness; and spatial disorientation. Debilitation can be moderate to significant, potentially resulting in serious limitations to a person’s occupational functioning, mobility and quality of life. Prevalence rates vary by specific etiology, but overall estimates suggest as many as 35 percent of U.S. adults age 40 and older are at increased risk for these and other negative outcomes, including fall and injury.

Individuals with vestibular impairment often think symptoms will go away on their own, especially if the indications began after a head injury, and may not seek attention until they notice their well-being or functioning continues to be negatively affected. But with proper diagnosis and identification of the underlying cause, these conditions are treatable. Further, the past two decades have produced a growing body of research supporting the use of a form of physical therapy (vestibular and balance rehabilitation therapy, or VBRT) tailored specifically to these populations.

PINPOINTING THE CAUSE

Multiple conditions could give rise to a vestibular disturbance. Although the balance organs are well protected by bone in the base of the skull, they frequently are injured as a result of a head injury. Even minor traumatic brain injury can cause enough disruption in the otolith organs and semicircle canals to result in balance problems and dizziness. The injury occurs not because of damage to the bone that surrounds the balance organs, but rather because of sudden pressure changes of the fluid in the balance organs as a result of the impact to the head. Such traumas are often caused by motor vehicle accidents, falls and athletic play. There does not need to be a fracture to the temporal bone or a severe loss of consciousness to cause a decrease in the capacity of the balance system.

Several nontraumatic origins must also be considered. The organs of balance can be negatively affected by increased volume of inner ear fluid—known as Ménière’s disease. Benign paroxysmal positioning vertigo is the most common vestibular disorder and occurs when calcium carbonate crystals in the otolith organs become dislodged and migrate into the semicircular canals. Neurotoxicity, ear infections, migraine-related vertigo and inflammation of the vestibulocochlear cranial nerve represent other causes for balance problems. Some degree of off-balance and dizziness is also associated with normal aging and may not reflect an underlying vestibular pathology. Similarly, common age-related issues like vision problems and neurocognitive disorders should not be overlooked as potential contributors to symptoms.

Dizziness is pervasive throughout many medical conditions, including cardiovascular disorders. Determining whether disequilibrium can be attributed to a vestibular problem requires objective, quantitative assessment rather than sole reliance on a patient’s complaint and history. This “hard” data is the foundation for the development of an evidence-based treatment.

Using objective measures, diagnosis at Kessler Institute for Rehabilitation includes evaluation of the multiple balance organs in the base of the skull as well as the central vestibular connections. For example, unilateral centrifugation can evaluate the functioning of the otolithic’s utricle. Vestibular-evoked myogenic potential analyses can be conducted to determine whether the vestibular nerve and central connections are normal. The neo-ocular head thrust test can assess the performance of the semicircular canals, while the rotational chair test indicates whether inner ear problems exist bilaterally or unilaterally.

TARGETED THERAPY

Objective assessments yield a more precise diagnosis that in turn informs appropriate referral for treatment. For instance, while medication is not a first-line intervention, some patients with a diagnosis of vestibular migraine will benefit from pharmacological intervention with vestibular suppressants or anti-emetics. A very small percentage of individuals might be referred for surgery if symptoms are intractable. However, at Kessler Institute, the most frequent intervention is VBRT, offered primarily at the Chester, West Orange and Saddle Brook hospitals.

Rather than exercising a single muscle, as in traditional physical therapy, vestibular rehabilitation targets the entire vestibular peripheral system as well as the brain. The point of treatment is to help patients achieve habituation. Individuals are exposed to stimuli that increase their symptoms. After the stimuli are removed, they are reintroduced at a progressively higher dose until the patient has adapted—or habituated—to the symptoms.
The goal is to make the brain “believe” that the information sent by the damaged inner ear is, in fact, accurate.

Static vestibular-ocular reflex (VOR) exercises traditionally involve placing an image in front of a person and having him look at it while turning the head quickly; this helps improve the gain of the VOR. But patients at Kessler Institute also undergo dynamic VOR exercises. These have the added difficulty of being performed while maintaining movement, like walking and turning the head to look at an object. Since most vestibular patients complain of unsteadiness, static and dynamic balance techniques are also needed. These tend to be functional in that they mirror activities someone with a vestibular disorder likely would have difficulty performing in daily life, like moving the head and talking while walking, or stepping over an object while walking. In this sense, vestibular rehabilitation is intended to help patients regain practical skills that will aid in everyday living.

At Kessler Institute, vestibular rehabilitation also includes a component of aerobic fitness, since people who have problems with balance, dizziness and disorientation usually refrain from exercise. Research suggests that regular physical activity can improve balance, but the primary reason Kessler therapists include this aspect of care is to prevent patients from limiting themselves outside of therapy. The general philosophy is to encourage people with vestibular dysfunction to live as normal lives as possible, just in moderation while rehabilitating. This approach is particularly meaningful for people who experience a reduction in mood and quality of life from having to limit their activities. As such, aerobic exercise not only imparts a physiological advantage but also allows individuals to reconnect with a part of their life they value, in turn contributing to good psychosocial functioning, mood and self-esteem.

On average, rehabilitation continues for one to three months, generally with two sessions per week. But patients are required to engage in daily, custom-designed, graduated exercises at home, which helps stimulate faster habituation and motor learning. Activities increase in complexity and duration as adaptation occurs. Treatment is individualized, and underlying etiology will inform how and which intervention is administered. For instance, in benign paroxysmal positioning vertigo, symptoms typically can be reduced in only one or two sessions of vestibular therapy using a canalith repositioning technique. Other vestibular diagnoses would take much longer to remit, though.

HALLMARKS OF QUALITY
Vestibular therapy is usually provided in some form or another across most rehabilitation facilities, but formal programs with credentialed therapists are not the norm. Furthermore, claims about competency to treat these conditions can vary and, unfortunately, can be unintentionally misleading. Well-meaning clinicians might attend a one-day workshop or course on vestibular exercises and subsequently market themselves as specialists in this modality. But that is not the case. Certified vestibular therapists undergo months of rigorous didactic and clinical training in programs accredited by the American Physical Therapy Association. The use of therapists with a demonstrated expertise in vestibular procedures helps maximize outcomes, such as faster time to recovery.

Quality care also requires clinicians to recognize when other rehabilitation and medical specialists are needed to help address symptoms and possible comorbid conditions that can affect prognosis. While neurologists, audiologists and physical therapists are typically at the front line of diagnosis and treatment, Kessler Institute’s vestibular experts often call on physician colleagues, such as physiatrists, internists and ENTs, as well as occupational therapists to ensure timely referrals and comprehensive care are provided.

There is a great need for clinician sensitivity to the importance of properly diagnosing and treating patients with balance problems and dizziness, as they are at higher risk for falls and other negative outcomes. Such complications can be debilitating and potentially life-threatening. For example, falls are the leading cause of traumatic brain injury in the geriatric population. Similarly, postmenopausal women with imbalance may be more likely to incur fractures due to the increased risk of osteoporosis at this life stage.

Because vestibular symptoms are so frequent and present throughout medicine, it is easy to overlook or downplay their seriousness. But the sooner an objective assessment can be made, the sooner specialized rehabilitation can begin—and the sooner patients can get back to living normal lives.

Coverage denied

BY BRUCE M. GANS, M.D.

A few months ago, the four regional Medicare contractors that operate the durable medical equipment, prosthetics, orthotics and supplies (DMEPOS) program—which approves and pays for DME, prosthetic and orthotic devices—published identical local coverage determinations (LCDs) that radically change the criteria for lower limb prostheses. The proposed policies threatened to dramatically reduce access to appropriate lower extremity prostheses for Medicare beneficiaries.

The proposals sparked an outcry among rehabilitation and prosthetic providers, igniting a firestorm of protest and numerous efforts to prevent the policies from taking effect.

Those efforts worked. In November, the White House announced that CMS “will not finalize” the draft LCD, at least not in its current form.

That is great news, because the impact of the policy could be devastating.

Currently, medical necessity for a prosthesis is determined based on the patient’s “potential functional abilities.” This takes into account the patient’s history, including prior prosthetic use; current condition, including the status of the residual limb and other medical problems; and the patient’s desire to walk. The existing rule also allows a prosthetic expert to perform the assessment rather than a physician.

Under the proposed rule, however, medical necessity would require a physician assessment of the patient’s overall health and medical status. That evaluation as well as the patient’s “documented performance using their immediately previous prosthesis” would determine necessity. In other words, a patient would need to demonstrate that he or she can walk with a “natural gait” with a prosthesis in order to receive a new prosthesis. If not, the patient may be saddled with an older, antiquated prosthesis or receive none at all. Furthermore, the level of functionality, such as how far one can walk with the prosthesis, would determine the type that the patient receives.

The LCDs also restricted technologically advanced prostheses to patients who do not use a cane, crutches, a walker or a wheelchair.

If enacted, the rule will affect an estimated 170,000 Medicare beneficiaries annually who require below-the-knee prostheses, but there is concern that other payers, including the U.S. Department of Veterans Affairs and private insurers, would follow suit.

Advocates identified numerous problems with the process and substance of the draconian and regressive policy.

Most importantly: How can amputees prove they can walk perfectly with a prosthesis until they get one? Yet it seems that they can’t get one until they prove they can walk with one.

The proposed rule appeared to be in reaction to a 2011 audit by the Inspector General for the Department of Health and Human Services. It found a 27 percent increase on spending for lower limb prostheses between 2005 and 2009, even as the number of Medicare beneficiaries receiving lower limb prostheses declined. However, that increase correlated with significant technological improvements in prostheses resulting from research and device development conducted by the Department of Defense, Veterans Affairs and others. In addition, between 2010 and 2013 Medicare expenditures for prostheses declined 13.8 percent, according to the American Orthotic & Prosthetic Association (see chart).

It is possible that regulators see “snipers” hiding behind every Bush—unscrupulous vendors committing Medicare fraud by overprescribing more costly technology. It definitely happens, particularly in the area of DME, so it is not surprising that improper billing and fraud are suspected.

Nonetheless, penalizing all patients for the actions of a small number of providers is, to say the least, not proportionate.

That is why associations whose members care for amputees, including the American Academy of Physical Medicine and Rehabilitation, banded together to fight these proposals. The groups posted a petition to withdraw the changes on President Barack Obama’s “We the People” page at whitehouse.gov.

By the middle of October, more than 110,000 people had signed the petition, demonstrating that vigilance and surveillance are needed when it comes to Medicare policies and that political activism is alive and well.

Two weeks later, the White House announced that the proposed changes would be studied more before anything becomes official.

Advocacy works.
Game on:
USING VIDEO TECHNOLOGY COMBINED WITH EXOSKELETON TO IMPROVE UPPER LIMB RECOVERY AFTER STROKE
BY MOOYEON OH-PARK, M.D., AND GRETCHEN MARCH, OTR

Of the nearly 800,000 Americans who will experience a stroke each year, about half will manifest significant functional disabilities. Limitations in upper limb mobility can linger for months or even years and may interfere with activities of daily living, occupational functioning and overall quality of life. But an innovative approach to rehabilitation using video games may be a useful and promising adjunct to traditional care.

REPETITION, REPETITION, REPETITION
A cornerstone of effective upper limb stroke rehabilitation is to continuously expose patients to highly repetitive movements, like reaching, grabbing, gripping and picking up objects. This is essential in the first six months following a stroke, as the brain is most receptive to recovery during this time period. Specifically, empirical evidence has highlighted the importance of repetitive, challenging, intensive tasks as a key element in promoting neuroplasticity. However, clinician-guided therapy is often limited by time and resource constraints; it simply isn’t feasible during a given treatment session for patients to receive the hundreds of daily repetitions that are necessary to foster neuroplasticity. This is where modern technology steps in.

Stroke rehabilitation has increasingly integrated novel technology—such as robotic devices, virtual reality systems and video game equipment—with standard therapy to meet the needs of patients while reducing clinician burden. Gaming strategies in particular, such as video game sports like bowling or tennis and cognitive tasks, including puzzles or memory games, offer highly engaging activities that utilize repetitive motions and can be incrementally, automatically adjusted for greater challenge as skills are mastered. Game therapies intend to address motion, strength, dexterity, grip and force while providing positive reinforcement and feedback on performance, which enhances patient engagement, adherence and motivation.

At Kessler Institute for Rehabilitation, for example, patients with upper limb mobility dysfunction can experience such training on the ArmeoSpring—a whole-arm exoskeleton that integrates gaming hardware and software in intense, repetitive, task-oriented movements. The affected limb is supported with an exoskeleton that is linked to a computer. Games simulating regular activities of daily living are displayed on a screen and require the patient to perform grasp and release motions as well as extend and rotate the arm and shoulder to perhaps control an avatar or hit a moving target. The level of difficulty is adjusted to the individual’s strength and functional ability. As the patient improves, this particular device, which is set to counteract the effects of gravity, can also be adjusted to provide less assistance to the affected limb as the patient improves.

CULTIVATING MORE SCIENCE
Research about rehabilitation gaming devices has grown over the past decade, aided in part by increased availability and popularity of commercial consoles. Systematic reviews suggest game strategies are tolerable and feasible for integration into traditional stroke upper limb rehabilitation. While more data are needed to determine the extent of video games’ benefit, initial effectiveness outcomes are generally equivalent to, if not slightly better than, those seen with conventional physical and occupational therapy. Benefits to activities of daily living and quality of life have been documented in comparison with dose-matched, repetition-matched traditional interventions.

Kessler Foundation and Kessler Institute for Rehabilitation will soon participate in a research project investigating the feasibility of gaming systems through a Small Business Innovation Research grant from the National Institute on Aging in collaboration with researchers from Rutgers University’s Department of Electrical and Computer Engineering. This phase I project will assess the feasibility of a gaming therapy device called BrightBrainer G (BBG) for bimanual training in patients’ homes via a novel telemmedicine approach. Its games address such functions as motor control, short-term visual memory, sustained attention and executive functioning. Like the ArmeoSpring, the system acquires baseline performance and progressively increases in difficulty.

If outcomes from this project are positive, it could signify a potential long-term option for rehabilitation that reduces clinic time and resources while giving patients an even better opportunity for recovery.
4th ANNUAL
National Summit on Safety and Quality for Rehabilitation Hospitals

April 18-20, 2016
ROYAL SONESTA HARBOR COURT ★ BALTIMORE, MD

LISTEN to leading experts
SHARE best practices & strategies
LEARN to meet the challenges at your hospital

Announcing the Call for Abstracts
Bringing to light the latest clinical breakthroughs and research in safety and quality

Our presenters include:
Michael Choo, MD | Paradigm Outcomes
Patrick Conway, MD, MSc | Centers for Medicare & Medicaid Services
Erin S. DuPree, MD, FACOG | The Joint Commission Center for Transforming Healthcare
Ayse P. Gurses, PhD, MS | The Armstrong Institute for Patient Safety and Quality
Chris MacDonell, FACRM | CARF
Dale M. Needham, FCPA, MD, PhD | Johns Hopkins University
Peter W. Thomas, JD | Powers, Pyles, Sutter & Verville PC
Kara Odom Walker, MD, MPH, MSHS | Patient Centered Outcomes Research Institute

For more information, or to register, visit safetyqualitysummit.org

SPONSORED BY:
Kessler Institute for Rehabilitation

IN COLLABORATION WITH:
Inpatient Rehabilitation Hospital Division of Select Medical