FOCUS ON
Rehabilitation
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CONCUSSION DISCUSSION

> Mild TBI is widespread and difficult to diagnose—but a multidisciplinary program can achieve optimal outcomes

BY NEIL N. JASEY, JR., M.D., AND MONIQUE TREMAINE, PH.D.

AN ESTIMATED 1.3 MILLION Americans sustain a mild traumatic brain injury (MTBI, or concussion) each year, with some experiencing prolonged or permanent impairment. Despite this high prevalence, MTBI is challenging to diagnose and treat. Optimal patient outcomes are possible, however, through an approach that combines medical, neuropsychological and therapy services rendered within a comprehensive TBI program, including cognitive rehabilitation (CR).

For individuals with MTBI, employment and daily activities can be disrupted for months, and treatment costs nearly $17 billion per year in the U.S. alone. The risk of repeat injury is up to six times higher after initial MTBI, and future damage is likely to be more severe.

Among younger people, most cases result from sports and bicycle accidents; for older persons, motor vehicle accidents and falls are the most common causes. Girls performing certain activities, such as gymnastics, have a higher incidence than do boys, but males of all ages are generally more likely to sustain MTBI. Combat veterans also represent an increasing proportion of this population.

All these statistics, however, underestimate the problem's true scope. First, no universal definition of MTBI exists. Second, surveillance mechanisms capture only inpatient data, whereas most patients with MTBI receive treatment in emergency departments or offices, if they seek care at all. Many people are unaware of or disregard the need for medical consultation after suffering only "minor" trauma.

Diagnosis: A Moving Target

Because each person reacts differently to the same event, and the "baseline" varies

among individuals, recent practice guidelines have called for doing away with formal classifications of MTBI. Accordingly, its diagnosis and treatment at Kessler Institute for Rehabilitation are now symptom-driven.

Identification starts with obtaining a thorough history. Key data to ascertain include the nature of the event; the presence of amnesia, irritability, headache, dizziness, nausea or blurred vision; and details about any loss of consciousness. A complete neuropsychological assessment is then performed.

Although CT and MRI can rule out structural damage, MTBI may not be apparent on these or other scans. New technologies such as diffusion MRI are promising, but additional research is required before they can be incorporated into practice. Computerized concussion-evaluation systems such as ImPACT and standard neuropsychological and cognitive measurements are useful, especially *(continued on page 7)*

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McMURRY

IT ALL ADDS UP

> Recent legislation will intensify the need to monitor, measure and report quality benchmarks

INPATIENT REHABILITATION hospitals and units (IRH/U) are facing a new emphasis on the measurement and reporting of quality data. This is not unique to rehabilitation medicine; quality is a topic of increasing focus for health care in general, but until now, IRH/Us have not been required to report such data, as acute care hospitals are doing. The health care legislation recently passed, the Patient Protection and Affordable Care Act, includes a requirement for quality reporting that will affect IRH/Us.

The Centers for Medicare & Medicaid Services (CMS) has not completed the process of defining rehabilitation quality measures, and it will be several years before reporting becomes mandatory. Advocates should now be working on the development of these important indices in anticipation of pronouncements to be expected from CMS, MedPAC and other agencies.

Quality reporting for IRH/Us should focus on a framework that reflects the principles of rehabilitation as well as medicine. If we define quality as the avoidance of preventable adverse events, we could evaluate it simply as the number of bad events that do happen, such as hospital-acquired infections, skin ulcers or falls. In fact, most measurement systems stop here.

We could expand beyond counting adverse events and describe the achievement of positive health outcomes. We could then assess quality as decannulating a patient with a tracheostomy, eliminating an indwelling urinary catheter, healing acute care hospital-acquired skin ulcers or improving patient strength. While this is a better definition, it still leaves us thinking only in terms of disease or impairment.

The next step forward is to think in terms of positive accomplishments of functional program objectives. Common examples would be measuring functional improvement, rates of discharge to home, or training of family members to provide care safely and successfully. We also could report the efficiency and effectiveness of programs by describing the rate of functional improvement or the cost of care. Additionally, tracking patient perceptions of satisfaction as indices of quality would be germane.

An ideal reporting framework would take each of these domains into account—from reporting negative events to assessing patient satisfaction—and it would embrace the perspective of the International Classification of Functioning, Disability and Health (ICF) from the World Health Organization. The ICF describes health outcomes in terms of patient impairment, function, activity and participation, and recognizes contextual factors such as personal characteristics and environment.

I am suggesting these options as a way that our field can think about quality, even though we may not want to recommend such detailed measures as part of mandatory reporting. Whatever standards are developed must be valid, reliable, sensitive and meaningful, and not overburden providers. Reporting must also be risk-adjusted to recognize the variations caused by patient characteristics. The system should not inadvertently encourage facilities to avoid admitting higher risk patients to eliminate a negative impact on their quality reporting.

Embracing such reporting should benefit both our facilities and our patients, and we should start adopting and implementing quality measures sooner rather than later.

Bruce M. Gans, MD

Bruce M. Gans, M.D.
Chief Medical Officer

HIDDEN WOUNDS

> Psychiatry plays an important role in addressing depression and other significant mental disorders that often accompany brain injury, whether from stroke or trauma

BY M. KEVIN O'CONNOR, M.D.

WHILE SOME INJURIES are obvious to the outside observer, others are less visible and more subtle, yet cause a significant burden for the individual experiencing them. For patients undergoing medical rehabilitation, psychologic distress following physical trauma can be difficult to detect and treat. But at Kessler Institute for Rehabilitation, the integration of psychologic assessment into patients' physical and rehabilitative care is making this an issue of the past.

Mental health problems are prevalent in individuals who have sustained catastrophic injuries and illnesses, predominantly in the form of major and minor depression and generalized anxiety disorder, although a variety of other significant disorders may be present. Among those who have experienced traumatic brain injury, several studies have reported prevalence rates ranging from 18 percent to as high as 61 percent. Psychiatric illness is often related to the direct effect of the physical injury, such as disruption of the central nervous system structures that regulate emotional response and expression. But such symptoms also may represent a person's psychological response to loss and disability. The reductions in functioning and greater dependence on others, which often follow such brain injuries, can be emotionally stressful.

Left untreated, mental disorders affect the ability to fully participate in and achieve the maximum benefit from rehabilitation. Therefore, the prompt identification of such illnesses and the initiation of treatment may have a profound influence on clinical outcomes.

A Different Viewpoint

As with physiatry, psychiatry often uses a team approach to the care of patients. At Kessler, consulting psychiatrists bring their expertise to bear on the individual's response to his or her illness and by so doing broaden the team's understanding of these issues. This requires respect for the opinions and observations of the other professionals involved, as well as sharing the responsibility for various aspects of a person's care. Psychiatrists welcome, encourage and value the input of team members in achieving a greater knowledge of the patient and, hopefully, better results. Related disciplines, such as psychology and neuropsychology, enhance outcomes by providing assessments and psychosocial therapy. Psychiatrists bring a unique perspective to rehabilitation, however, in that they possess an expertise in diagnosing and treating critically ill individuals.

More specifically, at Kessler, consults from psychiatry involve conducting in-depth clinical interviews to achieve an accurate diagnosis and recommending appropriate psychopharmacologic and psychotherapeutic treatment. Regular meetings with attending physicians and other members of the team to share clinical impressions of a particular person's presentation and progress and discuss additional approaches benefit therapeutic outcomes. Hospital stays are often brief, and outpatient therapy for mental disorders has therefore become the norm.

A thorough understanding of the patient, including his or her symptoms and the neurologic deficits sustained, is a necessary prerequisite to effective psychological and psychiatric treatment. This can only be obtained by practitioners sharing and integrating each other's assessments, making a team framework essential to bringing about desired recovery.

Looking Ahead

To determine what treatments are most effective, clinical research needs to be performed in defined populations of brain and spinal cord injured patients who experience psychological difficulties. At present, methods are used that are efficacious in medically healthy populations, yet these may or may not be as effective in the rehabilitation setting. With greater attention to the psychologic and psychiatric needs of such individuals and the launching of appropriate research protocols, the mysteries of how best to assess and treat mental illness in this population may be determined.

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MEETING OF THE MINDS

A unique conference brings together aphasia experts from multiple disciplines to bridge research and clinical applications

Q&A WITH ANNA M. BARRETT, M.D.

IN JUNE, leaders in the study and treatment of aphasia convened at Kessler Foundation in West Orange, N.J., for a one-day conference titled, "Innovative Physiologic Treatments for Aphasia." With sponsorship from Kessler Institute for Rehabilitation, Kessler Foundation and the Bob Woodruff Foundation, the meeting was initiated entirely on the part of the presenters, led by Anna M. Barrett, M.D., Kessler Foundation's director of Stroke Rehabilitation Research, and Jonathan Fellus, M.D., Kessler Institute's director of traumatic brain injury. *Focus on Rehabilitation* recently spoke with Barrett about the importance of this unique gathering, and what it means for the future care of patients with aphasia.

Focus on Rehabilitation: What was the impetus behind the conference and what did you hope to accomplish?

Anna M. Barrett, M.D.: Aphasia carries a significant patient burden, but it has not attracted as much attention as some other cognitive problems in neurorehabilitation, such as Alzheimer's dementia or cognitive dysfunction from Parkinson's disease or multiple sclerosis. As a physician, that always struck me as being a disconnect. So when I proposed this conference to Drs. Jonathan Fellus, Bruce Gans and John DeLuca here at Kessler Institute and the Foundation we talked about how we hoped it would bring together neurology, neuroscience, and speech and language pathology. These disciplines have not banded together to advocate for the scientific agenda of treating aphasia, and we wanted to know if we could form a multidisciplinary grass-roots effort to build momentum, and put together a major research initiative, to address aphasia.

Focus: Who attended the symposium and what were the topics discussed?

Barrett: Most of the attendees were speech and language pathologists, but we also had psychologists, neuropsychologists, occupational therapists, physical therapists and nurses. I should point out that our speakers were not only pioneers in aphasia rehabilitation specifically, but also leaders in the interface

THE FRONTIER OF APHASIA TREATMENT

While aphasia is typically associated with stroke, it also can result from infection, neurodegenerative disease or traumatic brain injury. Treatment is generally centered around speech therapy to improve verbal comprehension and expression. But much like in spinal cord trauma and certain muscle injuries, it may be possible to use electrical stimulation to enhance recovery.

As discussed in panel presentations at the Kessler Foundation conference, noninvasively stimulating the brain via repetitive transcranial magnetic stimulation (rTMS) has shown promise as a possible treatment. This procedure introduces an electromagnetic field from outside the skull, and might be effective to improve speech production for people whose brain injury prevents fluid, clear verbal output. Findings from functional MRI studies suggest that some patients with aphasia may have excessive activation in some left brain regions, and that suppressing these areas electrically may improve language production. But the amount of improvement demonstrated in recent studies, though promising, has limited the broad applicability of this technique. Current studies, funded by the National Institute on Deafness and Other Communication Disorders, to investigate rTMS in patients with aphasia are under way. Researchers hope that these and similar work will clarify how best to treat this diagnosis and help patients regain their quality of life.

between this type of rehabilitation and medical care. That is, these were not individuals who specialized in one area to the exclusion of the other. They all have a broad background, and that was very important; we wanted to bring together a speech pathology audience with scientists outside the field to create more of a connection among clinicians.

The meeting was divided into three panel discussions and two plenary presentations in order to emphasize translational questions. We wanted the panels to focus on how current science on the medical treatment of aphasia could be brought into the clinical realm, and in the plenary sessions, discuss what this might mean for individuals with aphasia. For example, one of the plenary speakers, Micaela Cornis-Pop, Ph.D., of the VA Central Office in Washington, D.C., discussed how research initiatives might impact returning war veterans who have experienced stroke or traumatic brain injury.

Focus: From the discussions that took place, what outcomes emerged and what are your next steps?

Barrett: One specific product of the conference will be a manuscript based on the presentations, which we will submit to a peer-reviewed journal. This will be our first step in carrying the conversation about aphasia to a broader audience.

We also discussed the importance of establishing an aphasia research network. Creation of such a network needs to be launched out of a project like a manuscript publication: That generates response and interest and gets people from across the country working together.

Another possible outcome is a working group, which could convene at a national conference. We could then go from nine or 10 individuals interested in addressing this problem, to a group of 50, to eventually, we hope, 50 centers studying aphasia in a coordinated way. It's a stepwise process.

Overall, we probably generated more questions than answers, but one phenomenon that I felt truly optimistic about was mentioned by Ross Zafonte, D.O., chair of physical medicine and rehabilitation at Harvard Medical School, and Steven Small, M.D., Ph.D., professor of neurology and psychology at the University of Chicago. Both stated that there seems to be an orderly progression in how we develop large research initiatives, and for aphasia we may be at the point where, say, Alzheimer's disease was 10 years ago. Therefore, it could be an opportune time for generating an initiative and obtaining federal funding to support studies on aphasia treatment.

With Alzheimer's disease, lobbying and extensive research resulted in specialized state-funded centers, with both clinical and research activities, and increased federal spending on research. We might be close to developing something similar for aphasia that would allow for different kinds of research activities and relate them closely to patient care.

Focus: The fact that these sessions were organized without any prompting from an external organization or governing body is unique. Why is it important to the field to have these meetings where experts come together and dialogue?

Barrett: I think clinicians, especially academic clinicians but also those in high-profile settings like Kessler, want to be leaders. How can we lead? We can lead by doing excellent work with patients, through teaching excellence and by providing a network of clinical services. But also, we can provide a setting for advanced decision-making in the field, where ideas come together in science and clinical care. The only way to do this is to bring scientists to us and encourage a conversation. People use this in the business world as a technique to achieve goals; they hold focus groups, working groups and retreats to establish ideas. In medicine and rehabilitation, we tend to rely on what is traditional, and we may not necessarily think about what we could be doing that is different. In planning this conference, I feel we saw a gap, and began to fill it by implementing a process for change.

Working together, clinicians and research scientists can explore new ideas and avenues of treatment that will lead to advanced patient care.

Planning for change makes us drivers instead of passengers. To be at the forefront of medical rehabilitation or any discipline for that matter, we need to be willing to act as catalysts.

This conference was a collaborative, grass-roots initiative that generated many new and important ideas. It opened the door to future discussion and research opportunities that will hopefully lead to greater knowledge in our field and more advanced treatment for our patients, helping to further position us on the leading edge of rehabilitation.

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CHANGE IS THE ONLY CONSTANT

> The new health care law and related regulations promise a plethora of changes for rehabilitation hospitals and units. Is the field ready for the future?

BY BRUCE M. GANS, M.D.

HEALTH CARE PROVIDERS are still discovering all of the elements contained in the 2010 Patient Protection and Affordable Care Act (PPACA), a massive, 2,000-page bill, but it is now possible to focus attention on the parts that are most relevant to rehabilitation medicine. Here, *Focus on Rehabilitation* highlights some of the important risks and opportunities offered to the field from this legislation.

Defining the Details

Accountable Care Organizations (ACOs), mandated under the PPACA, are clusters of providers that come together to assume risk for certain patient populations in return for defined payments. Many hospitals and rehabilitation facilities are already aggressively pursuing these options.

The definition of basic benefits that must be included in insurance plans includes the words "rehabilitation" and "habilitation," but the details of what these will mean still need to be defined. The scope of rehabilitation benefits could be very limited or more expansive, and the participation of our professional organizations as public policy advocates on behalf of our patients could be key to determining this.

The field should consider how to respond to pilot projects for bundling services, even though the implementation of these projects is several years away. Participating acute care hospitals will be prepaid for their care plus post-acute care for selected diagnoses. Rehabilitation hospitals and units will need to negotiate with these hospitals about how and what to bundle and how to price their care.

Specific regulations will be developed to pilot the Continuing Care Hospital (CCH). It is time for rehabilitation hospitals and units to consider how they can partner, grow, change or adjust to become part of a CCH. Planning should begin now even though these pilot projects are several years away from implementation.

The medical home concept also will be supported. This will allow rehabilitation providers to create care systems for special needs populations and become their medical home. This is particularly relevant for some of our patients, such as those with spinal cord injury.

Health information technology is another opportunity supported by this recent legislation, and it is necessary that our facilities adopt electronic health records (EHR). We must not only computerize our own patient data but also have the ability to exchange data with other health care facilities, laboratories and physicians. We need to advocate to the federal government to provide additional financial support similar to the funding that acute care hospitals and physicians are receiving to adopt EHR.

A Fundamental Shift

The PPACA is likely to lead to broad changes in health care delivery that will impact our field in many other ways. This transformation could put acute care hospitals in control of much more patient care, altering our relationships with physicians and referral facilities. Reimbursement will shift, too, with more competition for reduced levels of funding, especially from Medicare.

Some rehabilitation providers could be driven out of the market, with individuals losing access to their services. At the same time, the demand for rehabilitation services will probably increase dramatically with expanded insurance coverage and an aging population in need of more care. Confusion in the marketplace will be rampant for years to come as patients and organizations try to learn what the law and related regulations require.

It is time for rehabilitation hospitals and units to consider how they can partner, grow, change or adjust to become part of a CCH. Planning should begin now even though these pilot projects are several years away from implementation.

To be successful under the PPACA, rehabilitation providers must be fully aware of the new rules. To manage costs, they will need efficient clinical data systems, as well as effective financial and reporting structures. Also vital will be good communication tools and excellent relationships with referral sources, physicians, patients and their families.

In this new climate, providers must have a willingness to continuously adapt and change as the health care field evolves. They will need a clear focus on quality care and service to patients and stakeholders, and they must maintain this emphasis even as the rules change.

CONCUSSION DISCUSSION

(continued from page 1)

when preinjury findings are available for comparison. Consequently, many high schools now perform ImPACT before their athletic seasons begin.

Underlying illness can complicate the diagnosis, particularly among military members, for whom the same event often results in both MTBI and post-traumatic stress disorder. These two conditions can be difficult to distinguish. Persons with cognitive impairment before the injury likewise present diagnostic challenges. A careful history and assessments help to reveal MTBI, distinct from other disorders.

Holistic Perspective

After initial stabilization and evaluation, the patient requires physical and cognitive rest. The need for the latter has only recently become appreciated; without sufficient respite, recovery will be delayed and possibly compromised.

The goals of Kessler's CR programs are to help individuals maximize their capabilities and independence. These aims are achieved through an evidence-based, holistic approach involving a multidisciplinary team including the neuropsychologist, nurse case manager, speech-language pathologist, and occupational, cognitive and physical therapists. A rehabilitation vocational counselor also focuses on return-to-work issues, speaking to employers as needed about accommodations and reduced schedules, or empowering patients to negotiate their own terms. The team works extensively with families, who play a key role in the recovery.

Individual and group CR programs assist in the reemergence of basic reasoning, provide practical strategies to overcome cognitive deficits, and aid in improving awareness, psychosocial adjustment, and managing reactive anxiety and depression. One-on-one sessions include psychotherapy, if warranted, and personalized development of skills and compensatory methods that enable patients to return to work, school, community or volunteer pursuits. Group activities offer opportunities for both support and mentoring.

In all cases, treatment is individualized according to a person's specific capabilities and goals.

Challenges, Advancements

Patients may have a negative psychological response after injury, which can manifest in "catastrophic thinking": an extreme, worst-case interpretation of their symptoms and perceived deficits. Executives and others accustomed to achievement are particularly susceptible. This outlook can be transmitted to other patients, especially in group settings. It is best countered by appropriate medical management of psychiatric/regulatory symptoms and redirection to a solution-based strategy. At Kessler, components of such a strategy include emphasizing residual cognitive strengths, refuting irrational thoughts, and developing return-to-work and activity plans.

New technologies can greatly enhance rehabilitation. Within an individual's functional and financial means, basic tools such as a paper-based planner or watch alarms can give way to a smart phone, which features reminders, task lists, and other aids to memory and cognition. Hand-held GPS systems help a person navigate to daily destinations, tracking progress and providing motivation along the way. Wii® and other computer programs also can be used to develop and monitor exercise programs, encouraging physical fitness.

With tailored, multidisciplinary rehabilitation, most patients with MTBI can optimize recovery and resume meaningful and productive activities.

DID YOU KNOW?

- An estimated 1.3 million cases of mild traumatic brain injury occur annually in the U.S., including 63,000 among teenagers.
- Sports are a major contributor—4 to 20 percent of U.S. football players sustain mild TBI each year.
- Headache is the most common symptom; loss of consciousness (LOC) is infrequent (fewer than one in 10 cases).
- Repeat injury is four to six times more likely after initial concussion and tends to be more serious.
- Memory impairment, rather than LOC, may better predict injury severity.
- Neuropsychological assessment and neuroimaging are critical to establish a baseline and monitor progress.

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JOINT EFFORTS

> Optimizing joint replacement rehabilitation requires incorporating the most effective therapy modalities and regular consultation with the referring surgeon

BY SHAILESH S. PARIKH, M.D.

THE GOALS OF INPATIENT rehabilitation after joint replacement are to return the patient to maximal functional activity, prevent postoperative complications, and educate the individual about living with the new joint. Achieving the best outcomes requires evidence-based communication among members of the rehabilitation team, the referring orthopedic surgeon and the primary physician.

A Mix of Modalities

Interdisciplinary rehabilitation at Kessler Institute for Rehabilitation includes at least three hours of physical and occupational therapy daily. These modalities address flexibility, strength and range of motion (ROM) as well as independence in performing activities of daily living; adaptive strategies; improvements in gait, balance and proprioception; and education in assistive equipment.

Exercises can include isometric contraction of leg muscles, heel slides, knee extension and hip abduction. Transfer practice, walking and stair climbing with precautions are important for functional training. All team members should know the weight-bearing and ROM precautions advised by the operating physician. These should be modified as recovery evolves, in regular consultation with the orthopedist.

Continuous passive movement (CPM) utilizes a machine to passively flex and extend the knee after surgery. Its effectiveness and long-term value are questionable, however. In fact, with aggressive physical therapy, CPM has proved unnecessary.

Following Protocol

The major complications after joint replacement include deep-vein thrombosis (DVT), infection, contractures and dislocation following hip replacement. In all cases, the protocol of the referring orthopedic surgeon should be followed, with deviations discussed proactively.

Pain must be monitored and managed to enable patients to actively participate in a comprehensive therapy program and optimize individual recovery. Anticoagulants, along with foot- and ankle-pumping, compression stockings and walking, are used to prevent DVT and pulmonary embolism. Fever accompanied by chills, sweating, and/or increased pain, excessive drainage, unusual redness, warmth or swelling at the incision indicate possible infection; communication with the referring surgeon is critical in such cases.

A pillow under the ankle of a healing knee will aid in achieving full extension. But in total knee replacements, such support under the knee increases the risk of flexion contracture, possibly jeopardizing functional gain. Most surgeons therefore recommend a knee immobilizer at night for at least three to six weeks, although some allow discontinuation when the patient can perform a straight-leg raise unassisted. Protected weight-bearing, initially with a walker and progressing to a cane, also is advised until the quadriceps heals completely and regains strength.

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