

Rehabilitation

SUMMER 2010

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TAKING A NEW VIEW



Ultrasound technology offers a deeper look into diagnosis and treatment for physical medicine and rehabilitation

JEFFREY L. COLE, M.D.



Static and dynamic ultrasound imaging can aid clinical diagnoses and treatment plans.

tendon and nerve structures in static and dynamic situations. In a static image, the US echo provides the location of a structure and captures the intricate parts of the anatomy. In dynamic applications, the image allows clinicians to visualize the relationship

FOR THE CLINICAL PHYSIATRISTS on staff at Kessler Institute for Rehabilitation, ultrasound (US) is a musculoskeletal imaging tool that has become synonymous with improved patient safety and treatment efficacy. And as the technology continues to advance, it is evident that the impact of US comes from providing clinicians a picture that is worth far more than a thousand words.

Dual Applications

The mechanics behind US are relatively straightforward. An image is produced by sound waves that are bounced (or "echoed") off structures within the field of view. The image captures both anatomy and movement and can identify a range of pathologies, including tears, congenital variations, fluid, swelling and presence of masses.

In general, application US is used primarily for the evaluation of joint, muscle,

between tendons and muscles, and the joints that they are working around. For example, imaging a patient's shoulder while he or she is lifting the arm helps the clinician follow each tendon and determine whether the tendon or muscle is impinged and at what point in its range.

Achieving Optimal Outcomes

In the rehabilitation setting, US technology is utilized for both diagnosis and treatment, particularly for focal nerve injuries. The echo identifies the location of the anatomical change as well as the probable causes, thereby aiding in differential diagnosis. In extremity nerve entrapments, US imaging can follow the course of the nerve to determine if it is injured or entrapped under a ligament, across a bony process, or under or through a muscle.

Additionally, when the area being viewed is swollen, US allows

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FOCUS ON

Rehabilitation

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HOME REMEDY



The concept of a medical home has existed for years, but it just may provide new opportunities for innovation



THE 2010 PATIENT PROTECTION and Affordable Care Act (PPACA), an enormous, 2,000-page bill, contains authorizations for many demonstration projects. One pilot project of particular interest for the field of medical rehabilitation is called the “medical home.”

A medical home refers to a care delivery enterprise (overseen by physicians) that will coordinate and deliver medical care for a specific patient population. The overall goals are better health outcomes and less total health care expenditure. While the medical home concept has been promoted by several medical specialty groups, including the

American Academy of Family Physicians, American College of Physicians and American Academy of Pediatrics, physical medicine and rehabilitation may also have the opportunity to adopt this concept.

The notion of a medical home is actually not new to our field. Rehabilitation medicine has long relied on a case management model, and we have a history of serving as primary care resources for many of our patients. We already manage long-term, coordinated care for individuals who have certain conditions such as spinal cord injury (SCI) or traumatic brain injury (TBI). These patients have lifelong needs, and rehabilitation medicine integrates their social and functional issues with their medical requirements, providing both outpatient and inpatient care.

The history of rehabilitation medicine’s pursuit of this approach dates back to the 1980s and 1990s. At that time, the proposed care model was called primary care for the disabled rather than a medical home. Conferences were held, research was conducted, journal articles were published, and pilot programs were operated in Michigan and elsewhere.

The primary care model for rehabilitation medicine was not widely adopted because of a lack of generalizability across rehabilitation institutions and providers, and a lack of sustainable reimbursement options. What was learned from those efforts, however, should be of great value to us as we consider the medical home concept. This is especially true since the model would include a funding mechanism for the care coordination function, something sorely lacking in previous efforts.

Physicians and hospitals working together could form a medical home for our patient populations, including those with SCI, TBI, amputation or other relevant conditions. We could build upon the existing research on clinical care models to identify how to best provide medical, functional and case management services, as well as how to capture information about the care that is being provided. We could further refine financial models to determine costs and the reimbursement that would support the medical home approach to care.

The field of physical medicine and rehabilitation should develop new medical home programs based on clinical and financial models that are replicable and generalizable. The greatest need at the moment is to identify people who are willing to work together to create or adopt clinical standards and to refine financial models to create a medical home model that will work well for providers, institutions and, above all, patients.

What is old is sometimes new again. The medical home model is an idea ripe to be adopted and adapted to the needs of our patients.

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

GAINING CONTROL



Managing drug-resistant infections in the rehabilitation setting requires careful evaluation of treatment options and a system-wide approach to containment

CRAIG EICHNER, M.D., AND RITA GUELLNITZ, R.N.

INAPPROPRIATE ANTIBIOTIC usage has been linked to the emergence of several drug-resistant microbial strains. Bacteria are particularly efficient at developing drug-resistance, since they multiply rapidly and can transfer their resistance genes as they replicate. Patients arriving at Kessler Institute for Rehabilitation often are predisposed to the risk of developing a drug-resistant infection because many have received antibiotics during their hospital care or are treated with therapies that have a greater chance of infection, such as urinary catheters, mechanical ventilation or vascular access.

Pathogens of particular concern at Kessler are *Clostridium difficile* (C diff), Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-resistant *Enterococci* (VRE) and extended-spectrum beta-lactamases (ESBL) organisms. It is not uncommon to see a pressure ulcer that grows MRSA in a spinal cord patient or the elderly with C diff diarrhea.

Treatment Strategies

Although there are still a few antibiotics available to treat these infections, there is a greater opportunity for drug-resistance to develop when antibiotics are used for too short a period of time or too low a dose, or for the wrong pathogen. This includes the use and overuse of broad-spectrum antibiotics.

Instead of automatically treating a positive culture, it is important to differentiate between colonization and infection. A patient who does not appear ill or present with clinical symptoms of an infection may be able to mount an immune response to prevent infection. It often is prudent to observe the person for signs and symptoms of an active infection before initiating antibiotic therapy.

When an individual is symptomatic, appropriate treatment includes a broad spectrum agent until a final culture and sensitivity report is available. Positive growth, if any, is usually noted within 48 hours of a culture, with full identification and sensitivity available in another 24 hours. Switching from a broad-spectrum agent to a culture-specific antibiotic is essential as soon as the sensitivity is available.

Preventing Spread

The Antibiotic Stewardship program at Kessler monitors all antibiotic use and laboratory results. A pharmacist may suggest switching from intravenous to oral therapy or from a broad-spectrum to culture-specific antibiotic if it has not been done at the appropriate time. This program will develop into a comprehensive medication therapy management system, complete with restricted access to certain antibiotics.

Kessler actively tracks all infections, with particular focus on the most prevalent: urinary tract, pneumonia, ventilator-associated, central-line associated and surgical site infections. "Bundles," developed by The Institute

for Healthcare Improvement (IHI), have been adopted to define individual processes and steps to minimize infection risks. For example, key components of the IHI central-line bundle include: hand hygiene, maximal barrier precautions upon insertion, chlorhexidine skin antiseptis, optimal catheter site selection, and daily reviews of line necessity.

Ordering isolation precautions for an infected patient triggers a series of directives that also protect the health care workers. When a positive culture verifies infection, the individual may be moved to a single room if warranted. Staff is required to wear personal protective equipment (PPE) for any direct contact. In the past, splashing of body fluids placed employees at a relatively high risk for infection until Occupational Exposure Monitoring discovered a link to inaccessible PPE and the situation was quickly corrected.

Reducing drug-resistant infections is critical to providing the best possible patient care. It takes the conscious effort of every employee to minimize the risks. Attending educational initiatives and complying with infection control programs have allowed Kessler staff to achieve the current level of success.



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SETTING THE RECORDS STRAIGHT



Two experts reveal the keys to successfully selecting and implementing an electronic health record system in the rehabilitation hospital setting

JOAN ALVERZO, PH.D., CRRN, AND JAMES TALALAI

REHABILITATION HOSPITALS face increasing pressure from the federal government to adopt an electronic health record (EHR) system to improve quality of care and reduce health care costs. Organizations must eventually collect and report quality metrics under the recent health care legislation, and this adds even more pressure to find and install the right EHR system. Kessler Institute for Rehabilitation, a Select Medical company, began this process several years ago and installed an EHR in 2005. Kessler continually updates and upgrades this system to meet the changing needs of its patients and staff and the requirements of government regulations.

James Talalai, executive vice president and chief information officer, Select Medical Corporation.

Focus on Rehabilitation: Were you able to select an EHR designed specifically for rehabilitation?

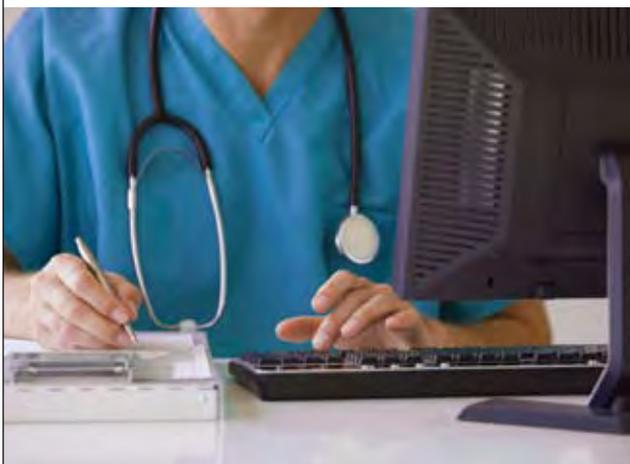
Joan Alverzo, Ph.D., CRRN: When we began this process, no vendor had yet developed a complete package for the rehabilitation hospital. The rehabilitation setting is unique in that care is delivered in multiple areas and not just in the patient's room, as in the acute care hospital model. Individuals are moved between nursing and physical therapy for example, and we need

James Talalai: A wide variety of hardware is needed, and it is essential to listen to clinicians and staff to understand the specific requirements for their clinical needs. Every environment in the hospital is different. In some areas mobile carts will work best, while fixed devices near each hospital bed are better suited to meet other needs, and handheld devices may be the best option in certain other clinical settings. When selecting software it is equally important to match requirements to needs.

Focus: What do you view as the key benefits of installing EHR systems into rehabilitation hospitals?

Alverzo: Once implemented, an EHR creates certain efficiencies and standardizations with documentation. This is particularly important to help us meet all of the regulatory compliance measures, including the upcoming requirements for collecting quality data. EHR will be the platform that all health care will use in the future, and it makes sense to adopt a system now rather than waiting until it is compulsory. We also find that having an electronic file of all patient records not only saves on storage costs but also gives us the ability to easily access old records.

Talalai: The long-term benefit is to improve continuity of care for any given patient, which we hope will improve outcomes and reduce costs. For example, data collection via the EHR system will help us advance our research in evidence-based medicine and best practices. Similarly, a reduction of duplicate diagnostic testing will lead to better care and cost efficiencies. EHR systems also offer the possibility to implement electronic medication administration records (EMAR), which provides the ability to



The team at Kessler and Select Medical Corporation has implemented the same system at two other hospitals and are in the process of installing it at a third. *Focus on Rehabilitation* discussed the selection and implementation of EHR systems with two experts from the team, Joan Alverzo, Ph.D., CRRN, vice president for the Rehabilitation Division, Select Medical Corporation, and

the therapist to be able to review nursing notes and vice versa. Some companies had developed smaller niche products to serve rehabilitation clients, but none of these were comprehensive EHR systems. We evaluated a number of packages and found that the most suitable EHR product was the same one used by Select Medical Corporation, our parent company. We then modified and extended the technology to further meet Kessler's specific requirements. This approach helped to simplify the overall process by eliminating the need to build an interface between our computer systems.

Focus: What are the unique challenges in selecting EHR hardware and software for a rehabilitation hospital?



FOCUS ON SECURITY

Ever since the Health Insurance Portability and Accountability Act (HIPAA) was introduced in 1996, health care providers and employees have become increasingly knowledgeable about the need for secure patient records. All parts of the EHR system, and patient data in particular, must be protected constantly with regularly updated security protocols. Hard drive encryption is essential, for instance, and any e-mail containing patient data that goes outside the institution must also be encrypted. An EHR system requires identity management as well; all personnel must use the correct password and protocol every time someone logs on to the EHR. This ensures that the institution can readily identify the person who accesses any particular piece of data at a given time.

Tight security for an EHR must be balanced with staff access to that system. Hospitals are 24/7 operations, and a nurse must be able to access the EHR any time of the day or night even if something goes awry with that person's password-protected clearance. The hospital must maintain close collaboration between its clinical staff and IT department so that any problem with access or workflow function can be solved quickly.

scan a drug name, as well as the patient's and health care staff's identifications, safeguarding medication administration, so that you know when a drug is administered, to whom, and by whom.

Focus: What challenges did you face when launching your EHR at Kessler?

Alverzo: An EHR system is complicated and can be difficult to implement, and people's expectations always exceed what any EHR can deliver. It is a challenge to manage these expectations while building support and enthusiasm for instituting a computer system. Another important issue is training. I find it is critical that the ultimate trainers be your own staff, and we use a model called "Train the Trainer." We create a group of internal expert peers, and they become the trainers for the rest of the staff, as opposed to having the EHR company provide all instruction. It's important that everyone on staff complete appropriate training in a relatively short time period before the EHR goes "live" to avoid any big lag times between training and implementation.

Talalai: Cost is an issue for anyone implementing an EHR. In addition to software and hardware expenses, you must plan for the cost of training and the fact that staff may need to do extra work until the system is fully integrated. Another limitation is the lack of complete interoperability between different systems used by different components of the health care network, for example, laboratories, hospitals, physicians' offices and government agencies. We believe the field



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will eventually correct this with ever-improving technology and a drive toward improved standards of interoperability, but it remains a challenge.

Focus: What are your tips for a successful implementation plan for a hospital installing its first EHR?

Alverzo: Build a coalition of key players before you even begin. These are the people who agree to own the project and are committed to making the new EHR system work. These might include physicians as well as other operational leaders from nursing, pharmacy and/or physical therapy. You also need considerable preplanning to understand how your workflow processes operate now and how the system will replace them. At the same time, you have to be willing to make some operational adaptations so that your work will flow seamlessly with the EHR system. Lastly, the project needs a champion, an individual who can keep everyone focused and drive the resolution of any problems so that the implementation will be successful.

Talalai: I recommend that the hospital tap into corporate steering committee oversight and buy-in. As a leader for the implementation process, you must communicate in a positive way and on a regular basis that the EHR is coming, that it is an institution-wide effort, and that the primary focus is to improve patient care. You can also use the key internal players that Dr. Alverzo mentions to provide long-term feedback that will allow you to fine-tune the EHR system in an ongoing basis.

A THREE-PART APPROACH

> New health care legislation will require the field to tackle the issues of the basic benefit plan, CCH/bundling and quality reporting

BRUCE M. GANS, M.D.

THREE SPECIFIC ASPECTS of the Patient Protection and Affordable Care Act (PPACA) provide opportunities for physical medicine and rehabilitation to take immediate action. Even though the legislation has just been passed and the necessary regulations have not been written, it is not too early for the rehabilitation field to anticipate and start planning for these three issues.

First, the federal government will be defining what constitutes essential

Bundling Up

Second, the legislation mandates pilot projects to evaluate the continuing care hospital (CCH) model and systems for “bundled payment” for post-acute care. The CCH has been described in earlier columns. In brief, it combines the inpatient rehabilitation hospital or unit (IRH/U), long-term acute care hospital (LTACH) and hospital-based skilled nursing facility (SNF) into one enterprise, either in one physical location or as a virtual hospital.

care hospital will become the customer of the IRH/U and others.

With this in mind, it is not too early in the process for IRH/Us to go to key referral hospitals to discuss how to work together to become part of an anticipated bundling arrangement. Rehabilitation hospitals and units could also start to form alliances with LTACHs and hospital-based SNFs in anticipation of the changes that PPACA will bring.

Quality Considerations

Third, the PPACA mandates quality reporting by IRH/U, as well as LTACH. Rehabilitation hospitals and units will need to be prepared to compile and report these quality metrics once they have been defined.

While we don't know exactly what the specific reportable quality indicators will be, there are a set of voluntary elements in the Medicare Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) that relate to quality. Some items in this voluntary list may become part of the future mandated list.

A starting point for an institution not currently gathering these quality data would be to begin consistently collecting and reporting them. Institutions could also analyze their data and use it to improve patient care. Organizations taking these actions will be that much further ahead once mandatory quality reporting is introduced, even if the reporting parameters change.

These three significant issues—the basic benefit plan, CCH/bundling and quality reporting—provide us with excellent opportunities to prepare for the possibilities and challenges offered by the PPACA.

A starting point for an institution not currently gathering these quality data would be to begin consistently collecting and reporting them. Institutions could also analyze their data and use it to improve patient care.

health insurance benefits. All health benefits plans (except certain grandfathered plans) will be required to offer, at a minimum, this essential health benefits package effective Jan. 1, 2014. Since “rehabilitation” has been included as part of the basic benefit plan, it is now up to the regulators to articulate what specific elements of rehabilitation will be covered. The field will need to advocate for the broadest possible scope of services embraced by this language.

Also, the federal benefit definition will tend to be a model, therefore individual facilities and providers could begin working now with commercial insurers to encourage them to define and adopt the best rehabilitation benefit for their contracts. Admittedly, that might not be the easiest thing to do, but it will help to build awareness of these issues.

Separately, a “bundled payment” would combine reimbursement for the acute inpatient hospital, physicians and post-acute care (including rehabilitation), for a given episode of care. The inter-relationship between CCH and bundling pilot programs is undefined at this time.

Anticipating the development of the CCH, institutions can begin to define what they would like to see in terms of grouping services across the traditional settings of IRH/U, LTACH and hospital-based SNFs. Institutions could even put together packages of services to sell to commercial insurance carriers right now.

If the acute care hospital “owns” the bundled payment, it will then be the decision maker as to how much to pay and from whom it wishes to purchase post-acute services. The acute

TAKING A NEW VIEW

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practitioners to avoid relying solely on the clinical examination, which can be insufficient and requires additional imaging to confirm diagnosis. Asking for authorization for supplementary radiographic imaging (for example, an MRI or CT scan) can significantly delay treatment. In contrast, by more quickly identifying problems and more accurately differentiating diagnosis, US helps preclude the need for additional imaging studies, other rehabilitation services or medication trials. Also, refining the diagnosis can enhance the plan of care thereby speeding up treatment and allowing for implementation of an efficacious rehabilitation services program.

Images from US also assist clinicians in specifying the type of therapy needed by accurately revealing diagnostic severity. For severe injuries, surgery might be considered. If an injury is moderate, a local injection can be provided in a safer manner. For mild traumas in which dynamic imaging shows the anatomical problem is potentially intermittent, medication, splinting or bracing, and/or physical or occupational therapy could be offered.

Above and beyond these benefits, however, the ability of US to locate structures and detect anatomical variations has been one of the greatest additions for patient safety during interventional procedures in the past few years. For example, when performing muscle biopsies, US assists in evaluating muscle thickness to improve diagnostic yield, visualizing subcutaneous tissue and locating blood vessels and nerves. Recently, when performing a quadricep muscle biopsy on a tetraplegic patient with a femoral artery that could not be palpated, US imaging indicated the artery was more lateral in the thigh. Without such equipment available, biopsy and subsequent piercing of the artery could have seriously compromised the safety of the patient.

Forging Ahead

Diagnostic US is not new. It has been in wide use for cardiac valve studies since

the 1970s and for obstetrical imaging since the 1980s. Its use for musculoskeletal imaging is relatively recent, however. The technology has improved since its inception, with availability of higher frequency (12-14 megahertz) units providing much better image resolution. These advances also offer more powerful control and superior depth visualization. The concurrent use of Doppler within US machines helps define vessels that may otherwise be difficult to visualize. Furthermore, the ability of US equipment to store and print images makes it a source of reliable documentation that can be accessed if repeat procedures are clinically indicated.

Unfortunately, because of the high cost of better-quality US machines, and the skill set and experience required to apply diagnostic US (see "From the Classroom to the Clinic"), there are many hospitals and clinics where the technology could improve a patient's treatment and increase safety, but it simply is not offered. Kessler has provided both diagnostic and image guided US for musculoskeletal problems for the past five years. The organization has been committed to remaining at the forefront of applying this highly effective imaging technique and disseminating sound teaching to staff and residents, thereby achieving superior clinical outcomes for our patients.



FROM THE CLASSROOM TO THE CLINIC

The greatest shortcoming in the use of ultrasound (US) imaging is most often the experience and knowledge of the physician. Successful use of US requires a combination of operator skill and the patience to properly define the structures within the field. Operators must differentiate normal from abnormal anatomy and recognize the changes US will reflect as a result of scar tissue, muscle

atrophy and the healing processes. Years of experience are needed to be truly versed in this modality to take full advantage of all its capabilities. Training should extend beyond the clinical setting to include an in depth knowledge of the US equipment's potentials and shortcomings.



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BACK ON TRACT

 The high prevalence of urinary tract infections following spinal cord injury presents unique challenges in prevention and effective treatment

TODD A. LINSENMEYER, M.D.

URINARY TRACT INFECTIONS (UTIs) are the most common type of infection experienced by individuals with spinal cord injury (SCI). Because these injuries typically result in neurogenic bladder, most patients will have at least one or two UTIs per year. An awareness of the definition, pathophysiology and symptoms in this population is helpful in preventing bladder infections and providing effective treatment.

Clarifying the Diagnosis

In order to differentiate UTI from bacterial colonization, which can be benign and does not necessarily indicate infection, a person with a neurogenic bladder should be evaluated to determine whether three diagnostic criteria are met: bacteriuria, pyuria and new onset of UTI-related symptoms. Such symptoms most commonly include odor and cloudy urine. There may be more generalized symptoms, however, such as increased bladder spasticity or autonomic dysreflexia. Fever is extremely rare with a bladder infection and generally signifies a kidney infection or some other cause of infection. A 2003 study at Kessler Institute for Rehabilitation found that nearly 40 percent of SCI

patients were inaccurate at predicting whether or not they had a UTI based on their symptoms; therefore, a patient who reports possibly having a UTI should always be examined for other potential causes.

While some patients prefer to delay treatment until after culture results can confirm diagnosis, empiric treatment is often instituted while waiting for the outcome of urine lab tests. Laboratories should be instructed to culture all organisms since, in individuals with SCI, there are frequently multiple organisms in the urine. Another Kessler study found that antibiotics usually cause UTI symptoms to subside, but if the organisms are found to be resistant, there is a 40 percent chance of recurrence. Therefore, repeat cultures may be necessary, even if a patient reports improvement following the pre-emptive antibiotic.

An Ounce of Prevention

Since SCI populations are vulnerable to UTI, preventive care is key. One of the best instructions to give patients is to keep the bladder from becoming over-distended. Bladder distention causes a relative ischemia of the bladder wall and/or small tears in the mucosal lining, allowing tissue invasion of the colonized organisms within the bladder. An important cause of distention among patients with an indwelling catheter is an overfilled leg bag. This produces enough pressure to prevent urine drainage from the bladder, resulting in retention. If a person continues to develop recurrent bladder infections, a urological evaluation will often help to determine the cause.

The importance of patient education in this population underscores the need for clinicians who understand the pathogenesis of UTI following SCI and can guide individuals in effective self-care strategies.



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