

Rehabilitation

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When Ventilators Are Required

Managing ventilator patient care in a rehabilitation hospital

■ BARBARA BENEVENTO, M.D.

Managing the rehabilitation of patients on ventilators involves a complex course of medical care that requires collaboration among a specialized team of healthcare practitioners.

At any given time, Kessler Institute for Rehabilitation cares for an average of six to eight patients on ventilators, individuals who are admitted to the hospital with neuromuscular diseases or restrictive lung disorders, such as spinal cord injury or traumatic brain injury, or with a dual diagnosis. Depending on the primary diagnosis, the time a patient spends on the ventilator may vary. Some may demand 24-hour ventilatory support; others may need intermittent support during the day; and some require only nighttime ventilation.

Acute Setting

In the acute care setting, ventilator therapy is often considered a short-term solution to improve oxygen exchange and avoid lung injury as the patient is stabilized following injury. Weaning the patient off the ventilator as quickly as possible is a primary goal.

Patients are often managed following a ventilator protocol that includes low tidal volumes, small-diameter tracheostomy tubes and frequent patient suctioning. These techniques are associated with recurrent pneumonia

and the need for repeat bronchoscopy, factors that may delay moving the patient into rehabilitation.

In general, maintaining pulmonary stability and preventing respiratory complications are paramount. Patient care is individually planned based on acuity and medical complications rather than a strict protocol.

Rehabilitation Care

The Kessler approach to managing ventilator patients is to increase the tidal volume while closely monitoring pressures in order to maintain opening of the small airways and therefore promote secretion mobilization. The use of the Cough Assist replaces traditional suctioning with a suction catheter.

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FOCUS ON

Rehabilitation

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Health Reform Needs for Persons with a Disability

It is likely that the nation will embrace healthcare reform (HCR) as a priority after the next presidential election. Each candidate has adopted HCR as a major campaign-platform component. This is our field's opportunity to draw attention to the fact that the special needs of persons with disabilities (PWD) are not being met. We should prepare ourselves to speak out loudly as a voice for change during the upcoming reform efforts.

Persons with disabilities constitute a heterogeneous group with no common age, gender, or social, ethnic, religious or geographic feature. Because it is so multifaceted, it is an extremely vulnerable minority. With so many different faces and voices, this group is often marginalized, and the power of its collective voice may be lost.

What's more, this group is challenged by several important health issues, including access to the right kinds of acute and chronic disease management. Their primary care needs are unique; physical and logistical access to primary care is frequently a major problem. Because many disabling conditions are actually rare, a significant number of providers and payers are ill-equipped to understand and provide for proper medical and rehabilitation needs.

Our system of health insurance typically discriminates against PWD. The ubiquitous caps on services that impose lifetime limits for people who require long-term care inadvertently punish the neediest. We often see insurers impose inappropriate restrictions on access to the rehabilitation needs of PWD. Other problems include ever-increasing premiums, co-pays and deductibles; limited numbers of qualified providers in networks; complicated coverage rules; and lengthy appeals processes. As a result, PWD often are underserved and may become impoverished by health and rehabilitation expenses. Unfortunately, this minority group will be among the least able to speak out during the upcoming national healthcare discussion.

Providers of rehabilitation services must be prepared to assist PWD by joining the healthcare reform debate and articulating the principles that should be incorporated into the next version of the U.S. healthcare system. Accommodating the health and rehabilitation needs of PWD should be a fundamental objective for healthcare reform. Arbitrary dollar or service caps are irresponsible. Instead, appropriate utilization restraints should be developed that are based on both medical and functional need. Healthcare systems should promote fitness and well-being as well as illness treatment, and recognize quality of life and longevity as important goals.

Our patients face unusual, complex situations, and their access to appropriate specialty providers and services should be encouraged by our healthcare system. Their access to primary care should be incentivized, and transportation to needed medical services should be a covered benefit. The International Classification of Functioning, Disability and Health, the World Health Organization's model for describing health and disability, should be adopted as a framework for establishing benefits of a healthcare reform plan.

By working together with consumer groups and health policy advocates, the field of medical rehabilitation has a once-in-a-generation opportunity to dramatically enhance the quality of health and life for persons with disabilities in our nation.

Bruce Gans, M.D.
Chief Medical Officer



Treating Back Pain

Invasive procedures in the management of one of the most common medical conditions

■ JEFFREY L. COLE, M.D.

Back pain is one of the top four reasons patients seek medical care. It is often associated with deconditioning, overexertion, poor body mechanics or trauma. Or it can result from the natural aging process, obesity or diseases such as diabetes, lupus or cancer.

Regardless of the source, studies have shown that one-third of all Americans suffer from pain in any given month, and between 70 and 90 percent of adults will suffer from this condition at some time in their lives. A February 13, 2008, article in the *Journal of the American Medical Association* placed the price tag for treating back and neck pain at \$86 billion per year. Only expenditures for heart disease and stroke rank higher.

Start with the Basics

To date, no single therapy has proven to be the ideal method of alleviating back pain. However, conventional therapy, particularly in the acute phase, should always precede more interventional treatments. When rest and nonsteroidal anti-inflammatory medications (NSAIDs) do not resolve the pain, then a standard physical therapy program for stretching and strengthening may be initiated.

By the time Kessler clinicians see patients with back pain, most have already run this gamut. Still, the hospital performs an in-depth evaluation, which backtracks to the beginning. The No. 1 responsibility is to make sure that

a patient has had a proper and complete work-up. This involves a review of medical history and related treatment to ensure that critical areas have been addressed, including evaluating all films and images. After that, the physician performs an intake to find out what therapies had been tried to compare what failed versus what worked.

After thorough analysis, a comprehensive, conservative treatment plan is developed. This may be as simple as a change in medication. For example, articular problems respond better to ibuprofen than naproxen because the latter doesn't penetrate joints well. Sustained-release drugs may eliminate breakthrough pain. Even if a person has the right medications and treatment plan, mitigating factors could cause problems, such as bad biomechanics, bad positioning or a persistent activity that continues to induce trauma.

Conservative care attempts to alleviate pain, restore function and provide protection to an injured area. These treatments can be both diagnostic and therapeutic. If an appropriate spinal orthosis relieves a patient's pain, this can provide information about the source of the problem, and what other interventions may be best suited to help.

Getting More Aggressive

When pain persists after conservative treatments, advanced imaging techniques and electromyography

(EMG) may help pinpoint the problem's origin. In addition, minimally invasive procedures, such as nerve blocks, are considered—again, both for diagnostic and treatment benefits. When you block a nerve and the person feels better, then it's clear that the anatomical site or tissue is causing the problem.

Nerve blocks may be performed under fluoroscopic, ultrasound or EMG guidance in an outpatient setting, which is an attractive option for patients. Because nerve blocks are not considered permanent procedures, they may be repeated with a high degree of safety. One of the oldest patients Kessler sees routinely for nerve blocks is a centenarian.

Open surgery is the most invasive intervention for back pain. In fact, except in cases of severe spinal stenosis when cord compression poses an imminent danger, it is considered a last resort.

Throughout this continuum of care, from NSAIDs to open surgery, the same rehabilitation principles underscore the ultimate goal of returning the patient to the highest level of functioning possible. There is no one answer. But there is a time and a place for all these remedies.

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A MUST-READ

Pain medicine was recognized as a subspecialty in 1998. Today, neurology, anesthesiology, psychiatry, and physical medicine and rehabilitation programs offer accredited fellowships in pain medicine.

Jeffrey Cole, M.D., is representing the American Board of Physical Medicine and Rehabilitation on an expert panel convened by the American College of Occupational and Environmental Medicine. He and 17 other physicians on the panel are writing a textbook on best practices for interventional and pharmacological pain management. The book will be published this spring.

The Changing Face of Medical Rehabilitation

The responsibilities of hospitals and healthcare practitioners amid the 60 Percent Rule

The 2007 Medicare, Medicaid and SCHIP Extension Act signed into law on December 29 includes provisions of particular interest for inpatient rehabilitation hospitals and units (IRH/U). The law permanently sets the so-called “75 Percent Rule” at 60 percent compliance. The rule had previously stipulated that by July 2008 at least 75 percent of patients discharged from an IRH/U must be diagnosed with one of 13 specific conditions in order for the hospital to

Pomeranz, M.D., medical director of Kessler Institute for Rehabilitation, to discuss the treatment decisions for patients who fall outside this list.

Focus on Rehabilitation: Please give us your perspective on the recent changes in the CMS “75 Percent Rule.”

Bruce Pomeranz, M.D.: These changes are important steps in the right direction for patients who medically need access to hospital-level rehabilitation. The move to a “60 Percent

instead of actual medical and rehabilitation needs. Physicians assess the needs of each patient in terms of what is medically necessary, instead of considering rehabilitation needs solely in terms of a diagnosis. They determine the setting appropriate to treat these patients so that they will be medically well, functionally independent, and back in their home environments as soon as possible. A skilled nursing facility (SNF) is appropriate in some situations; however, many individuals with medically complex conditions are more likely to have better medical and functional outcomes in an IRH/U. It is important that each patient be treated in the proper setting, to achieve the best outcome, and to return home as quickly as possible.

Focus: How does Kessler Institute for Rehabilitation approach the treatment of patients whose conditions fall outside of the CMS list?

Pomeranz: Kessler strives to provide state-of-the-science treatment, including attention to all of the little pieces that must come together for optimal care. Of course, this applies to all of our patients, regardless of diagnosis. For example, our clinicians evaluate each patient thoroughly, providing a comprehensive assessment of his or her multidisciplinary needs. They formulate a goal-focused care plan for each patient, and regularly update this plan and revise goals as needed. Our team also has access to the latest rehabilitation technology, and individual practitioners thoughtfully consider how these technological advances can make a difference in the patient’s outcome and quality of life. That said, we know that there is no substitute for the expertise and availability of skilled rehabilitation physicians, nurses and therapists.

Standardized instruments and clinical judgment are routinely used to assess outcomes. Practitioners reexamine the situation regularly to assure that the patient is making appropriate progress. They help plan carefully for the transition home, and focus on education and training for the patient, families and caregivers. They also

Kessler encourages hospitals not to regard the **60 Percent Rule** as an admission criterion or guide for clinical decision making, but rather as a **standard to be complied with for reimbursement purposes.**

maintain inpatient rehabilitation facility status and receive Medicare payments as a rehabilitation hospital. The 2007 legislation also continues inclusion of comorbidities to determine compliance with the 60 percent threshold.

While these new provisions provide significant relief to IRH/U hospitals, many patients do not fit the Centers for Medicare & Medicaid Services (CMS) list of 13 diagnoses, including those individuals with cancer, respiratory disorders, chronic pain, major organ transplants or severe debility. *Focus on Rehabilitation* spoke with Bruce

Rule” and the consideration of comorbidities at least reduces concerns that patients who need rehabilitation in an IRH/U will be denied access. However, the CMS rule still does not take into account the medical complexity and functional deficits involved in treating many conditions that are not among the 13 diagnoses.

Focus: What are your chief concerns for patients who fall outside the 13 categories?

Pomeranz: There is a critical flaw in the premise of the rule, which uses a diagnostic list as substitute criteria



Exclusions from the CMS List of Conditions for IRF Status

- **CANCER.** Associated medical problems include muscle wasting, neurological issues and debility arising from surgery, radiation, chemotherapy and treatments such as stem cell transplants. Acute care hospitals, under pressure to decrease patient length of stay, often cannot address these issues comprehensively before releasing patients. Inpatient rehabilitation hospitals and units (IRH/U) have the staff and expertise to help these patients regain functional independence.
- **CARDIAC CONDITIONS.** Patients with serious heart disease-related health complications, as well as those requiring post-surgical and transplant medical care and rehabilitation, can benefit from the specialized treatment provided by an IRH/U.
- **RESPIRATORY DISORDERS.** Patients with tracheotomies or compromised respiratory reserve need expert respiratory medical care and well-integrated physician and nursing management that an IRH/U can provide.
- **SEVERE ACUTE PAIN OR CHRONIC PAIN, FOR EXAMPLE, AFTER SURGERY.** Pain can exacerbate immobility, while immobility exacerbates deconditioning, a combination that can create a downward spiral of debility and functional decline. An IRH/U can provide expertise in optimizing medication management, as well as the benefits of a team approach to pain control.
- **MAJOR ORGAN TRANSPLANTS.** These patients have complex needs for both skilled medical care and rehabilitation. The most helpful approaches are holistic in nature, speaking to the duality of their needs. An IRH/U has resources to provide both.
- **SEVERE DEBILITY ASSOCIATED WITH COMPLEX AND CRITICAL ILLNESS.** An IRH/U is often the best facility to comprehensively and knowledgeably address debility before it worsens.

meticulously document the medical and rehabilitation needs and treatments of each patient.

Focus: Can you give us some examples of special treatment advances that Kessler offers?

Pomeranz: A patient suffering from pain from surgery or metastatic cancer, for example, or from some other debilitating condition, will be treated at Kessler by a multidisciplinary team with expertise in pain management. Our staff uses this highly integrated approach to optimize the therapy and minimize side effects, with frequent communication among team members. Kessler is on the leading edge of pain management, and we participate in crucial research in this area.

Patients who have challenging nutritional issues also receive special care. Their feeding and swallowing status is routinely monitored and, if indicated, neuromuscular electrical “VitalStim” therapy is implemented to help them regain swallowing function.

Aspiration pneumonia is a serious potential complication of impaired swallowing that could initiate a downward spiral or possible irreversible setback. Kessler’s approach is to monitor the patient to reduce the risk of this complication and, at the same time, provide family and caregiver education about this to help minimize risk at home after discharge from the rehabilitation hospital.

Focus: Any last thoughts about the 60 Percent Rule?

Pomeranz: It is clear that many patients who both need and can benefit uniquely from IRH/U care are not described by the 60 Percent Rule. It is important that these individuals continue to have access to our services. Kessler encourages hospitals not to regard the 60 Percent Rule as an admission criterion or guide for clinical decision making, but rather as a standard to be complied with for reimbursement purposes.

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Adopting New Technology

Opportunities and obstacles in medical rehabilitation

■ BRUCE M. GANS, M.D.

When new technology becomes available for medical rehabilitation, what drives the marketplace's decision to adapt or reject it? The answers involve the interactions of science, engineering, medical practice and reimbursement.

Physical medicine and rehabilitation has always been a technology-oriented specialty that adapts technology to the needs of patients and rapidly adopts new options. For example, radiography

these technologies to help treat their illnesses, manage their conditions, and enhance their function and quality of life.

Mass Appeal

Today we are seeing an explosion of new devices with increasing capabilities and decreasing prices. When a robotic vacuum cleaner became a mass-market product, our patients benefited from the manufacturer's efforts to lower costs, provide more

readily available to pay for medically necessary technology that is also marketed to the able-bodied consumer, the costs would be driven down further. Unfortunately, the flip side of the cost issue is that devices created solely for the medical market usually carry inflated price tags.

Ensuring Access

To promote our patients' access to technological advances, a number of requirements should be met:

1. We need knowledgeable and well-trained providers who will ensure smart prescribing and use of the newest technologies.
2. Costs, as always, are very important to the ultimate adoption of technology. Our patients need insurance coverage for medically necessary devices, always a challenge in our field.
3. Ensuring long-term service and maintenance for new technologies is always a problem. We need reputable and committed manufacturers and distribution chains that stay in business to supply updates, revisions, maintenance, spare parts and so forth.
4. Finally, we need to encourage prescribers to recognize the need for some deliberate redundancies in the use of technology. If one part of a multipurpose device breaks, the device may fail to perform other, more critical functions. For example, if your cell phone is also your environmental control interface, and it fails, you unacceptably lose two critical functions.

While new technologies can make a huge difference for our patients, it is our professional responsibility to advocate for intelligent and prudent usage. We need to avoid being driven by the desire to use technology for its own sake rather than provide for the patient's needs. We don't want to fall in love with a new device and match a patient to it. Rather, we should focus on assessing patient needs and then locating the correct technologies to meet those needs.

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While new technologies can make a huge difference for our patients, it is our professional responsibility to advocate for intelligent and prudent usage.

originally was adopted for patient care by our field years ago (and subsequently spun off to the specialty of radiology).

Physiatrists were the first to find therapeutic uses for light, heat, cold, radar and electricity. This characteristic of early adoption continues today: We employ transcranial magnetic stimulation and functional electrical stimulation to enhance motor performance and fluoroscopy for visually guided injections. Robotic devices optimize arm function and ambulation while computerized prosthetics enable precise fit and motion. We even prescribe computer access with specialized adaptations such as eye-gaze control.

Now and in the future, our patients are particularly in need of

choice and achieve better durability. Meanwhile, robotics continues to advance, batteries have improved, and we have a wider array of materials that can be used for wheelchairs and braces. Miniaturization has advanced to the point that direct connections to the nervous system will be feasible someday: Biomedical engineers are now beginning to make use of biological signals, with hopes of converting these to useful signals for motor control and even sight.

Competitive market pressures will improve the technologies available for our patients, especially as universal design strategies become more widely adopted. If medical insurance or some other form of subsidy were more

When Ventilators Are Required

(continued from page 1) The Cough Assist initially applies positive pressure followed by a rapid shift of negative pressure, causing the patient to cough. It can be used via tracheostomy tube, face mask or mouthpiece. The advantage of this technique over suctioning, in addition to the comfort of the patient, is that the Cough Assist better clears secretions from the airways, allowing larger mucous plugs to be easily removed.

The Cough Assist is uniquely utilized at Kessler. In combination with increasing the tidal volume, it has significantly reduced the incidence of pneumonia. It provides a noninvasive method to help clear bronchial secretions when patients have insufficient muscle strength to cough on their own. The device is portable and usually preferred by both inpatients and outpatients.

Active Therapy

In the typical hospital setting, ventilator-dependent patients receive only bedside therapy. By comparison, patients in Kessler's ventilator program receive physical therapy and occupational therapy in the gym along with all the other patients. All the nurses and therapists who work on the unit and in the gym are trained and ventilator-certified through an in-house education program. Physicians not only make rounds in the

patient rooms but also rounds in the gym to evaluate progress.

In Kessler's state-of-the-science Neurorehabilitation Center, physicians who are fellowship trained and board specialized in spinal cord injury and traumatic brain injury work collaboratively to help maximize patients'

management and use of the Cough Assist. They are invited to the weekly team conferences, working together with the clinicians to determine what is best for the patient.

Some patients may leave the hospital for a day, which helps their transition to outpatient care. Equipment, including

The ultimate goal for all ventilator-dependent patients is to require the least amount of ventilatory support possible.

functional capacity. Weekly team conferences include not only physicians and residents, but also case managers; speech, physical and occupational therapists; respiratory therapists; and rehabilitation nurses. In addition, Kessler has a pulmonologist on staff.

Clinical psychologists are also part of the team and both counsel and educate patients and family members in dealing with their fears and concerns.

Family Involvement

The family and caregivers are vital members of the team. During the patient's rehabilitation, the family also receives intensive training in all facets of patient care, including ventilator

wheelchairs, is modified to allow for transport of the ventilator and ease of mobility. By the time of discharge, the family is more comfortable with caring for their loved ones.

Adjusting to a new life with a chronic medical condition presents ongoing psychological, social and economic challenges that patients and families face after discharge. Returning to the home environment can be stressful. Family dynamics and social networks are altered, and patients may need to rely on caregivers for many, if not most, of their daily tasks. The patient may not be able to return to previous employment, leaving a gap in family income and causing economic hardship. New medical issues may arise, necessitating doctor visits and adjustment of medications. Continuity of care through Kessler's extensive outpatient program is extremely important for these patients to their functionality, health and well-being.

The ultimate goal for all ventilator-dependent patients is to require the least amount of ventilatory support possible. Although some patients will always need the ventilator in some form, they can still lead productive lives.

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The Kessler Approach

Kessler's specialized ventilator program is based in its West Orange, N.J., hospital. Among the benefits to patients:

- Residents, physicians, therapists and nurses receive special training and certification in the care of ventilator patients.
- The Cough Assist device, uniquely utilized at Kessler, better clears secretions from the airways than traditional suctioning.
- Physical therapy and occupational therapy in the gym are part of the rehabilitation for all ventilator patients.
- Family and caregivers are involved in care planning and decision making throughout the rehabilitation process.

Modern Mobility

A look at advancing techniques for joint replacement and rehabilitation

■ SHAILESH S. PARIKH, M.D.

More than 193,000 hip replacements and approximately 300,000 knee replacements are performed each year in the United States. By the year 2030, total hip replacements and total knee replacements are projected to increase by 175 percent and 675 percent, respectively. This is partly due to the prevalence of obesity and arthritis, as well as the active lifestyle of aging baby boomers.

Medical Advancements

All aspects of total joint replacement have undergone significant advancements in recent years. The method of fixation has evolved from all cemented prostheses to bony ingrowth porous hydroxyapatite-coated implants. Much stronger, wear-resistant joint-bearing surfaces such as ultra-high molecular-weight polyethylene, metal-on-metal, or ceramic-on-ceramic joints have prevented early joint failure, especially in young patients. Gender-specific implants, high-flex joints, low-contact stress joints, mobile-bearing implants and rotating-platform knees are just a few of the new designs. Most recently, small-incision minimally invasive surgical approaches for both hip and knee joints have been developed. All of these developments have impacted patients' rehabilitation outcomes.

Minimally Invasive Surgery

Of these advancements, minimally invasive surgery (MIS) techniques may have the greatest impact on patient outcomes. In the 1970s, all total hip surgeries were performed using a procedure that required cutting muscle and bone attachment. This involved a fairly long posterior incision requiring strict postoperative hip precautions. Knee surgery also required partially cutting the quadriceps muscle resulting in postoperative rehabilitation that lasted three to four months. The use of MIS can reduce rehabilitation time to less than one to two months, resulting in less postoperative morbidity and an earlier transition from walker to cane.

MIS procedures (e.g., short posterolateral and two-incision approach in the hip joint; quadriceps-sparing small incisions for the knee joint) cause less soft-tissue disruption and less scarring by using special retractors to access the joint without cutting through muscles. Small capsular incisions and repair make it possible to preserve joint capsule integrity. In the short term, these new techniques have claimed to be associated with less immediate postoperative pain, shorter hospitalization, shorter rehabilitation and an early return to work.

MIS Challenges

Joint replacement using MIS is difficult to perform because it requires the

surgeon to work with a restricted visual field that may result in misalignment of the prosthesis. MIS also limits implant choices because of the smaller access and increased risk of bone fracture during implant insertion. Currently, very few orthopedic surgeons perform MIS procedures.

Development of computer-guided navigation has improved the accuracy of implant alignment. Computer-guided navigation systems are not currently accessible at all hospitals; however, this may change with a decrease in cost, an increase in training opportunities and more outcome studies.

The goal of joint replacement is to implant a painless, functional joint that will last for many years. MIS offers a smaller scar and shorter rehabilitation time but should not be done at the expense of the prosthetic joint's durability. The appropriate patient for this intervention is a thin or normal-weight patient without significant joint deformity and contracture. Most patients who require joint replacements are elderly, or obese or have multiple medical comorbidities, and thus may not be ideal candidates for MIS.

Techniques for MIS are evolving. Indication criteria for surgery may become less restrictive in the future. At present, some patients do benefit from MIS, and some are managed at Kessler with shorter rehabilitation times and a faster return to their usual active lifestyle.

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