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Capturing the Momentum of Rehabilitation Medicine  
at NYU Langone Medical Center

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WINTER 2013-2014 • SPECIAL EDITION—COMPLEX CASES

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# Letter from the Chair



When plans were laid for Rusk Rehabilitation to be relocated to new sites throughout the NYU Langone Medical Center campus, the goal was to provide our clinicians, staff, and the patients we serve with modern, state-of-the-art facilities and an environment conducive to the multidisciplinary collaboration inherent to rehabilitation care. With the transition now complete, I am extremely pleased and proud to see that our new model of care is accomplishing exactly that. In Rusk's new locations, our physiatrists and rehabilitation teams not only have the best equipment and technology at their disposal, but they are now embedded in the fabric of the Medical Center, able to consult seamlessly with both Rusk colleagues as well as leading specialists from other disciplines at NYU Langone.

Those capabilities are highlighted in this issue of *RUSK*, which focuses on five complex rehabilitation cases. While each case is unique, they all have a common thread: their successful resolution depended not on the skills of any single clinician, but rather on the unique blend of talents and knowledge found in Rusk and our NYU Langone colleagues.

In one instance, Dr. Brian Im and Rusk's neurorehabilitation team found themselves dealing with a medical mystery—a patient with encephalitis of uncertain origin, who continued to display symptoms even after her condition appeared to be resolving. The collective input from a discussion group for residents and consultations with an NYU Langone neurologist led to an unorthodox treatment that ultimately worked.

In another unusual case, Dr. Jeffrey Cohen confronted a rare, progressive neurological disorder that left his patient barely functional. Through a carefully managed mix of medications and rehabilitation therapy administered in collaboration with NYU Langone's movement disorder specialists, the patient is now back at home. Similarly, Dr. Jung Ahn drew on a wide array of medical and therapeutic approaches for a patient paralyzed by a severe cervical spinal cord injury, enabling him to live successfully at home as well.

The case presented by pediatric physiatrist Dr. Renat Sukhov posed another sort of challenge: preparing a teenager to return to school just a few weeks after brain surgery that left her with physical and cognitive deficits. Finally, cardiopulmonary rehab specialist Dr. Jonathan Whiteson reports on a multidisciplinary approach to a stroke patient with an implanted left ventricular assist device (LVAD)—a scenario that will become increasingly common as this technology spreads.

These patient stories depict fascinating medical challenges and demonstrate Rusk's leadership in treating complex rehabilitation cases—the kind of cases that require not just a world-class rehabilitation department, but a world-class medical center.

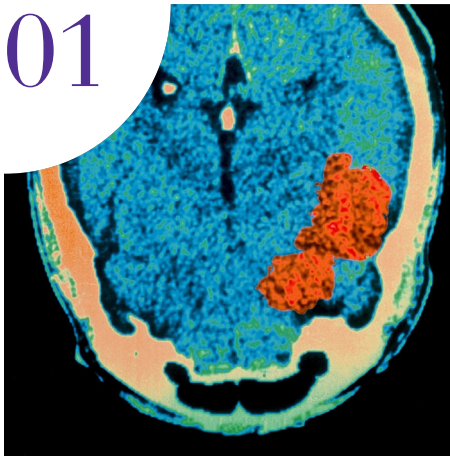
A handwritten signature in white ink, reading "Steven R. Flanagan". The signature is written in a cursive, flowing style.

Steven R. Flanagan, MD

The Howard A. Rusk Professor of Rehabilitation Medicine  
Chair, Department of Rehabilitation Medicine  
Medical Director, Rusk Rehabilitation

# Five Complex Cases at Rusk

## 01



Airelle-Joubert / Science Source

## An Interdisciplinary Approach Improves Function in a Patient with Brain Swelling from an Unclear Cause

When a patient transferred recently from another medical facility to Rusk's Neurorehabilitation Unit, she came with a diagnosis of Hashimoto's encephalopathy—a brain swelling caused by a rare, thyroid-related autoimmune disorder. Psychiatrist Dr. Brian Im was dubious. "Although she'd tested positive for the Hashimoto's antibody," he says, "not all of her symptoms fit the condition."

Seeking input, Dr. Im brought the case to the weekly clinical discussion group for residents, therapists, and medical students that he hosts with an NYU Langone neurologist. "Our literature review found that twenty percent of the population tests positive for the Hashimoto's antibody," says Dr. Im. "Putting that together with the patient's presentation, we concluded she probably had another autoimmune condition."

Follow-up thyroid tests confirmed she most likely didn't have Hashimoto's.

Meanwhile, the patient experienced a seizure and was transferred briefly to NYU Langone's Tisch Hospital. Once back in the neurorehab unit, her condition deteriorated. Where she previously could walk with assistance, now she couldn't get out of bed and was confused, emotional, and uncommunicative.

"Encephalitis can fluctuate quite a bit—the patient may get better, then suddenly get worse," notes Dr. Im. Before transferring to Rusk, she'd undergone a course of intravenous immunoglobulin (IVIG) in addition to steroid therapy. Although her CT scan no longer showed significant brain swelling, the decision was made to try another round of IVIG. After five days, she returned to the unit, stabilized but still experiencing weakness and cognitive issues, including anxiety-provoking hallucinations. She was also having trouble sleeping.

During that week's cognitive rounds, the neurologist suggested that the patient's symptoms might be due to ongoing, low-level seizures combined with resulting lack of sleep. Carefully weighing the decision, the Rusk team started a trial of low-dose benzodiazepine treatment, a sedative medication that's typically avoided with neurorehabilitation patients, since it promotes sleepiness and can dull cognition.

"She instantly started sleeping better," says Dr. Im. "Her cognition also improved, and she became much calmer." With an artistic background, she was even able to begin art therapy, drawing, painting, and working in clay. Today, while she has some remaining issues, she can interact with her spouse and function at home. "Her case illustrates the value of an interdisciplinary environment," concludes Dr. Im. "I'm not sure one clinician alone could have figured out what was causing her symptoms. By working as a team, we gave each other the confidence to pursue an unusual course of treatment that ultimately worked."

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## 02



Stan Levy / Science Source

## Multispecialty Care Lets a Patient Return to Family after a Life-Changing Injury

When the new cervical spinal cord injury patient arrived in Dr. Jung Ahn's rehabilitation unit last summer, it quickly became clear that his care would require the expertise of Rusk clinicians as well as specialists from other departments at NYU Langone.

“A few days after his injury, his heart stopped beating,” says Dr. Ahn. “So his medical team at the prior acute care hospital implanted an on-demand pacemaker—one that kicks in when the heart slows or stops. He was also having problems breathing and swallowing, so they put in a tracheotomy tube and a percutaneous endoscopic gastrostomy feeding tube.”

In addition to heart and breathing issues, the patient was paralyzed from the neck down with no bowel or bladder control. At Rusk, Dr. Ahn’s early consults with NYU Langone colleagues involved an ear, nose, and throat specialist who managed the patient’s tracheotomy tube, a pulmonologist who helped the patient clear his airway, and an infectious disease specialist who administered appropriate antibiotics for urinary tract infection.

At the same time, Rusk nurses catheterized him to empty his bladder, assisted him to move his bowels with a daily regimen of colonic stimulant, enemas, and stool softener, and turned him to prevent pressure ulcers. Meanwhile, his heart condition was observed closely at bedside and in therapy, and Rusk therapists helped him remove upper airway secretions.

“Fortunately, the nerves controlling his diaphragm muscles were mostly preserved,” notes Dr. Ahn. “But he couldn’t clear his airway by coughing because of paralysis of his intercostal and abdominal muscles.” The therapists gave “assisted cough” therapy, applying pressure to the chest. Soon, he could breathe with no respiratory distress and the tracheotomy tube was removed. After a swallow test that showed he could handle food and drink, a gastroenterology colleague removed his feeding tube.

The patient also received physical and occupational therapy designed to enable him to function at home with the help of a full-time nurse or aide. “He has some motion in his left elbow and learned to feed himself with assistance,” says Dr. Ahn. As the discharge date approached, the rehab team instructed his spouse and caretakers on the patient’s special needs, which included a mechanical lift for transfers from bed to wheelchair, bladder and bowel management, and pressure ulcer prevention. A barrier-free design expert at Rusk drafted a home renovation plan.

Ten weeks after arriving at Rusk, the patient was discharged. “He made great progress both medically and physically,” Dr. Ahn notes, “but it required excellent care from multiple disciplines at NYU Langone. Fortunately, we are in an ideal place for that.”



Manfred Kage / Science Source

## Stabilizing a Rare, Progressive Neurologic Condition with an Intensive Team Effort

When Rusk admitted a patient with multiple system atrophy (MSA) last fall,

Dr. Jeffrey Cohen knew that this would be a significant clinical challenge. A rare disorder that attacks the brain’s nerve cells, MSA strikes like a bolt out of the blue, with no known cause and no identifiable risk factors. Average life span with the condition is eight years, and 80% of patients become severely disabled within five years.

Typically, MSA falls into one of two categories—causing either cerebellar dysfunction, characterized by slurred speech, unsteady gait, and coordination problems, or Parkinson’s-like symptoms of slow, stiff movements and muscle rigidity. With both forms, one prominent symptom is dysfunction of the autonomic nervous system, which controls blood pressure and other essential functions. Since sudden blood pressure drops when upright make MSA patients prone to passing out, addressing this issue was Dr. Cohen’s first priority. Besides prescribing blood pressure-raising medications and salt tablets, he supplied the patient with compression stockings and an abdominal binder to prevent blood from pooling in his legs.

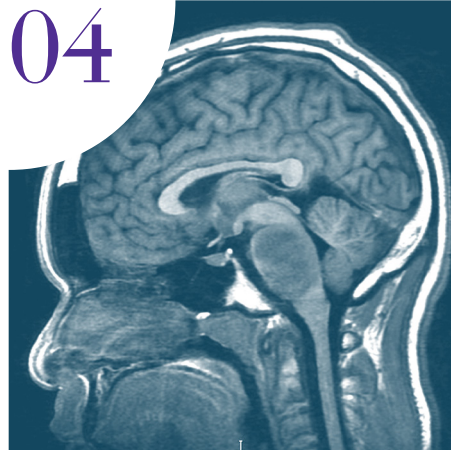
“It was still difficult,” Dr. Cohen recalls. “His blood pressure sometimes shot sky-high, forcing us to cut back on his blood pressure medication regimen.” Since the autonomic system controls urination as well, the patient also needed frequent bladder catheterizations.

While a brain MRI showed atrophy in the patient’s cerebellum, his myriad of symptoms indicated he had an unusual combination of both MSA types—meaning clinicians had to treat two constellations of symptoms plus the autonomic disorder. A combined effort involving the patient’s neurologist at the NYU Langone Parkinson’s and Movement

Disorders Center and Dr. Cohen's rehabilitation team was essential to a successful outcome. The rehabilitation program was an intensive three-week inpatient program of physical, occupational, and speech-language therapy to address functional issues, including balance and gait training, breathing exercises to improve speaking ability, and swallowing therapy.

A Rusk occupational therapist helped the patient regain the hand coordination needed for self-care skills, and he met with a psychologist to grapple with his diagnosis. "The goal was always to stabilize him so he could function at home," says Dr. Cohen. As discharge neared, the patient's family received instruction in home care and equipment, such as grab bars and a raised toilet seat, which were ordered to facilitate his mobility at home. In addition, a Rusk social worker arranged for continued home rehabilitation services.

At the end of the three weeks, the patient was ready to head home under the supervision of a home health aide. "He did well—very well," says Dr. Cohen. The difference in function before and after Rusk was especially apparent to the patient's neurologist. "The word he used," recalls Dr. Cohen, "was 'dramatic'—and I couldn't agree more."



Living Art Enterprises / Science Source

## 04 Helping a Teenager Recover Function after Brain Surgery

As soon as the two NYU Langone neurosurgeons finished removing the vascular tumor from the 14-year-old patient's brain, pediatric rehabilitation specialist Dr. Renat Sukhov knew the clock was ticking. "There's always tissue damage following this type of procedure," he explains, "and it's very important to begin retraining the brain right away."

Dr. Sukhov's evaluation with the girl took place less than 48 hours after surgery, while she was still in the Pediatric Intensive Care Unit (PICU). "She was very weak, but she could talk and answer questions," he says. An initial assessment found a wide range of functional deficits, however, including significant right-side weakness as well as difficulties balancing, walking, and coordinating her movements. She also had trouble forming complex sentences and comprehending instructions.

The girl's rehabilitation began there in the PICU, with a physical therapist and occupational therapist each coming in daily for half-hour sessions. In mid-August, six days after the operation, she was transferred to

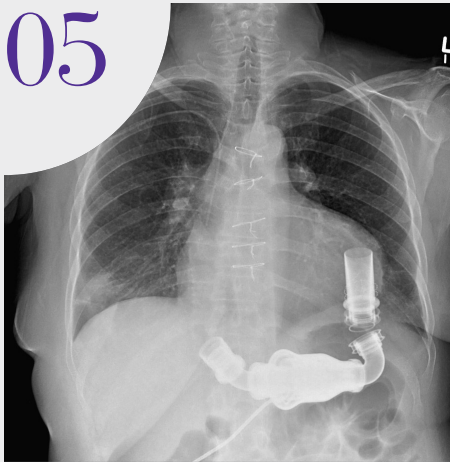
Rusk's new pediatric inpatient unit located at the Hospital for Joint Diseases, where Dr. Sukhov's treatment plan, including three hours of therapy a day, could be accomplished. Now there was a new time pressure: could she regain enough function to start school in early September, just a few weeks away?

Much of her rehab focused on improving strength and coordination in her weakened right side. One approach used was constraint-induced movement therapy, in which the unaffected side was immobilized while the patient performed tasks with her affected hand and arm. To improve her walking, her physical therapist focused on trunk- and leg-strengthening drills. Occupational therapists helped her regain function in her hand and wrist with active assisted range-of-motion exercises.

As her functional abilities returned, the patient, an accomplished artist, progressed to painting with her right arm partially supported. Meanwhile, sessions with a Rusk neuropsychologist led to steady cognitive gains, while a recreational therapist encouraged her to interact with other patients in preparation for her return to school. "Over two weeks, we saw tremendous improvement in all areas," says Dr. Sukhov. "The fact that we started the process so early had a lot to do with that."

The patient was discharged home on August 27, allowing her to start the school year with the rest of her classmates. A Rusk child life specialist helped plan her school reentry, including arranging for an aide to accompany her to classes. Today, while she still has some deficits, the patient continues to improve with outpatient therapy. "She had her bas mitzvah last fall, not long after her surgery," reports Dr. Sukhov. "It was a big event; a real celebration. She was so happy."





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## Breaking New Ground with a Revolutionary Heart Device

For individuals with advanced heart failure, a left ventricular assist device, or LVAD, can mean a new lease on life. By supplementing the heart's pumping function, an LVAD can turn a failing heart into a viable one. "They were originally considered a bridge to a heart transplant," explains Rusk cardiopulmonary rehabilitation specialist Dr. Jonathan Whiteson. "But given the scarcity of available hearts and the fact that patients with LVADs now have an average survival rate of six or seven years, people increasingly are foregoing transplants and living with the LVAD."

Some 3,000 LVADs are implanted annually in the United States, and that number is expected to rise dramatically. LVADs present new rehabilitation challenges, however, both in terms of cardiac rehab and because they require intensive management—including medications and batteries that must be recharged and monitored—and carry risk of serious complications, including stroke.

For Dr. Whiteson, these challenges converged in a middle-aged patient with advanced cardiomyopathy. "She received an LVAD two years ago," he recalls. "Shortly afterwards, the device developed a blood clot and had to be replaced. She did well for a time but then developed shortness of breath from a faulty aortic valve." Following valve replacement surgery, she suffered a stroke that weakened her left side and caused significant cognitive impairment, requiring one-on-one supervision in the hospital.

Rusk's decision to admit her for combined post-stroke and cardiac rehabilitation was complicated by the fact that she had no one to care for her after discharge. "Still, sitting in a hospital bed wasn't helping her," Dr. Whiteson notes. "We put her into an intensive program of cardiovascular, stroke, neuro-, and cognitive rehab. Six weeks later, she was walking, and her strength and dexterity had improved to where she could change dressings, recharge her LVAD batteries, and take medications. But cognitively she was forgetful and impulsive, and we were concerned that if a battery failed, she wouldn't know what to do."

This posed a dilemma: how to send her home if she was physically ready, yet didn't have the cognitive skills to manage her LVAD? Considering the relatively new and complex technology, finding a solution required significant collaboration between the clinical team and the patient's insurance group, which had limited experience with an LVAD patient's needs.

"I spoke with the company's medical director virtually daily for two weeks," says Dr. Whiteson. Over the course of their discussions, it was agreed that a home nurse was both better suited to handle the complexity of care as well as more cost-effective than a subacute facility.

The patient thrived under this care plan and quickly transitioned to daily visits from a nurse or home health aide. "She continues to get outpatient rehab therapy, and is doing tremendously well," reports Dr. Whiteson. "The lesson is that LVADs are becoming much more common, and many recipients will require related inpatient and outpatient rehabilitation. We need to recognize and prepare for this."