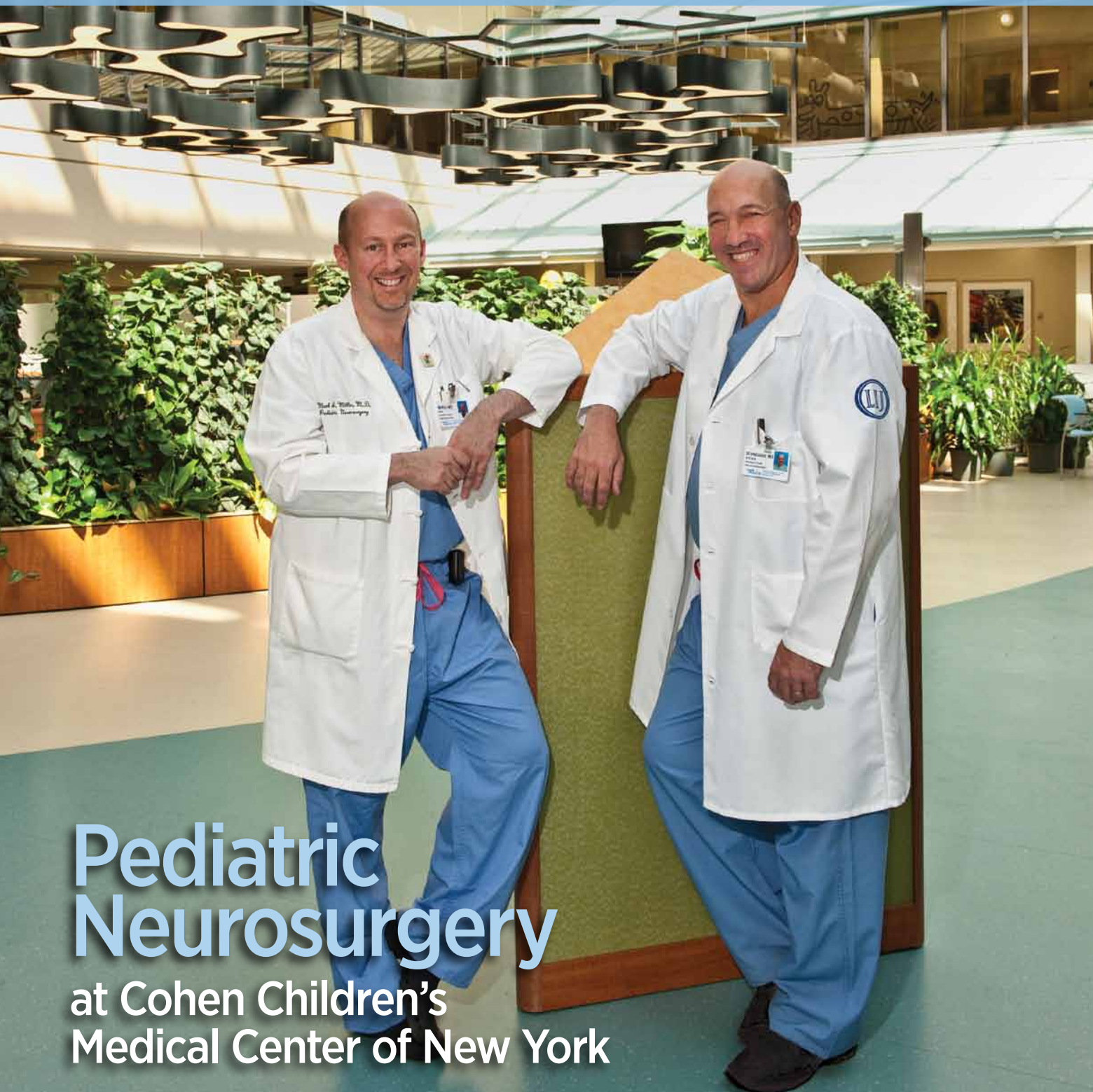


LONG ISLAND

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Pediatric Neurosurgery

at Cohen Children's
Medical Center of New York



Dr. Mittler performs microsurgery on an arteriovenous malformation of the brain.

Pediatric Neurosurgery

AT COHEN CHILDREN'S MEDICAL CENTER OF NEW YORK

THROUGH THE STEVEN AND ALEXANDRA COHEN CHILDREN'S MEDICAL CENTER OF NEW YORK (CCMC), AREA CHILDREN HAVE ACCESS TO WORLD-CLASS PEDIATRIC NEUROSURGICAL SERVICES.

OFFERING COMPREHENSIVE CARE for a wide variety of conditions, including pediatric brain and spinal cord tumors, craniofacial deformities, spasticity, hydrocephalus, head trauma, epilepsy and vascular malformations, the pediatric neurosurgical program at CCMC emphasizes state-of-the-art technology and an interdisciplinary, caring approach to disease management.

Exceptional Care for Pediatric Brain and Spinal Cord Tumors

“One of the most successful programs we have developed through the pediatric neurosurgical program is our pediatric brain and spinal cord tumor program, which encompasses both the medical and surgical aspects of tumor care,” says Mark Mittler, M.D., FACS, FAAP, Co-Chief of the Division of Pediatric Neurosurgery at CCMC and the North Shore Long Island Jewish (LIJ) Health System. “A variety of open and minimally invasive surgical procedures are available, as well as radiation therapy and chemotherapy when needed.”

Through the use of advanced technology and surgical techniques — including frameless stereotactic techniques, microscopic surgery, minimally invasive neurosurgery and intraoperative imaging guidance — the team utilizes the least

invasive treatment modality whenever possible. Dr. Mittler, along with Steven Schneider, M.D., FACS, FAAP, Co-Chief of the Division of Pediatric Neurosurgery, is able to operate on tumors located outside the brain, such as tumors presenting in the pituitary region as well as tumors located in the ventricular system, through use of minimally invasive endoscopy.

“When operating on the ventricular system, we are essentially operating underwater, which requires specialized techniques. Outside of the brain, we often operate in conjunction with our colleagues specializing in pediatric otolaryngology to provide access to the tumor by way of the back of the mouth or nose,” says Dr. Mittler.

Physicians are also able to merge technologies, such as by utilizing endoscopy with microscopic surgery and intraoperative imaging, to provide the best possible outcome. CCMC also recently acquired the CereTom CT scanner, a mobile, intraoperative CT scanner physicians can use to more easily locate the tumor and important surrounding structures during surgery.

A Multidisciplinary Approach to Brain Tumor Management

Treatment of pediatric brain tumors often involves many physicians and the use of multiple therapies. For example,

medulloblastoma — the most common solid tumor of childhood — requires surgery for complete resection of the tumor as well as a diagnostic workup to search for the presence of tumor cells in neighboring structures, such as the spinal cord or cerebrospinal fluid. Surgical treatment for this type of tumor is followed by chemotherapy and often radiation therapy. At the center of decision-making is the goal to minimize long-term side effects of treatment.

“We have had tremendous success treating this disease,” says Dr. Mittler. “In the vast majority of patients, we can provide a cure.”

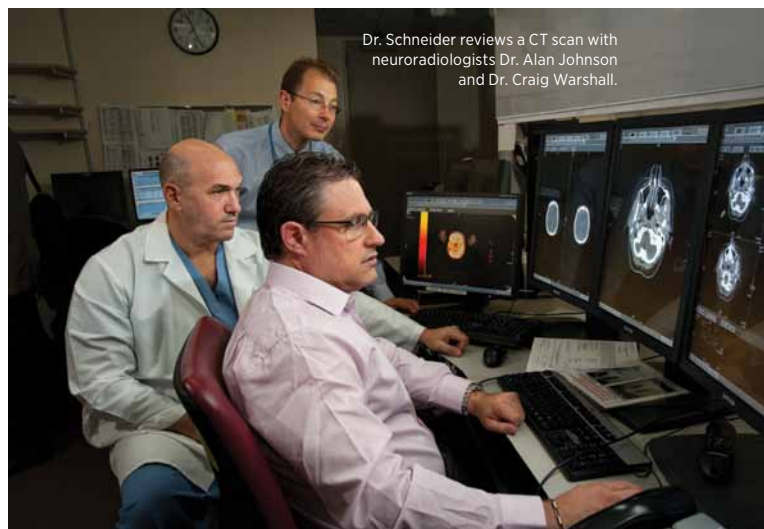
To ensure all physicians involved in the treatment plan provide input when developing the care plan, the neuro-oncology treatment team — consisting of physicians from a variety of specialties, including pediatric neurosurgery, neuro-oncology, neuroradiology, neurology and endocrinology — collaborates once a week at a tumor board.

“We utilize a comprehensive program that involves a variety of specialties, and physicians who are all specialty trained in pediatrics meet together to develop treatment plans and determine if follow-up therapies will be necessary,” says Dr. Schneider. “This interdisciplinary team also includes a designated neuro-oncology social worker and a pediatric care coordinator to help patients’ families navigate the care process. The diagnosis of a pediatric brain tumor is often one of the most traumatic experiences that families and parents can face, which makes providing supportive services crucial.”

“When a child is diagnosed with a brain tumor, that diagnosis is often made suddenly,” says Dr. Mittler. “Children may have been experiencing symptoms, such as headaches and vomiting, for several weeks or months; however, they often see a gastroenterologist for their vomiting before anyone realizes it could be a brain tumor. Dr. Schneider and I see newly diagnosed patients in very short notice, as brain tumors often block the normal fluid pathways of the brain, thereby causing hydrocephalus. When this occurs, it may become an urgent situation, and it is not uncommon for us to meet patients in the emergency department at any hour of the day.”

Managing Vascular Malformations of the Brain

Arteriovenous malformation (AVM) is the most common



Dr. Schneider reviews a CT scan with neuroradiologists Dr. Alan Johnson and Dr. Craig Warshall.

vascular malformation seen in pediatric patients. While many patients do not experience any symptoms related to AVM, others can experience symptoms such as headaches, seizures and hemorrhage.

“While adult patients can develop cerebral aneurysms due to chronic high blood pressure, vascular malformations in children are generally congenital lesions,” says Dr. Schneider. “These types of lesions — when treatment is required — may need multiple modalities of treatment, including endovascular embolization, surgical resection and/or radiation treatment.”

At CCMC, pediatric neurosurgeons, interventional neuroradiologists and radiation oncologists generally work together to deliver treatment.

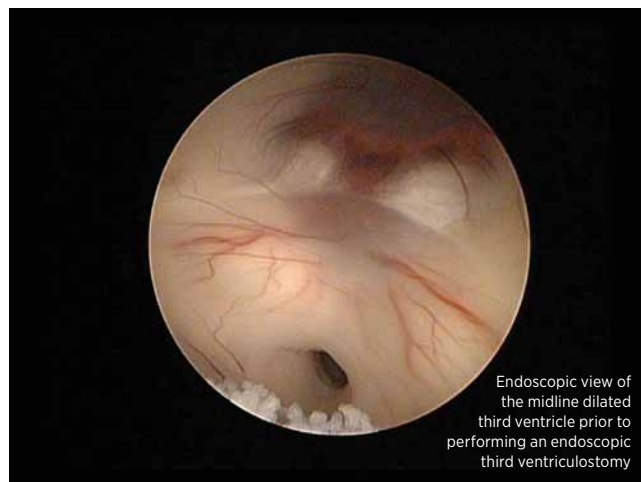
The risk of treatment for AVM can at times outweigh the risk of the disease itself. To determine if patients are candidates for treatment of AVM, several factors must be considered, including the presence and severity of symptoms, the type of malformation and the malformation’s location inside the brain. The specialists at CCMC are highly skilled in the decision-making process that often accompanies an AVM or other vascular malformation diagnosis.

Care for Traumatic Brain Injuries and Head Trauma

“Traumatic brain injury is one of the most common things we deal with on a day-to-day basis,” says Dr. Schneider.

There are a variety of traumatic injuries that occur in children, including skull fractures, epidural and subdural hematomas, subarachnoid hemorrhage, and cerebral contusions. CCMC is a designated Level 1 pediatric trauma center. With a dedicated pediatric emergency department and a pediatric intensive care unit — both staffed by board-certified specialists — CCMC is the region’s most advanced tertiary referral center for these types of injuries. Because of the expertise and protocols in place to manage head trauma, a transfer center is available for patients coming to the facility from hospitals throughout the region.

“Children suffering from severe traumatic head injury in the presence of elevated intracranial pressure require the expertise of critical care specialists and need to be hospitalized in an ICU that has protocols to deal with severe head injury,” says



Endoscopic view of the midline dilated third ventricle prior to performing an endoscopic third ventriculostomy

INTRODUCING THE TREATMENT TEAM

THROUGH THE STEVEN and Alexandra Cohen Children's Medical Center of New York (CCMC), children benefit from the knowledge of two skilled pediatric neurosurgeons — Mark Mittler, M.D., and Steven Schneider, M.D. Specializing in a variety of pediatric conditions and anomalies, including brain and spinal cord tumors, vascular malformations, craniofacial deformities, spasticity, hydrocephalus, and traumatic injuries of the brain and spinal cord, Drs. Schneider and Mittler employ a team approach to patient care, ensuring that patients benefit from each physician's specialized expertise.

Mark A. Mittler, M.D., FACS, FAAP, completed both his bachelor's degree in neuroscience and his medical degree at the University of Rochester. His neurosurgical residency was performed at Brown University. During his residency, he was a member of the staff that was instrumental in the transition of pediatric neurosurgical care from Rhode Island Hospital to the then-newly created Hasbro Children's Hospital in Providence, RI. Dr. Mittler's fellowship in pediatric neurosurgery was completed at Children's Hospital Los Angeles.

In addition to serving as Co-Chief of the Division of Pediatric Neurosurgery for CCMC, Dr. Mittler is the Director of Quality Assurance for the Department of Neurosurgery at the North Shore LIJ Health System. He is also a member of the Core Admissions Committee of Hofstra North Shore-LIJ School of Medicine, as well as

an assistant professor of neurosurgery. He is involved in pediatric brain tumor biology research at The Feinstein Institute for Medical Research and serves on the medical advisory boards of Project to Cure Pediatric Brain Tumors, TLC Foundation and Children's Medical Fund of New York.

Dr. Mittler is a member of several professional organizations and received board certification from the American Board of Neurological Surgery and The American Board of Pediatric Neurological Surgery. Dr. Mittler is also a reviewer for *The Journal of Trauma* and the author of numerous peer-reviewed publications.

Steven J. Schneider, M.D., FACS, FAAP, completed his medical degree and neurosurgical residency at the Baylor College of Medicine in Houston, TX. His fellowship in pediatric neurosurgery was performed under the guidance of the world-renowned Fred Epstein, M.D., at New York University. During his fellowship, he was distinguished as the Nat Simpkins Pediatric Neurosurgical Fellow by Codman & Shurtleff. Dr. Schneider became the first fellowship-trained pediatric neurosurgeon on Long Island, where he founded the Division of Pediatric Neurosurgery at North Shore University Hospital and served as Chief of Neurosurgery at Nassau County Medical Center for more than a decade. He also served as the Director of the Neurosurgical Residency at Long Island Jewish Medical Center for several years.

In addition to serving as Co-Chief of the Division of Pediatric Neurosurgery, Dr. Schneider is an assistant professor of neurosurgery at Hofstra North Shore-LIJ School of Medicine and the Director of Pediatric Epilepsy Surgical Services at the Comprehensive Epilepsy Center of the Cushing Neuroscience Institute.

Dr. Schneider was a co-founder of the Brain and Spinal Cord Tumor Tissue Donation Program and an assistant researcher at The Feinstein Institute for Medical Research. He is currently engaged in active pediatric brain tumor research involving medulloblastoma. Dr. Schneider is a primary investigator for a National Institutes of Health grant studying pediatric traumatic brain injury.

Dr. Schneider serves on a number of professional advisory boards and is board certified through The American Board of Neurological Surgery and The American Board of Pediatric Neurosurgery. He is a member of The American Society of Pediatric Neurosurgeons, International Society for Pediatric Neurosurgery, the Joint Section for Pediatric Neurosurgery, Congress of Neurological Surgeons, American Association of Neurological Surgeons, New York State Neurosurgical Society and New York Society of Neurosurgery. Dr. Schneider also serves as an editor for multiple scientific journals, including *Pediatric Neurosurgery*. He is also the author of numerous book chapters and articles covering many topics in pediatric neurosurgery.



[LEFT] Dr. Mittler discusses the care of a preterm infant with the Chief of Neonatology Dr. Dennis Davidson. [ABOVE] Sagittal T1 weighted MRI with gadolinium demonstrating a fourth ventricular tumor extending through the foramen magnum into the upper cervical spine with resultant hydrocephalus

“Pediatric neurosurgical services are a critical component of fully evolved children’s hospitals. World-class neurosurgical services require superb expertise within the neurosurgical faculty, as well as skilled intensivists and neurologists who work to ensure that children are properly diagnosed before proceeding with surgery. At Cohen Children’s Medical Center, we have a dedicated team of highly skilled professionals and have married clinical skill with state-of-the-art technology to provide the best possible outcomes.”

— Arthur Klein, M.D., Executive Director and Chief of Staff at the Steven and Alexandra Cohen Children’s Medical Center of New York

Dr. Mittler. “We work very closely with our transfer center to safely transport children to CCMC for neurosurgical care at all hours of the day and night.”

Management of traumatic head injury may involve surgery to remove a blood clot or to repair a skull defect. In some cases, decompressive craniectomy may also be required. In the ICU, patients may benefit from extensive monitoring via a fiberoptic catheter that measures elevations in brain pressure or ventriculostomy to drain cerebrospinal fluid. On occasion, a child suffering from head trauma may also have an injury to the spine or spinal cord. In cases that require spinal reconstruction, Drs. Mittler and Schneider perform surgery in conjunction with colleagues from the department of pediatric orthopedic surgery.

“The key to providing successful care for head and spinal trauma is the rapid availability of advanced techniques,” says Dr. Schneider. “Treating severe head injury can actually be one of the most rewarding aspects of our practice. Every once in a while, we will see a patient in our office six months or so after a severe, closed head injury. The patient may have no recollection of his/her time in the hospital and think that he/she is meeting us for the first time when, in fact, we had spent days or weeks caring for this patient in a traumatic coma.”

The team is a member of the Pediatric Traumatic Brain Injury Consortium and is currently involved in a National Institutes of Health-funded study evaluation of the potential benefits of hypothermia for pediatric closed head injury.

Treatment for Hydrocephalus

Hydrocephalus resulting from accumulation of cerebrospinal fluid in the brain can be either an acquired or congenital condition. This can be the result of a genetic abnormality, bleeding in the brain, trauma, infection or tumor. Often, this is a lifelong condition and requires lifelong follow-up care.

“We follow thousands of children throughout childhood to ensure proper management of hydrocephalus,” says Dr. Schneider. “This is important because it is not unusual for

A life-long relationship, Dr. Schneider has followed this patient, who has myelomeningocele, since birth.



a patient to intermittently have difficulties, such as a shunt malfunction, which require intervention.”

Modalities available for management of hydrocephalus include endoscopic third ventriculostomy, endoscopic arachnoid cyst fenestration, placement of ventricular tapping reservoirs and placement of ventricular shunts.

Craniosynostosis and Other Craniofacial Deformities

Each week, the pediatric neurosurgeons evaluate patients with abnormal head shapes. Some craniofacial deformities such as craniosynostosis require surgical correction. These surgeries are performed utilizing a team approach involving physicians who specialize in pediatric neurosurgery, craniofacial plastic surgery, anesthesiology and critical care. In these cases, surgery is used to reshape the skull and facial bones to allow for normal development and brain growth.

“Most of the cases we see are fairly straightforward, with only one suture of the skull fused,” says Dr. Mittler. “More complex cases, such as those arising from a genetic syndrome, may require multiple operations during childhood. These types of procedures require tremendous coordination of care, and we are experts in providing just that.”



Some of the members of the pediatric neurosurgical team (front row, L-R): Christopher Nelson, PA-C; Violeta Ortaliza, R.N.; Cheryl Armstrong, operating room technician; Jungsook Kwak, R.N.; and Bhavna Mathews, R.N. (Back row, L-R): Dr. Christopher Bognignore and Dr. Joseph Chabot



Dr. Mittler measures a patient's head circumference after calvarial vault remodeling for sagittal craniosynostosis.

Spasticity

The treatment of children with spasticity is quite challenging. Over the years, Dr. Schneider has developed one of the largest pediatric spasticity practices in the country. He has implanted hundreds of intrathecal baclofen pumps for the continuous infusion of medication into the cerebrospinal fluid. This requires titration of dosing, refilling of pumps, and coordination of care with physical therapy, rehabilitation specialists and pediatric orthopedists. The goal of these cases is to maximize function, decrease pain and enhance the parent's ability to provide care.

Pediatric Epilepsy

Seizures are one the most common pediatric neurologic disorders. "While most patients respond to medical therapy, surgical treatment becomes a consideration in those refractory cases," says Dr. Schneider.

To determine the feasibility of these procedures, children are evaluated by a comprehensive team of neurologists, neurosurgeons and neuropsychologists. Video EEG monitoring is usually performed to localize the focus. This can be followed up with PET scanning, functional MRI and a battery of neuropsychological testing.

"In some cases, we implant electrodes in the brain to map it and determine the sites of function as well as where the focus is," states Dr. Mittler.

Procedures performed include temporal lobectomy, hemispherectomy, corpus callosotomy, lesionectomy and vagus nerve



The CereTom CT scanner is the latest acquisition of CCMC. In addition to its use in the operating room, the device can be easily transported to the pediatric ICU for use on critically ill children who cannot be safely transported to the CT department.

STATE-OF-THE-ART, MULTIDISCIPLINARY CARE

THE STEVEN AND Alexandra Cohen Children's Medical Center of New York offers all-inclusive, first-class pediatric care, including specialized services that would otherwise be unavailable on Long Island.

Pediatric neurosurgery is only one of the shining stars of the hospital.

"The center is unique because we are the only children's hospital on Long Island to provide bone marrow transplantation, open heart surgery and extracorporeal membrane oxygenation," says Arthur Klein, M.D., Executive Director and Chief of Staff at Cohen Children's Medical Center of New York. "All of our programs utilize an interdisciplinary approach to care, and a team of specialists, tremendously skilled nurses, social workers and child life experts are involved in every child's care."

Additional service lines provided through the Cohen Children's Medical Center of New York include:

- | | |
|---|---------------------------------------|
| + Adolescent medicine | + Ophthalmology |
| + Allergy and immunology | + Orthopedics |
| + Cardiac surgery | + Otolaryngology |
| + Cardiology | + Pain management |
| + Critical care | + Pediatric and adolescent gynecology |
| + Developmental and behavioral pediatrics | + Pediatric dentistry |
| + Emergency medicine | + Pediatric endocrinology |
| + Gastroenterology | + Psychiatry |
| + General surgery | + Pulmonology |
| + Hematology and oncology | + Radiology |
| + Infectious disease | + Rheumatology |
| + Medical genetics | + Sleep medicine |
| + Neonatology | + Urgent care |
| + Nephrology | + Urology |
| + Neurology | |

stimulation.

Chiari Malformations

Drs. Mittler and Schneider routinely care for patients with Chiari malformations. Chiari I malformation is characterized by crowding of the foramen magnum by abnormal descent of the cerebellar tonsils. This sometimes requires surgical intervention to reestablish normal flow of cerebrospinal fluid between the cranium and spine.

"The key to treating patients with Chiari I malformation is clinical judgment," states Dr. Schneider. "There are more and more of these being diagnosed each year with the increasing availability of MRI. The minority of these patients, however, actually needs treatment. Those patients who have severe pain or develop syringomyelia of the spinal cord are often candidates for surgery. While our success in these situations has been quite dramatic, we pride ourselves on knowing when not to intervene."

For more information about the care provided through Cohen Children's Medical Center of New York, visit www.northshorelij.com/ccmcny/home. ■