Progressive Neuroscience

A publication for physicians produced by the Institute for Neurosciences at Winthrop-University Hospital

- Intraventricular Use of tPA
- Advanced Surgical Treatment for Adult Spine Deformities
- Surgical Clipping Used to Obliterate Basilar Tip Aneurysms
Message from the Chiefs

The treatment of diseases of the nervous system has been revolutionized by superior diagnostic technology, pharmacological advances, once-unimagined anatomic visualization, meticulous functional imaging and space-age intraoperative systems, as well as by the astounding clarity of operating microscopes.

However, these phenomenal developments have not obviated the need to perform complex brain and spine procedures. At Winthrop’s Institute for Neurosciences, the challenge of these bigger, often life-altering operations is met daily by our experienced, skilled and talented neurosurgeons. Even the deepest brain lesions are approached with confidence and the singular conviction that we can perform the procedures safely and effectively.

What’s more, our state-of-the-art Neuroscience Intensive Care Unit — dedicated to patients recovering from extensive neurosurgical procedures, as well as acute neurological problems — has had a significant, positive impact on patient outcomes.

This issue of Progressive Neuroscience features some of the exceedingly intricate neurosurgical procedures we perform, including the occipital/transtentorial approach to excising pineal region tumors, endoscopic removal of third ventricle colloid cysts, surgical clipping of basilar tip aneurysms and advanced treatment of adult spinal deformities. The intraventricular use of tPA and management of increased intracranial pressure are also discussed.

We consider it a privilege to treat your patients with these advanced techniques, and we look forward to continuing our teamwork so that, together, we can provide them with the highest quality care.

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Meningioma in Pineal Region Resected Using Occipital/Transtentorial Approach

At first, 52-year-old EM had a vague feeling that something was not quite right, but she dismissed the fleeting fuzziness that swept across her eyes as a figment of her imagination. Then, she attributed her recurrent headaches to long hours of intensive computer work. Finally, when she felt as if her body was tilting, though she knew she was standing straight, it was time to find out what was happening.

An MRI revealed a large, benign meningioma in her brain’s pineal region, deep in the back of the base of the brain. It was growing downward on the tentorium, pressing into the brain stem, making contact with nearby cerebral veins, blocking normal cerebrospinal fluid (CSF) circulation and causing hydrocephalus. “While meningiomas account for approximately 30 percent of primary brain tumors, and we excise them often, they’re not usually found so deep in the cranial cavity,” said Michael Brisman, MD, Winthrop-University Hospital’s Chief of Neurosurgery. “This one was not only in an unusual spot, it was also too big and deep to benefit

Neurosurgeons removing pineal region tumors must be familiar with all the advantages and disadvantages of the surgical options so they can select the best and most appropriate approach for a particular patient.

Sagittal brain MRI with gadolinium showing a large pineal region meningioma arising from the tentorium.
from radiation. Surgery was our best option even though it was dangerous.”

Because of the area’s complex anatomy and enmeshed venous system, the surgical removal of pineal region tumors is considered exceptionally challenging and fraught with potential for serious morbidity. But, with advances in neuroanesthesia, neuroimaging and microneurosurgical techniques — such as those used by Dr. Brisman — accuracy, safety and outcomes have improved dramatically over the past 20 years.

Neurosurgeons removing pineal region tumors must be familiar with all the advantages and disadvantages of the surgical options so they can select the best and most appropriate approach for a particular patient. Given the location and size of EM’s lesion, Dr. Brisman elected to use the occipital/transtentorial option — a supratentorial approach that provides an extensive and expansive view of the pineal area and excellent exposure of the venous anatomy.

After the customary pre-anesthesia evaluation and assessment of pre-operative neurological status, EM was placed in the “park bench” — semiprone — position and medicated cautiously to relax her brain. Dr. Brisman performed a craniotomy, entering through the back of the skull. He employed stereotactic guidance using the technology’s three-dimensional coordinates to determine the precise location of the meningioma. With advanced microsurgical technology and techniques, he navigated through the tentorium, obtaining excellent exposure of the operative field and gaining access to the tumor. Retraction of the occipital lobe was minimized to avoid injury to the visual cortex. Once the encapsulated lesion was fully resected, the hydrocephalus was resolved and the CSF began to flow normally, obviating the need for shunting.

After the six-hour procedure, EM was transferred to Winthrop’s exceptional Neuroscience Intensive Care Unit, where neurointensivists — physicians with advanced training and experience in critical care medicine and clinical neuroscience — are skilled in identifying and treating even minuscule changes in neurosurgical patients’ clinical status. They vigilantly monitored her intracra-

EM was lucky for many reasons, not the least of which was the fact that her tumor was benign. There are several types of pineal region tumors. Most are malignant, and they can be invasive and life-threatening, with the ability to seed CSF and metastasize to the spine and other parts of the brain. Consequently, they usually require post-operative adjuvant chemotherapy and radiation.

She was also lucky because Dr. Brisman’s surgery was curative, and she returned home to experience an uneventful recuperation. Within three months she was back working at her computer, symptom-free. “When this first started, I thought that if I just ignored what was happening, my symptoms would go away. But, Dr. Brisman made me realize that something was very wrong. Brain surgery is always serious, but his confidence, ability and positive attitude...plus a lot of praying...helped me recover.”

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.
What began as an unremarkable day for 63-year-old JT quickly turned into a grave, life-threatening experience — albeit with a positive outcome.

It started when she began to feel very tired for no apparent reason. Thinking the fatigue would pass, she remained unconcerned even when overcome with uncharacteristic lethargy. What really got her attention, though, was the powerful, piercing pain that erupted in her head.

Not long after that, JT found herself in Winthrop-University Hospital’s Neuroscience Intensive Care Unit (NeuroICU) with a suspected intracerebral hemorrhage. A CT scan and CT angiography ruled out any underlying lesions or aneurysms, pinpointing the condition as a severe primary intraventricular hemorrhage (IVH).

“Unfortunately, we see IVH frequently — especially in patients over age 50,” said Elzbieta Wirkowski, MD, Medical Director of the NeuroICU, which is fully equipped with state-of-the-art monitoring, mechanical ventilation and related intensive care support systems to identify even the most subtle critical neurological problems and provide the specialized, comprehensive care for patients with acute neurological conditions that threaten both survival and brain function.

“Historically, IVH has a poor prognosis, with a high mortality rate,” explained Dr. Wirkowski. “Brain contusions and subarachnoid hemorrhages are commonly associated with IVH, but neither existed in this patient’s case. She had chronic hypertension, which we suspect severely weakened and damaged the cranial blood vessel walls and caused the intraventricular hemorrhaging.”

With JT’s vital signs and neurological activity monitored continuously and painstakingly, the bleeding stopped. But when an external ventricular drain (EVD) failed to remove a large clot in one of the ventricles, hydrocephalus became a real concern, as did the possibility of fatal brain herniation. It was imperative to restore normal cerebrospinal fluid (CSF) circulation. To achieve this, the NeuroICU team — with full-time Board Certified Neurointensivists and highly skilled, Certified Neuroscience Nurses (CNRN), all with expertise at recognizing and treating the conditions that place the brain at risk — decided to employ a novel treatment at the forefront of neurocritical care as a last resort prior to surgery.

They administered low-dose intraventricular tissue plasminogen activator (tPA). “Though employing a thrombolytic agent to correct hemorrhaging seems counterintuitive,” said Dr. Wirkowski, “according to Dr. Daniel Hanley, who developed the procedure, tPA clears trapped blood from the ventricles without increasing the risk of bleeding.”

Winthrop’s NeuroICU team is one of the relatively few neurocritical care teams in the nation proficient in the use of tPA as a treatment for IVH. Prior to administering the tPA, a CT scan was performed to ensure that there was no ongoing bleeding. Using the EVD as a conduit, 1mg of tPA was delivered directly to the clot; the drain was closed, allowing the medication to bathe and interact with the clot for one hour. Then it was reopened to facilitate drainage of the dissolved clot materials.

“Every patient responds differently,” explained Dr. Wirkowski. “There is no standard dosage. The key to success is not only constant observation, but also having the training and skill to know exactly what you’re looking for. If the effect is suboptimal, you very carefully repeat the procedure until the clot breaks up completely and drains. Sometimes the dosage can reach 25mg and the lysed clot materials can take three to four days to drain thoroughly.

“In this patient’s case, the clot broke up after only one bolus of tPA. Normal CSF circulation resumed almost immediately and recovery was excellent. She was very critical when we first saw her, but nothing is hopeless until it’s hopeless. If you have the ability to try novel procedures, such as this one, there’s always a chance for success.”

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Twenty-year-old GC celebrated when she walked away unharmed from the car she had just totaled. But her joy was short-lived: A routine CT scan, to rule out head injury, uncovered a clinically silent — but large (2.5cm) and potentially lethal — colloid cyst buried deep in her brain.

“Colloid cysts are slow-growing and most often asymptomatic,” explained Winthrop-University Hospital neurosurgeon Lee Tessler, MD, who specializes in the multimodality treatment of malignant and benign brain tumors. “While histologically benign, they can become life-threatening, and the risk of sudden death — though low — is real. Typically, the cysts are discovered incidentally when patients like this young woman are scanned for other reasons.”

Colloid cysts account for only about one percent of all intracranial tumors, but they are the most common masses of the third ventricle. They are almost always found posterior to the foramen of Monro in the anterior aspect of the third ventricle, originating on the roof of the structure. Because of their location, colloid cysts can cause acute obstructive hydrocephalus and increased intracranial pressure, which is why they are potentially lethal.

Epithelium-lined, grape-like spheres believed to take root during the embryonic formation of the central nervous system, colloid cysts contain a gelatinous mixture of blood, minerals and cholesterol crystals. Classically, they grow quietly during childhood, announcing their existence during the third-to-fifth decades, when they become large enough (3-40mm) to cause symptoms. Some neuroscientists suggest that the brain may compensate as the cysts grow slowly, thereby forestalling the symptoms.

Presenting symptoms include intermittent, paroxysmal headaches associated with changing head position, which may be due to

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transient obstruction of cerebrospinal fluid (CSF) as the mass behaves like a ball-valve mechanism at the foramen of Monro. Other signs, indicative of the lesion’s pressure on specific cerebral structures, include mild vertigo, decreased memory and behavioral changes so subtle that they often escape diagnosis and treatment.

GC’s was a textbook case: Following the initial CT scan, an MRI pinpointed the location of her asymptomatic cyst. The images, critical to mapping the treatment approach, confirmed that it grew out of the roof of the antero-superior third ventricle between the fornices, with a portion extending into the right foramen of Monro to the lateral ventricle.

“She was neurologically intact, without significant headaches, focal neurological deficits or significant memory problems,” said Dr. Tessler. “While it was a hyperintense mass, sitting in a strategic location, her cyst had not yet significantly blocked CSF flow. If left untreated, increased cranial pressure from the growing lesion could ultimately cause brain herniation or sudden death. We needed to resect the cyst soon and completely.”

Patients with small, asymptomatic colloid cysts may be monitored safely over time, but the definitive treatment for symptomatic and large masses — such as GC’s — is surgical removal. Because of the deep and central location of these benign tumors, surgery can be complex, lengthy and risky.

Conventional open surgical techniques include a transcortical approach with a corticectomy and an interhemispheric transcallosal process involving a frontal craniotomy. State-of-the-art, less-invasive endoscopic stereotactic surgery — through a small incision just behind the hairline above the forehead — has been used increasingly over the past five years.

Dr. Tessler, among a select group of neurosurgeons in the country specially trained to remove colloid cysts deeply embedded in the brain with the use of an endoscope, elected this more minimally invasive technique. “Surgical resection of any brain tumor is challenging because we must minimize manipulation and trauma to the surrounding functional tissue,” he explained. “Neuroendoscopy offers an excellent option. It reduces the risk of damaging important brain structures, requires less time, offers spectacular magnified images of the cyst and speeds recovery with fewer complications than open surgery.”

After making a nickel-sized hole in the skull and a small incision in the dura, he was guided by pre-operative stereotactic images to avoid critical structures as he inserted a peel-away sheath in the frontal horn of the lateral ventricle to create a corridor that would protect the brain tissue from the endoscope’s movement. Then, with great precision, the endoscope was gently threaded through the sheath past the fornix to the third ventricle, which was clearly visualized on a video monitor.

Using miniature, specialized instrumentation, Dr. Tessler first punctured and drained the cyst. Then he slowly peeled it away from its root, suctioning the entire mass through the sheath. To prevent the possibility of hydrocephalus in the future, he completed the process by fenestrating the septum pellucidum between the two lateral ventricles. The procedure, including covering the nickel-sized hole in the skull with a titanium plate, took three hours.

Post-operatively, a ventricular drain was left in place for three days, while GC recovered in Winthrop’s Neuroscience Intensive Care Unit. According to Dr. Tessler, “The chance of the cyst recurring is small, but she should have routine checkups to make certain the third ventricle remains free of a colloid mass.”

Five months post-op, GC is fully functional — working, going to college and, once again, celebrating the outcome of her car accident. This time the celebration is for another reason: “When I totaled my car, I probably saved my life,” she said.

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Aneurysms involving the upper basilar artery, which include...the terminal basilar bifurcation...represent one of the most formidable challenges in neurosurgery.¹

Jonathan Brisman, MD, Director of Cerebrovascular and Endovascular Neurosurgery at Winthrop-University Hospital — and one of the few neurosurgeons nationwide with dual training in microsurgery and endovascular techniques — met that challenge with skill and keen judgment when he recently operated on two patients with basilar tip aneurysms: One, a 47-year-old woman with an unruptured aneurysm, presented with transient numbness and tingling in one arm. The other, a 58-year-old woman who had suffered a ruptured aneurysm, was taken to her local hospital after collapsing and transferred to Winthrop for specialized emergency neurosurgery.

The unruptured aneurysm was picked up on an MRI and confirmed with magnetic resonance angiography (MRA), while the ruptured aneurysm was pinpointed using computed tomography angiography (CTA). Since both saccular aneurysms had wide necks and were located deep in the brain at the distal bifurcation of the basilar artery where it branches into the posterior cerebral arteries, Dr. Brisman elected to use surgical clipping, which involves the permanent placement of a tiny titanium spring clip across the neck of the aneurysm to seal it off from the normal blood circulation in the artery. “The goal of surgical clipping is to exclude the aneurysm from circulation without occluding normal vessels,” he explained. “We must be extraordinarily careful not to compromise any of the adjacent vessels or their small perforating branches, which in the case of basilar aneurysms, unlike other aneurysms, can rapidly lead to disaster.”

Clipping Takes Basilar Tip Aneurysms Out of Cerebral Circulation

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Risky Surgery

“The difficulty of accessing the basilar apex and the complex microanatomy of this region make surgical clipping in the area risky and technically demanding,” said Dr. Brisman. “This is a dangerous and rare operation. Only about seven percent of cerebral aneurysms occur at this spot, and a thorough knowledge of the microvasculature and microanatomy is crucial to selecting the best approach.”

In both cases, Dr. Brisman used a pterional or frontotemporosphenoidal approach because it allows for better visualization of the perforating arteries contiguous to the basilar tip. This type of craniotomy consists of approaching the brain and anterior skull through their lateral aspect by removing the frontal and temporal bones and the greater wing of the sphenoid.

With the aid of a surgical microscope, he gently retracted a small portion of the brain blocking the target area and carefully retracted the temporal and frontal lobes. Then he created a corridor between the carotid artery and the third cranial nerve, locating the aneurysm.

With the ruptured aneurysm, he first employed temporary clipping to staunch the blood flow. Then he placed the permanent clip, pinching off the aneurysm from the parent artery. When intraoperative angiography revealed that the aneurysm was obliterated and the clip was in an optimal position — not inhibiting normal blood flow through the artery and not encroaching on other vessels — the craniotomy was closed, and the patient was moved into Winthrop’s Neuroscience Intensive Care Unit (NeuroICU) for meticulous monitoring.

Careful scrutiny by the NeuroICU staff prevented complications from potential residual aneurysm activity, but a follow-up angiogram revealed an additional aneurysm lobe that had not been seen on the initial angiogram. This time, since the new aneurysm had a narrow rather than wide neck, the patient was a candidate for endovascular coil embolization.

The second aneurysm lobe was located using fluoroscopic imaging, and Dr. Brisman destroyed it by inserting a catheter into the femoral artery, threading it through the vascular system and placing it directly into the aneurysm. Tiny platinum coils were threaded through the catheter and deployed into the aneurysm, forming a mesh that produced thrombosis in the lesion, effectively filling it, sealing it off from artery circulation and preventing rupture.

With the patient who had the unruptured aneurysm, he used adenosine-induced cardiac arrest to help him secure the clip in under two minutes. The adenosine intravenous bolus temporarily causes marked hypotension with a systolic blood pressure of 30 mmHg or less, allowing softening of the aneurysm sac and precise clip placement. The procedure was successful, and after a few days in the NeuroICU for intense observation, she returned home.

“The surgical treatment of basilar tip aneurysms is treacherous because the view is obstructed due to the depth of the aneurysm, overlapping neurovascular and bony structures and the proximity of perforators,” said Dr. Brisman. “With each of these patients, our approach proved to be not only effective, but also safe. Both women have fully recovered without neurological deficits, and are living as they were before becoming afflicted with deep, life-threatening brain aneurysms.”

1. Day A. Surgical approaches to the terminal basilar bifurcation, posterior cerebral and superior cerebellar artery aneurysms. In Operative Neurosurgery, eds. Andrew Kaye and Peter Black, Chapter 84 (Edinburgh: Churchill Livingstone, 2000).
Elevated Intracranial Pressure Managed Meticulously by Neurocritical Care Specialists

The delicate volumetric balance between tissue and fluids within the rigid cranial vault is particularly sensitive.

Slight changes in any one of the compartments — brain, blood and cerebrospinal fluid (CSF) — do not immediately increase intracranial pressure (ICP). However, once CSF is fully displaced, cerebral perfusion pressure (CPP) is altered, and when maximum volume shift is reached, the cranium’s inability to expand usually leads to marked ICP elevation. This can compromise cerebral blood flow and oxygen delivery, rapidly damaging the brain and triggering severe, often-permanent neurological problems. Should the brain herniate, death can occur in as little as 10-20 minutes.

“Increased ICP is unequivocally one of the neurocritical care emergencies associated with high morbidity and mortality,” said neurointensivist Jay Yasen, MD, Associate Director of Cerebrovascular Disorders and Director of the Neurovascular Laboratory at Winthrop-University Hospital. In Winthrop’s Neuroscience Intensive Care Unit (NeuroICU), meticulous monitoring and expert treatment of patients with elevated ICP are standard practice for Dr. Yasen and the unit’s staff of full-time Board Certified Neurointensivists and highly skilled Certified Neuroscience Nurses (CNRN). “While increased ICP is certainly life-threatening, prompt, aggressive treatment can improve outcomes,” added Dr. Yasen. “Many interventions are effective, depending, of course, on each patient’s symptoms and circumstances.”

According to neurointensivist Mohamad Ibrahim, MD, “Understanding the etiology of the increased ICP not only sheds light on prognosis, it is essential to forming an effective treatment plan.” Many conditions — metabolic, toxic, traumatic, infectious and neoplastic — can result in increased ICP; in some instances the condition is idiopathic. Common causes include traumatic brain injury, subarachnoid hemorrhaging, ruptured aneurysm, venous thrombosis, infection (meningitis, encephalitis), intracranial lesions (tumor, focal edema, abscess) and hydrocephalus.

Clinical signs and symptoms that suggest elevated ICP include headache, vomiting and altered mental status (confusion, restlessness, obtundation, progressive unresponsiveness), as well as papilledema, hypertension and abnormal posturing, respiration or pupillary reaction. Once the symptoms are identified, an MRI or CT scan and laboratory tests can often pinpoint the cause, confirm the diagnosis and stage the increased ICP, enabling the specialists to tailor treatment.

- Stage I denotes potential danger from any of the above conditions.
- Stage II indicates a gradual rise in ICP with decreased cerebral perfusion and oxygenation, as well as lowered consciousness.
- Stage III occurs with rapid rise in ICP, loss of autoregulation and increased blood volume, followed by deep labored breathing that grows shallow and results in coma.
- Stage IV results when CPP falls below 30 mmHg, necrosis begins and brain stem respiratory centers are compressed, leading to respiratory arrest and death.

“Neurocritical care specialists know that the injured brain reacts differently to therapeutic maneuvers than the normal brain,” explained Elzbieta Wirkowski, MD, Medical Director of the NeuroICU. “Our experts view the brain as an incredibly complex, heterogeneous structure with a wide variety of focal regional forces constantly affecting one another.”

In addition to managing the underlying causes, major considerations in acute treatment of increased ICP include ensuring adequate oxygenation and cardiac output. Specific strategies for rapidly reducing the volume of one or more of the three intracranial compartments include:

- Inserting an external ventricular drain (EVD) to evacuate CSF and permit ongoing ICP monitoring and measurement.
- Increasing blood pressure in order to raise CPP, increase perfusion and lessen swelling.
- Using hyperosmolar therapy (mannitol or hypertonic saline), which reduces blood viscosity and creates an osmotic gradient that draws cerebral edema fluid from brain tissue into the circulation.
- Inducing hypothermia, which lowers the brain’s metabolic needs.
- Employing decompressive craniectomy, which allows the brain to expand outside the cranium.

“Clearly, we have many established options for controlling intracranial pressure,” said Dr. Wirkowski. “But the NeuroICU staff’s rigorous, constant and careful monitoring of patients — and their ability to detect even the most subtle changes — are crucial to effective management and minimization of morbidity and mortality.”

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.
Recent Advances in Techniques & Technology Transform Adult Spine Stabilization Surgery

Advancements in fixation techniques and technology are revolutionizing spine stabilization surgery for adults with spinal column deformities.

“Spine stabilization surgery is one of medicine’s fastest changing specialties,” said orthopaedic surgeon Marc Agulnick, MD, who collaborates at Winthrop-University Hospital with neurosurgeon Benjamin Cohen, MD, to correct adult spine deformities that cause progressive, debilitating pain in the back or lower extremities. “The rapid evolution of our field has altered the way we practice. New instrumentation made with stronger — yet lighter — metals, improved techniques and a better understanding of the biomechanics of the spine enable us to approach patients very differently today compared with just two years ago.”

With ongoing advanced training and a clear understanding of the surgical innovations transforming their specialty, Drs. Agulnick and Cohen are at the forefront of their field, tailoring their approach to each patient’s unique condition. “Every deformity is different, and every surgical approach varies to accommodate that difference,” explained Dr. Cohen. “But our goals are the same for patients: to eliminate pressure on spinal nerves, stop the deformity’s progression, minimize back pain and neurogenic leg symptoms and finish with a balanced spine.”

Marc Agulnick, MD

“The rapid evolution of spine stabilization surgery has altered the way we practice. New instrumentation made with stronger — yet lighter — metals, improved techniques and a better understanding of the biomechanics of the spine enable us to approach patients very differently today compared with just two years ago.”
Beginning with careful pre-operative evaluation and extensive surgical planning to treat the deformity and ensure that it is neurologically feasible for the patient, Drs. Agulnick and Cohen first determine the surgical approach — anterior, posterior or combined. Once in the OR, they flank the patient, utilizing implanted instrumentation to redistribute the stresses on the bones and keep them aligned properly so that bone fusion can take place.

The lengthy, arduous, complex and risky surgery is seamlessly performed as if the two specialists were melded into one surgeon with four hands. Their joint efforts blend their distinctive skills, expertise and training into an exceptionally productive synergy that continues through the post-operative period and significantly improves the patient's quality of life.

That is exactly what they did for AD, a 56-year-old woman barely able to work because of excruciating pain caused by a thoracolumbar 52º spinal curve. “She had scoliosis that developed and progressed during years of arthritis,” explained Dr. Agulnick. “The degenerative changes resulted from a vicious cycle of asymmetric loading of the spine, asymmetric degeneration and asymmetric deformity. Due to the variability of the condition, degenerative scoliosis is one of the most challenging spine conditions to treat. Her non-surgical therapies had failed, she was living on pain medication, and her quality of life was terrible.”

In most cases, thoracic curves can be treated with a one-stage posterior fusion and instrumentation. AD’s surgery to release and stabilize her spine, as well as relieve her pain, was more complex than most, and involved the combined approach conducted in two stages: Stage one entailed anterior access to the spine and focused on releasing the curve between the L3 segment and the sacrum; stage two, performed posteriorly three days later, addressed deformity between T10 and the pelvis. To support the bone grafts, the surgeons used state-of-the-art instrumentation, including high-grade plastic cages in the front and the latest pedicle screw systems made of the strongest metal alloys in the back.

“Pre-operative view of lumbar curve greater than 60º.”

“In the not-too-distant past, we would have been restricted to using unwieldy rods, wires and hooks, with varying results and rigid spine stabilization,” said Dr. Agulnick. “Today, many of the obstacles of the older-generation technology have been overcome with the development, refinement and strengthening of segmental instrumentation and the new, FDA-approved, pedicle screw systems, which allow us to use shorter rods and fuse fewer motion segments.

“We are correcting stiffer adult curves and restoring sagittal balance once thought to be unachievable. And, we’re getting greater control, correction and flexibility, as well as improved fusion rates, better prevention of pseudarthrosis and ease of post-op management. These advances are providing patients with immediate spine stability and earlier mobility.”

AD recovered and regained her mobility in short order. After eight days in Winthrop’s surgical intensive care unit, she began rehabilitation and returned to work four months post-operatively. She was off all pain medication by month six.

According to Dr. Cohen, the procedures he and Dr. Agulnick perform are enhanced by Winthrop’s spine specialty setup. “We have the most modern equipment, specialized microscopes and highly trained, experienced staff,” said Dr. Cohen. “Additionally, progress in pre-operative assessment technology, anesthetic techniques, intra-operative management and spinal cord monitoring has greatly improved our understanding of post-operative care and the ability to better handle the complexities of this high-risk surgery.”

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.
Contributing Surgeons & Physicians

Dr. Michael Brisman specializes in stereotactic surgery and radiosurgery for brain tumors and trigeminal neuralgia. He is Board Certified by the American Board of Neurological Surgeons and is a Fellow of the American College of Surgeons. His post-graduate training includes a neurosurgical residency and surgical internship at The Mount Sinai Medical Center in New York, where he was Chief Resident. He received his medical degree from Columbia University’s College of Physicians and Surgeons. Dr. Brisman has published numerous articles in professional journals. He is also on the Board of Directors of the New York State Neurosurgical Society and the Nassau County Medical Society.

Dr. Malcolm Gottesman specializes in the treatment of multiple sclerosis (MS), and is the founder of Winthrop’s MS Treatment Program. The program conducts original clinical research and participates in state-of-the-art clinical trials. Dr. Gottesman was instrumental in the establishment of the Stroke Program and Neuroscience Intensive Care Unit at Winthrop. He is Board Certified in Psychiatry and Neurology. His post-graduate training includes a residency in neurology at Long Island Jewish Medical Center, where he was Chief Resident. He also completed an internship and residency in psychiatry at Boston University Medical Center. Dr. Gottesman received his medical degree in an accelerated BS-MR program jointly sponsored by Rensselaer Polytechnic Institute and Albany Medical College. He has published numerous articles in professional journals and presents at national and international conferences. Dr. Gottesman received an MS Leadership award from the Long Island MS Society.

Dr. Marc Agulnick specializes in the treatment of spinal deformities using the latest spine surgery techniques and technology. He is Board Certified in Orthopaedic Surgery. His post-graduate training includes a Fellowship in Adult and Pediatric Spine Surgery at Beth Israel Spine Institute in New York. He completed a residency in orthopaedic surgery and an internship in general surgery at SUNY Stony Brook. Dr. Agulnick received his medical degree from the University of Medicine and Dentistry of New Jersey, where he was elected to the Alpha Omega Alpha Honor Medical Society. He has published numerous articles in professional journals, written book chapters on spinal injuries and spine surgery, and is involved in research examining a wide range of issues associated with the surgical treatment of spinal deformities.

Dr. Jonathan Brisman specializes in cerebrovascular and endovascular surgery for diseases of the central nervous system. As one of fewer than 100 neurosurgeons nationwide with dual training in microneurosurgery and endovascular techniques (and the first on Long Island), he is skilled in aneurysm clipping and endovascular coiling for brain aneurysms, and trained in advanced procedures to treat brain arteriovenous malformations (AVM), carotid disease and acute stroke. His post-graduate training includes an Interventional Neuroradiology Fellowship at Roosevelt Hospital in New York and a Microvascular Neurosurgical Fellowship at Swedish Hospital in Seattle. He completed a neurosurgical residency and surgical internship at Massachusetts General Hospital, where he was Chief Neurosurgery Resident. Dr. Brisman received his medical degree from Columbia University’s College of Physicians and Surgeons. He has published over 30 articles in peer-reviewed neurosurgery journals, including a recent article entitled “Medical Progress: Cerebral Aneurysms” in the New England Journal of Medicine and one on stroke management in Lancet.

Dr. Benjamin Cohen is a Board Certified Neurosurgeon specializing in spinal surgery. His practice includes revision spine surgery, adult scoliosis and the treatment of spinal infection and metastasis. Fully versed in standard laminectomy and fusion techniques, Dr. Cohen has a special interest in minimally invasive procedures, including kyphoplasty, X-STOP™ and microdiscectomy, as well as surgery for spinal tumors. His post-graduate training includes a Fellowship in Complex Spinal Surgery at the University of Alabama, as well as a neurosurgical residency and general surgery internship at the Albany Medical Center, where he also received the House Staff Scholarly Research Award. Dr. Cohen earned his medical degree from The Chicago Medical School, where he was elected to the Alpha Omega Alpha Honor Medical Society. He has authored and co-authored numerous manuscripts and articles in the fields of neurosurgery and the spine, and has given many presentations on these topics.
Dr. Mohammad Ibrahim is a neurointensivist with a special interest in neurosonology (sonographic imaging of the brain, intracranial vessels, spine and nerves).

His post-graduate training includes a Fellowship in Vascular Neurology at the University of Medicine and Dentistry of New Jersey. He completed a neurology residency at SUNY Downstate in Brooklyn and training in internal medicine at the Flushing Hospital Medical Center. He also completed a residency in internal medicine and received his medical degree at Dow Medical College and Civil Hospital in Karachi, Pakistan.

Dr. Lee Tessler specializes in the multi-modeality treatment of malignant and benign brain tumors, which includes stereotactic surgery and radiosurgery. He is proficient in CyberKnife® Radiosurgery. His post-graduate training includes a residency in neurosurgery and internship in general surgery at the New York University Medical Center and Bellevue Hospital Center, where he was Chief Resident. He earned his medical degree at The Ohio State University College of Medicine and Public Health in Columbus, Ohio, with clinical honors in neurosurgery and general surgery.

Dr. Elzbieta Wirkowski specializes in cerebrovascular neurology and neurocritical care. She is Board Certified in Neurology, Vascular Neurology and Neurocritical Care.

Her post-graduate training includes a Cerebrovascular Fellowship at Long Island Jewish Medical Center (LIJ), where she participated in multiple research trials dealing with neurocritical and cerebrovascular problems. She also completed a residency and internship in neurology at LIJ. Dr. Wirkowski earned her medical degree with honors from Warsaw University in Poland, where she also studied molecular biology. She is the author of many publications dealing with neurocritical care and stroke, and presents regularly at national and international meetings.

Dr. Jay Yasen’s primary areas of interest include acute stroke management and cerebral venous thrombosis. He joined Winthrop from Montefiore Medical Center, where he served as Director of Stroke Service for more than six years. Dr. Yasen is Board Certified in Neurology and is a Diplomate in the subspecialty of Vascular Neurology. His post-graduate training includes a Fellowship in Stroke and Neurocritical Care at Beth Israel Medical Center in Manhattan. He completed a residency in neurology at the Albert Einstein College of Medicine and an internal medicine internship at Columbia Presbyterian Medical Center. Dr. Yasen earned his medical degree from the Albert Einstein College of Medicine. He has conducted research into the prevention of second strokes and has authored several publications dealing with stroke.
Winthrop-University Hospital’s Institute for Neurosciences

Winthrop-University Hospital is a 591-bed teaching hospital located on Long Island in Mineola, NY. A major regional healthcare resource, the Hospital has been a leading healthcare provider for more than a century, dedicated to the integrity, dignity and well-being of every individual. Winthrop offers a full complement of advanced inpatient and outpatient services with a deep commitment to medical education and research.

Physicians and surgeons in Winthrop’s Institute for Neurosciences are pioneering the use of technologically advanced approaches for the diagnosis and treatment of diseases of the brain and spine, including computerized imaging systems, state-of-the-art surgical interventions and the latest generation of medication therapies.

The Institute’s interdisciplinary team includes neurologists; neurosurgeons; neurointensivists; pediatric neurologists and neurosurgeons; neuroradiologists; vascular surgeons; orthopaedic spine surgeons; neuro-oncologists; neuropathologists; neurophysiologists; and specially trained nurse practitioners, physician assistants and nurses. Specialized physical and occupational therapy, social work and other supportive services are also key components of the Institute. The Institute’s experts are up to date on the latest developments in neuroscience and help pave the way for new discoveries through participation in clinical research trials, which enable them to provide patients with access to tomorrow’s most promising therapies.

Programs & Services Offered by the Institute for Neurosciences

**Neuroscience Intensive Care Unit**
The 14-bed acute care NeuroICU is reserved for patients with serious, complex neurological issues. The focus is on providing continuous monitoring and instantaneous results of critical values, allowing the expert staff, experienced in using advanced technology and providing neurocritical care, to employ aggressive interventions that treat neurological deterioration.

**Neurology**
- Epilepsy Program
- Movement Disorders Program
- Multiple Sclerosis Treatment Center

**Neurosurgery**
- 3D Spinal Navigation
- Aneurysm Coiling & Clipping
- Disc Replacement
- Brain Aneurysm Program
- Brain Tumor Program
- Brain & Skull Base Surgery
- Carotid Stenting & Endarterectomy
- Cerebrovascular & Endovascular Surgery
- Complex & Minimally Invasive Spinal Surgeries
- Complex Cranial Surgery
- Computer-Assisted Resection of Brain Tumors
- CyberKnife® Radiosurgery
- Endoscopic Pituitary Surgery
- Epilepsy Surgery Program
- Facial Pain/Trigeminal Neuralgia Program
- Image-Guided Spine Surgery
- Kyphoplasty

**Neuroradiology**
- Aneurysm Treatment
- CT Perfusion Scanning
- Interventional Neuroradiology
- Neuroangiography

**Pediatric Neurology**
- Attention Disorders & Learning Disabilities
- Craniosynostosis Surgery
- Brain Tumor Treatment
- Evaluation & Treatment of Children with Headaches
- Evaluation & Treatment of Neurological Disorders

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX.