



Neurosurgery

2019

Restoring Function

Our multidisciplinary team of neurosurgeons and neurologists work together to provide the most advanced care for our patients.



#1

In the nation
in Ability to Rescue

#7

In U.S. News &
World Report

37%

Increase in total visit
volume 2015–2019

5,600+

Neurosurgical
cases in 2019

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Joseph P. Rath, PhD, Professor and Chief, Neurosurgery
Professor of Neurosurgery and Otolaryngology

Quality in neurosurgery is the difference between a good outcome and a transformative one.

It's enabled by technological leadership, multidisciplinary collaboration and advanced surgical expertise all informing the most sophisticated approaches and clinical innovations at our academic institution.

The scientific advancement of neuroscience has enabled us to work to make effective medicine, meaningful medicine, and comprehensive medicine in the most complex cases. Neuroscience is helping medicine understand the brain, mind, and behavior, leading to new cell-based therapies for neurodegenerative

Multidisciplinary Surgical Expertise, Advanced Endovascular Imaging Prove Critical in the Spinal Resection of a Complex Vascular Lesion

When a 62-year-old patient with a history of thoracic myelopathy presented with progressive sensorimotor decline despite previous treatment for a complex vascular lesion, a surgical team with vast endovascular and spinal expertise successfully executed a challenging resection that both relieved the patient's symptoms and restored her function and quality of life.

A CLOSER LOOK AT AN INTRACTABLE VASCULAR LESION

Treatment at another institution for the patient's previously diagnosed spinal arteriovenous malformation had ultimately proven unsuccessful.

This was likely due to a mischaracterization in diagnosing the complex lesion, combined with the added complexities of extensive vascular disease and previous spinal surgeries.

The patient's accelerating decline, with increasing loss of function in her legs, bladder, and bowel, prompted her referral to Anthon K. Frempong-Boad, MD, associate professor of neurosurgery and orthopedic surgeon, for reassessment.

A repeat MRI revealed extensive thoracic cord expansion and edema with enlarged spinal cord surface veins and flow voids from the T6 level down to the conus medullaris. The appearance of this lesion mimicked a dural fistula, which is typically associated with cord venous congestion, explains Dr. Frempong-Boad.

However, a sequential microcatheter-enabled angiogram performed by the neurovascular team and Eric Nossek, MD, associate professor of neurosurgery, demonstrated the presence of a pial, not a dural, fistula supplied by both the posterior spinal artery and the anterior spinal artery. Ultimately, the pial fistula is drained by regional radicular veins into the epidural space, but we believe this patient's drainage mechanism had shut down, resulting in cord venous congestion over time, Dr. Frempong-Boad says.

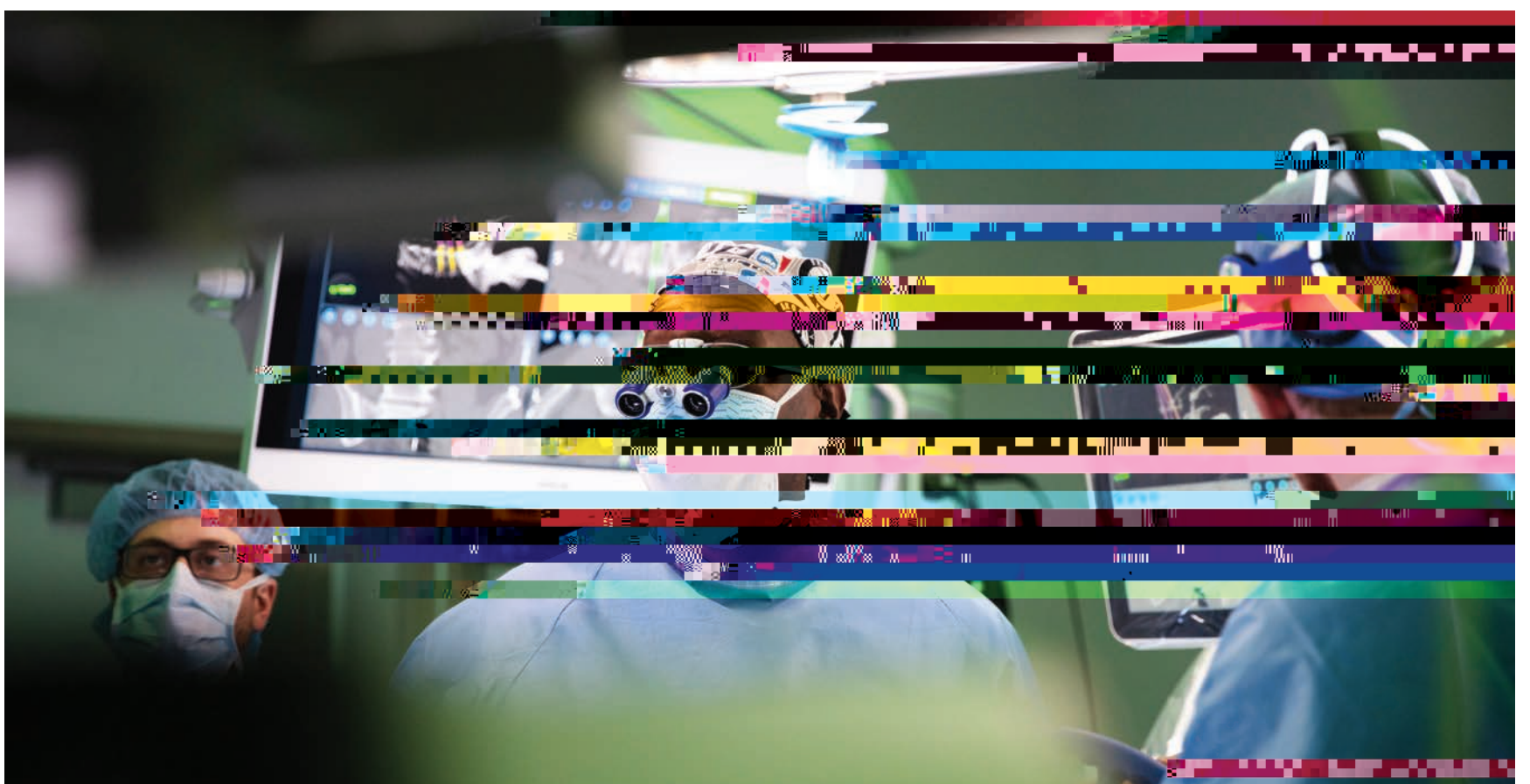
In advance of diagnosis, he explained the other institution's attempts to embolize the lesion, as a dural fistula in itself is a more basic abnormal connection between arteries and veins. For true arteriovenous malformation cases such as this, in which the malformed connection also feeds the main vessel to the spine, greater precision via a more extensive surgical resection is needed to achieve the desired outcomes.

VASCULAR REARCHITECTURE REQUIRES ESSENTIAL EXPERTISE

In documented cases, Dr. Frempong-Boad likens himself to a plumber brought in to rearchitect the highly complex vascular structure surrounding the spine through surgical resection. A robot arm connected to a vein is like a water main connecting directly to a sewer in an apartment building, he notes.

Either the veins burst, causing paralysis, or the artery leaks, becoming more robust and stealing from the apartment building the spinal cord and I need to come in and physically disconnect them.

The complexities of such a diagnosis warranted a collaborative approach shepherded by a multidisciplinary team of highly specialized experts. In this approach, Dr. Frempong-Boad's focused spinal cord expertise was complemented by the neurovascular expertise of Dr. Nossek, enabling them to co-navigate the vascular anatomy and the fistula point for resection.



In addition to orthopedic expertise, we need specialized training allows to combine expertise across the neurological system, says Dr. Frempong-Boadi.

By limiting our practice to focused parts of the anatomy, we each operate within the bounds of our training, thus ending up with both an ascular and spinal neurosurgeon on the same case.

ADVANCED IMAGING TECHNIQUES UNDERPIN SYSTEMATIC SURGICAL PLANNING

With further endovascular procedures related to the lesion's morphology, a multidisciplinary team of neurosurgeons, vascular surgeons, neurointerventional radiologists, and endovascular specialists architected

Enhanced by
complementary expertise
and leading-edge
technology, a culture of
quality and safety is
driving decision-making
across the Department of

RANKED

#1



ZERO



5,600+

Partners



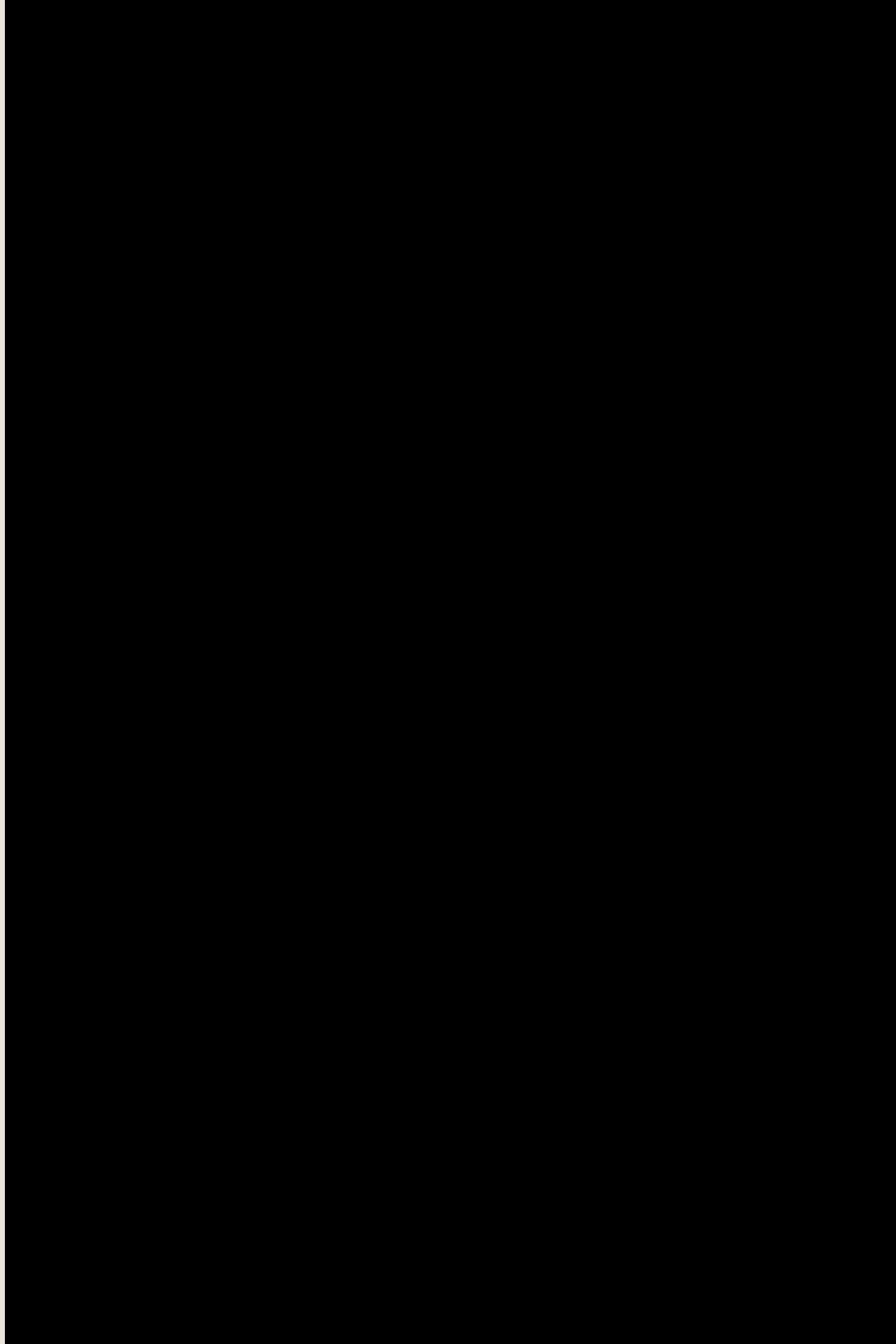
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IN THE NATION IN
ABILITY TO RESCUE

for the development of a resilient and a nation



Recent advances at NYU Langone's Brain and Spine Tumor Center part of Perlmutter Cancer Center are set to refine brain tumor treatment by targeting tumor tissue more precisely. With a novel intraoperative imaging system and collaborative drug trials, center experts are homing in on the nature and location of tumor cells in order to sharpen surgical



A 32-year-old patient consulted with experts at NYU Langone to evaluate her surgical options to address a large aortic aneurysm despite a high-risk presentation. Here, a multidisciplinary team of surgeons rapidly mobilized to help her weigh the inherent surgical risks and develop a treatment plan in the context of additional complexities: the patient was 21 weeks pregnant.



With MRI-enabled precision emerging
from a collaboration with neuro-
radiologists, clinicians at the Center for

