



Barrow Aneurysm and AVM Research Center is making breakthroughs in the laboratory to bring better treatments to patients in Arizona and around the world.

→ **A BRAIN ANEURYSM** bursts in the United States every 18 minutes – that means every three hours, 10 people are affected. Four of those people will die. Four of the six survivors will experience permanent neurological deficits. Arteriovenous malformations (AVMs), tangles of malformed arteries and veins, are less common than aneurysms but more deadly. Half of all AVM hemorrhages are fatal and young people are disproportionately affected. AVM ruptures occur most often in people between 15 and 20 years old.

The Barrow Aneurysm and AVM Research Center (BAARC) seeks to understand the underlying genetics, formation, and rupture of aneurysms and AVMs to discover better ways to detect and treat them, saving even more lives. Our research pushes the boundaries of care beyond our walls, leading to the development of new, less invasive, and more effective treatments for patients around the world.



30,000
people per year
experience a ruptured
brain aneurysm



A brain aneurysm
ruptures every
18 MINUTES



Half of burst
aneurysms happen
in people
UNDER 50

ABOUT BARROW
NEUROLOGICAL INSTITUTE



#1 IN ARIZONA
#11 IN THE UNITED STATES
for neurology and neurosurgery



CLINICAL IMPACT

92,515

BNI Clinic visits

3,135

number of neurosurgeries

1,578

number of spine surgeries

\$2.8 MILLION

amount of charity care



GLOBAL IMPACT

54

visiting scholars, research fellows and observers from Mexico, India, Egypt, Pakistan, UK, Russia, China, Chile, Spain, Brazil, Japan, France, Italy, Kingdom of Saudi Arabia, Indonesia, Turkey, Germany, Poland, Colombia, Philippines, Israel, Argentina and Thailand.

PROGRAM ACCOMPLISHMENTS

Scientists at Barrow's Aneurysm and Arteriovenous Malformation (AVM) Research Center developed a reliable preclinical model for AVMs, a tangle of deformed arteries and veins. The model is the first of its kind and will help scientists develop new, more effective, and non-surgical interventions.

While scientists look for new, better ways to treat aneurysms and AVMS, the center is also being recognized for excellence in clinical treatment. Barrow has been designated as a recognized clinical center by the Angioma Alliance for providing high-quality interdisciplinary care for sporadic and familial cerebral cavernous malformation patients.

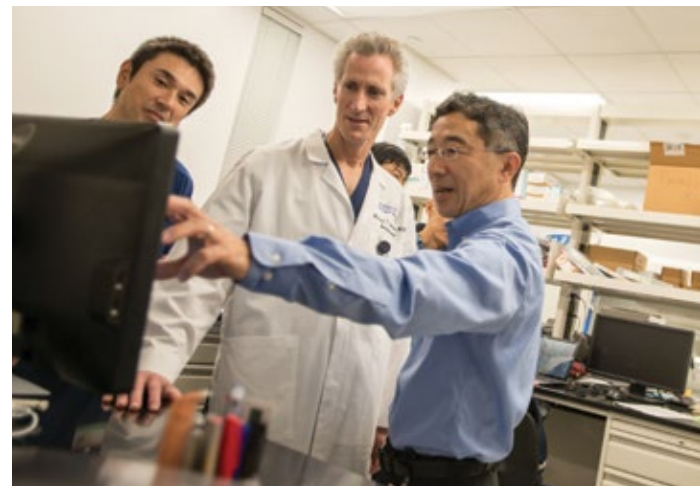
Patients at Barrow are now being enrolled in a trial called ENRICH which stands for **E**arly **M**inimally-invasive **R**emoval of **I**ntracerebral **H**emorrhage, the deadliest, most costly, and debilitating form of stroke worldwide. This study will contribute to the advancement of clinical care for patients suffering from these devastating hemorrhages.

RESEARCH ADVANCES

In addition to providing the most innovative care to patients, Barrow also is committed to finding the best ways to prevent and treat aneurysms. There were several peer-reviewed publications from Barrow scientists in the last year advancing the understanding of aneurysms.

For example, while it is proven that nicotine use increases the risk of rupturing a brain aneurysm, the molecular and cellular processes have not been well understood. A Barrow study published in the medical journal, *Stroke*, identifies a receptor in the brain that may promote rupture. It will take more research to know for sure, but it may be possible to give a drug that would block the receptor thereby preventing the rupture.

Another aneurysm study in the journal, *Hypertension*, examines whether the gut microbiota, the microenvironment in your gastrointestinal system, regulates inflammation and the formation of aneurysms. The preclinical model shows that the idea is worth further examination and that it could advance to clinical trials in humans.



→
Scientists are investigating new ways to prevent and treat aneurysms.



“I didn’t talk about it, but I worried about leaving my family. Dr. Lawton gave me the opportunity to be with them for years to come.”

KIM MANTLE, BARROW PATIENT

Barrow patient Kim Mantle with her husband, Matt, and their daughters Reid, Wells and Liv. ↑

ON THE HORIZON

Heidi Jahnke, RN, MSN, a research clinician, is compiling clinical data to build a reliable database of patient information. The database is called the Barrow Registry for Aneurysm and Vascular Malformation Outcomes (BRAVO). The data cover thousands of patients over three decades and will be used to identify ways to improve clinical care and surgical outcomes. The larger the database, the more accurate and beneficial the information pulled from it will be. Process improvements gathered from BRAVO data have the potential to inform care for patients around the world.

Understanding why and how aneurysms form is critical to the development of the best treatments. Barrow scientists have identified receptors that contribute to the formation and rupture of aneurysms in preclinical models. The next step toward the successful treatment of aneurysms is finding the most effective combination of therapeutic agents to interrupt aneurysms at different points in their development. These drug combinations may decrease the chance an aneurysm will rupture.



RESEARCH

320

active research studies

839

patients enrolled in clinical trials

\$9 MILLION

in federal research grant support



DONOR IMPACT

\$3.98 MILLION

for basic and translational research

\$3.65 MILLION

for strategic initiatives including Barrow Aneurysm & AVM Research Center, Barrow Artificial Intelligence Center, neuroimaging and stroke

\$1.26 MILLION

for education and fellowship programs

\$2.52 MILLION

for community outreach programs



THANK YOU FOR YOUR SUPPORT

Without your generosity, it would not be possible to advance our understanding of aneurysms and AVMs. Finding better treatments will help patients – at Barrow and from around the world.

We could not continue to solve the unsolvable without you.

With Gratitude,
Michael T. Lawton, M.D.

PRESIDENT & CEO, BARROW NEUROLOGICAL INSTITUTE
FOUNDER, BARROW ANEURYSM & AVM RESEARCH CENTER

↑ *Dr. Michael Lawton is the President & CEO of Barrow Neurological Institute.*

Barrow Neurological Foundation raises awareness and funding for patient care, medical education, community outreach and research offered at Barrow Neurological Institute. Barrow is an internationally-recognized leader in neurology, neurosurgery and neuroscience research, treating patients with a wide range of conditions, including brain and spinal tumors, concussion and brain and spinal traumas, neuromuscular diseases, stroke, cleft and craniofacial disorders, and cerebrovascular disorders. It is home to several centers of excellence, including the Ivy Brain Tumor Center, Muhammad Ali Parkinson Center and Gregory W. Fulton ALS and Neuromuscular Disease Center. www.SupportBarrow.org



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