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Treatments for Complex Wide-Neck Bifurcation Aneurysms are Evolving to Provide Better Outcomes

Stony Brook University Neurosciences Institute
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Treating wide-neck bifurcation brain aneurysms remains a complex clinical challenge. Learn about recent advances and research from neuro-interventionalist and researcher David Fiorella, MD, PhD, Professor of Neurosurgery and Radiology at the Renaissance School of Medicine at Stony Brook University.

Wide-neck bifurcation brain aneurysms (WNBAs) have historically been difficult to treat – complex affairs with suboptimal long-term patient outcomes. New research, minimally invasive approaches, and innovative interventional device designs in recent years have worked to improve the treatment paradigm.

In this interview, [Dr. Fiorella](#) discusses wide-neck bifurcation brain aneurysms, the challenges associated with surgical repair, and recent advances in treatment modalities.

Q: What makes wide-neck bifurcation brain aneurysms the most difficult type of saccular aneurysm to treat?

Dr. Fiorella: “Wide-neck bifurcation brain aneurysms form at branch points of blood vessels. The goal of any aneurysm treatment is to occlude the aneurysm without blocking any of the regional parent arteries, which supply blood to various regions of the brain. Wide-neck bifurcation aneurysms are broad-based and often times incorporate into their structure a portion of the primary blood vessel, as well as the proximal aspects of the branch arteries. In these cases, it can be very difficult, particularly using endovascular techniques, to occlude the aneurysm without partially or completely cutting off flow to adjacent normal arteries. In the past, these types of aneurysms either required surgery using an open approach with an invasive craniotomy, or they necessitated the use of a complicated, multi-step endovascular reconstruction, such as stent-assisted coiling. These approaches carry with them significant morbidities, recovery times, and in many cases poor outcomes. However, newer devices, many pioneered at or studied through multicenter trials at Stony Brook Medicine, such as the **Woven EndoBridge (WEB™)** and the **Cerus Contour Neurovascular System™**, allow these types of aneurysms to be curatively reconstructed in a straight-forward, single step, minimally invasive procedure.”

Q: Are treatment difficulties similar for aneurysms originating in anterior and posterior circulation/vessels, or does the vessel or anatomical location of the lesion make treatment more difficult or affect outcomes?

Dr. Fiorella: “Unlike the surgical clipping of aneurysms, which is often times much more dangerous in the posterior circulation than the anterior circulation, the endovascular treatment of aneurysms is typically not affected to a significant degree by the location of the aneurysm. In fact, the most difficult anatomical location for open aneurysm surgery – the basilar apex – is one of the more straightforward anatomical locations for endovascular treatment with the advent of new intra-saccular flow diversion devices like the WEB and Cerus Contour device.”

Q: In 2017, you co-authored a paper in the *Journal of Neurointerventional Surgery*¹ on the safety and efficacy of the prevailing treatments at the time for wide-necked bifurcation aneurysms. The paper concluded that conventional approaches realized low rates of total lesion occlusion and frequent postoperative complications or morbidities. To what degree, if any, has this dynamic changed in the intervening years?

Dr. Fiorella: “The intra-saccular flow diversion devices, that is, WEB and Cerus Contour, have made the treatment of WNBAs much more technically straightforward, faster, and safer. This has been particularly well demonstrated for the WEB device, which has been studied in seven prospective, core lab adjudicated, externally monitored clinical trials. The largest of these trials – the US WEB-IT Trial – observed only one major safety endpoint out of 150 WNBA patients treated with the technology. The Stony Brook Cerebrovascular Center was one of two lead sites in the world for the US WEB-IT trial and was one of the first centers in the US to use the WEB technology. Our Center remains one of the most highly experienced facilities in the world for the endovascular treatment of WNBAs.”



Photo Credit: MicroVention Terumo



WEB™ (Photo Credit: MicroVention Terumo)

Q: Stony Brook Medicine is one of the North American sites participating in the Cerus Contour IDE clinical trial. Have you enrolled any patients in the study to date?

Dr. Fiorella: “Our Cerebrovascular Center is currently the leading enroller in the US IDE trial; we have treated six patients with the Cerus Contour technology to date and expect more in the coming years.”

Q: How does the Cerus Contour differ from past types of occlusive interventional technologies, and how has the device performed in prior trials in Europe?

Dr. Fiorella: “The WEB and Cerus Contour allow for, in most cases a single step, technically straightforward occlusion of even the most complex wide-necked bifurcation aneurysms. Extensive clinical trials of the WEB device have demonstrated just that. The WEB achieves aneurysm occlusion and is the safest technology studied to date with respect to wide-neck bifurcation aneurysm treatment. The Cerus Contour is newer and fewer clinical data exist at this point. However, there are many aspects of the Cerus Contour, which, in some cases provide significant technical advantages over WEB. The initial European data available for the Cerus Contour have been very encouraging with excellent rates of aneurysm occlusion and procedural safety. If a patient has a wide-necked bifurcation aneurysm, I think it is important that the treating physician has expertise in and access to both technologies to offer the most optimal treatment approach for a patient’s particular aneurysm.”

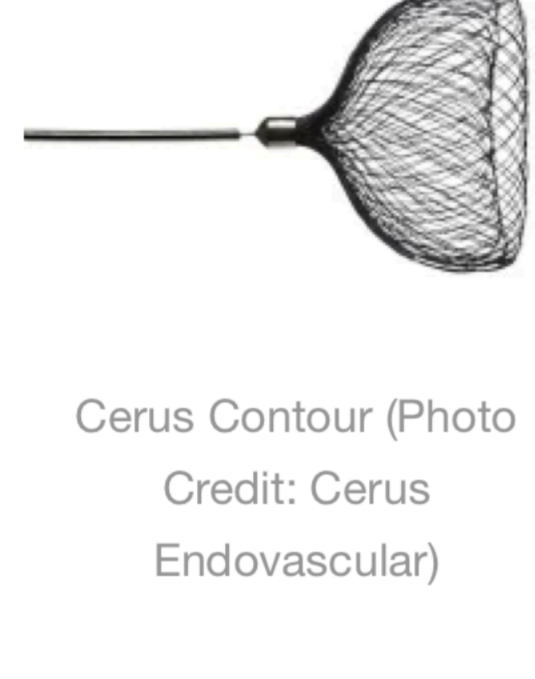


Cerus Contour (Photo Credit: Cerus Endovascular)

Q: Can the Cerus Contour or other devices be used for all types of wide-neck bifurcation brain aneurysms or are there limitations based on size or location of the lesion, or other patient-specific factors?

Dr. Fiorella: “There are many factors that go into choosing a specific device for the treatment of a specific brain aneurysm. There are some aneurysms that are particularly well-suited to treatment with the Cerus Contour. Preliminary experience suggests that the Cerus Contour may be able to treat a wider range of aneurysm shapes and sizes in comparison to the WEB device. But again, patient selection, characteristics, and the expertise of the treating physician are paramount in the decision-making process. Moreover, we are awaiting more clinical data on the Contour device at this point.”

Q: What type of patient may benefit the most from this type of cerebrovascular intervention?



Cerus Contour (Photo Credit: Cerus Endovascular)

Dr. Fiorella: “Many patients with wide-neck bifurcation brain aneurysms may be amenable to treatment with the Cerus Contour. The device is particularly well suited for aneurysms with very wide necks and irregular dome shapes – i.e., aneurysms that are the most challenging for other technologies or approaches. At the Stony Brook Cerebrovascular Center, our team carefully evaluates and treats each patient with the best device for their particular aneurysm. It is never a one-sized fits all approach. Patient and anatomical characteristics must drive the decision to pursue one approach in favor of another. At present, our center is the only one on Long Island currently participating in the Contour US IDE trial (Contour Neurovascular System™ for IntraCranial Aneurysm Repair (NECC Trial)).”

Q: Aside from the Cerus Contour trial, what other clinical trials in interventional neuroradiology are you currently leading at Stony Brook Medicine?

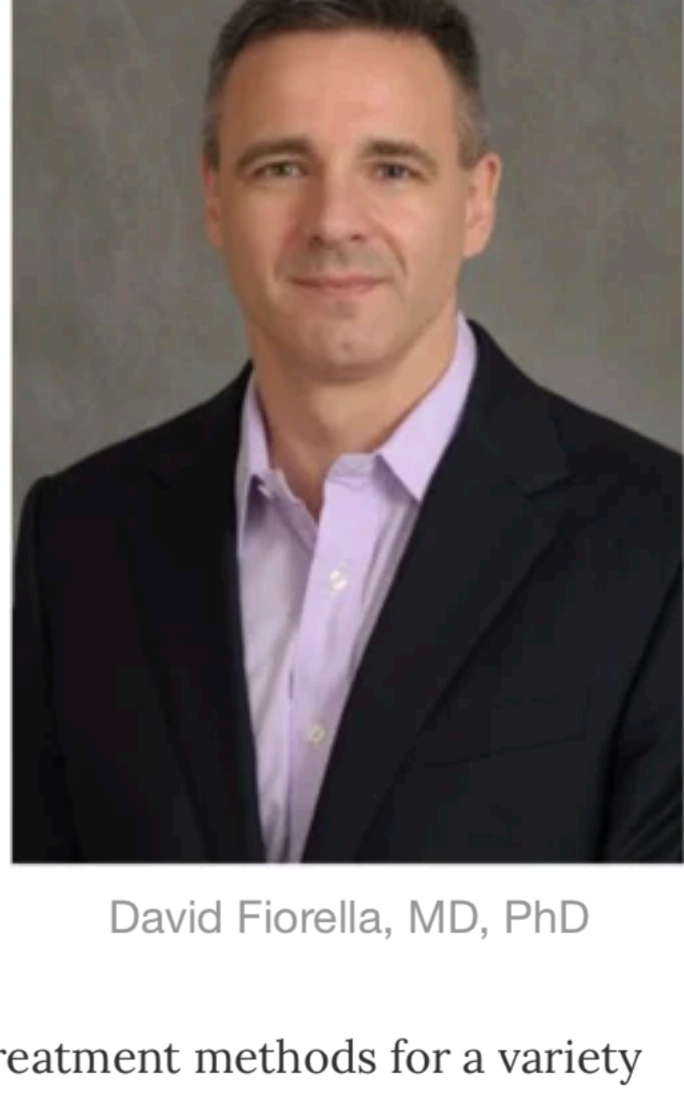
Dr. Fiorella: “We are currently participating in multiple ongoing clinical trials for brain aneurysm treatments, ischemic and hemorrhagic stroke, carotid artery stenting, and chronic subdural hematoma embolization, to name a few. Most recently, in 2021, our program began enrolling patients in the EVOLVE trial which is evaluating the safety and efficacy of the Surpass Evolve low diverter system for treating wide-neck aneurysms. We also are one of two lead centers in the STEM trial that is studying a minimally invasive treatment for chronic subdural hematoma via embolization of the middle meningeal artery. Also in 2021, our program joined the INSIGHT study which is investigating clot composition in ischemic stroke patients.”

Learn more about the [Stony Brook Cerebrovascular Center](#) and its clinical programs and current research projects investigating novel techniques and devices to improve outcomes for patients suffering strokes and other cerebrovascular events.

[Refer a Patient](#)

About Dr. Fiorella and the Stony Brook Cerebrovascular Center

Dr. Fiorella is the Director of the Stony Brook Cerebrovascular Center and Co-Director of the [Stony Brook Cerebrovascular and Comprehensive Stroke Center](#) at Stony Brook Medicine. His work in the field of neuro-interventional therapeutics for treating cerebrovascular events – aneurysms, strokes, and intracerebral hemorrhage – has involved numerous clinical trials as principal or co-principal investigator evaluating new devices and interventional approaches and strategies to improve functional outcomes and reduce mortality from cerebrovascular events. His prior work has included the development of new diagnostic protocols and minimally invasive neuroendovascular treatment methods for a variety of cerebrovascular disorders, particularly brain aneurysms. Dr. Fiorella began the Cerebrovascular Center in 2007 and has shaped it into one of the world’s leading centers for cerebrovascular research and [clinical trials](#), as well as a center of clinical excellence for the minimally invasive endovascular treatments for cerebrovascular disease.



David Fiorella, MD, PhD

In 2018, Stony Brook earned Comprehensive Stroke Center certification from The Joint Commission. Dr. Fiorella’s team at the Cerebrovascular and Comprehensive Stroke Center also is responsible for developing a Mobile Stroke Unit Program, the only one of its kind in Suffolk County. The program’s two mobile stroke units deploy to emergent calls with specialized staff and equipment that can aid in the immediate diagnosis of brain hemorrhages and blood vessel occlusions at the scene. They also are equipped to institute therapeutic interventions in the field prior to transporting the patient to the most appropriate facility for further interventional care. In its nearly three years of operation, the program has shown improved functional outcomes and reduced mortality for patients treated by the mobile units and transported to the hospital versus stroke patients transferred from other hospitals or those arriving at the emergency department.

¹ **Fiorella D**, Arthur AS, Chiacchierini R, Emery E, Molyneux A, Pierot LJ *Neurointerv Surg*. 2017 Dec; 9(12): 1197-1201.

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