

AN INTERVIEW WITH...

Daniela Branzan, MD

Dr. Branzan discusses various technical aspects of current approaches to TAAA repair, her belief in multidisciplinary cooperation, and the advancements she hopes to see during her career in vascular medicine.



What techniques or technologies should be further explored and evaluated to address reintervention rates after thoracoabdominal aortic aneurysm (TAAA) repair?

Reinterventions after endovascular repair of TAAAs are mostly performed to treat endoleaks, target vessel stenosis, kinking, occlusion, and sometimes branch instability or graft migration. To avoid proximal endoleaks, we need long and stable platforms for proximal fixation and seal. Furthermore, the long fixation zone minimizes the risk of movement of the main body and its potential consequence of bridging stent failure and target vessel ischemia. Late branch instability should also be improved with the development of purpose-specific bridging stents. A mix of flexibility and strength is needed in most branches. The ideal bridging stent needs to be able to accommodate both severe angulation and cyclical motion at different diameters. We should not forget the type II endoleak, which has a poorly understood natural history. In my opinion, type II endoleaks are not benign, but rather a cause of late aneurysm ruptures. We are currently developing a technique that consists of routinely embolizing aortic branches of the AAA before endovascular aneurysm repair (EVAR) to prevent type II endoleak after EVAR.

What is your patient selection algorithm for determining which high-risk patients would benefit from endovascular TAAA repair and those for whom the procedure would be past the point of deriving benefit?

First, we must consider that most perioperative risk stratification methods were designed to predict a certain type of event, typically death or specific complications. Second, the prognostic accuracy of a risk stratification tool is not necessarily transferable across different postoperative events. We routinely start with simple risk indexes such as the American Society of Anesthesiologists (ASA) physical status classification system, but the ASA has moderate predictive accuracy. There are also novel biomarkers and online risk calculators that allow for a more accurate and complex assessment of perioperative risk. In my opinion, the risk in such cases involves the stress the procedure will place

on the patient, the patient's ability to withstand that stress toward recovery, and finally, the technical difficulty of the procedure. We take into consideration morbidity, functional status, and quality of life. I see frailty as an important predictor of increased complications from AAA repair procedures. But when an emergency operation is the only hope, we must consider treating the patient. The most important thing after treatment is that the outcome results in a quality of life that is acceptable from the patient's perspective.

You recently received the VIVA/LINC Vascular Career Advancement Award, which recognizes up-and-coming leaders in the vascular field. How do you plan to use these skills of multidisciplinary integration and cooperation, and who were some of the leaders/mentors who have most influenced your own career?

In my opinion, the multidisciplinary approach is the key to success. I have learned so much from working together with interventional angiologists, radiologists, cardiologists, and cardiothoracic surgeons. I have come to realize that the best way to improve the care of patients with peripheral vascular disease is to approach the them in a holistic way with a planned scheme: patient risk, pathology assessment, and anatomic description of the disease afterward. You can only adopt this approach by getting input from the other vascular specialties. By obtaining critical information that allows you to predict risks and outcomes, you can really decide the best treatment for your patients.

I learned the benefits of the multidisciplinary approach early in my career while working at the Heart Center in Bad Krozingen. I was fortunate to start my training program in the Department of Interventional Angiology where Prof. Thomas Zeller introduced me to the endovascular procedures and showed me that even the most challenging cases could be satisfactorily treated with good planning and ingenious techniques. He also had a lot of research ideas, and thanks to him, I wrote my first peer-reviewed article at that time. I then moved to the Department of Cardiothoracic Surgery, where I learned open vascular skills from Dr. Wolfgang Peck and Prof. Friedhelm Beyersdorf. The next step was the move to Leipzig to become a Senior Vascular

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Surgeon in the team led by Prof. Dierk Scheinert. He is a great visionary and I learned from him that if you believe in your ideas, everything is possible. In Leipzig, I have also the great pleasure to work with Dr. Andrej Schmidt from whom I learned so many endovascular procedural tricks.

Can you give us an overview of the technical aspects involved in preconditioning via segmental intercostal artery embolization to prevent spinal cord ischemia during endovascular TAAA repair? What are some of the important points to be aware of, what are the outcomes you've seen thus far, and which patients are the best candidates for this approach?

Segmental artery (SA) embolization is performed under local anesthesia by embolization of the ostial segment of SA at the thoracoabdominal level, without spinal fluid drainage and under continuous monitoring of neurologic function 48 to 72 hours after the procedure. The administration of any antihypertensive drugs is temporarily paused prior to the procedure to allow for permissive hypertension. Through a common femoral artery access using a 5- or 6-F sheath, the SA is embolized with stainless steel or platinum coils over a microcatheter using the coaxial technique. Vascular plugs are used directly via the diagnostic catheters in case of larger SAs. Postembolization angiography is performed to confirm coil/plug position and arterial occlusion or arterial slow flow with anticipation of impending occlusion.

Preoperative SA embolization cannot be achieved in all attempts due to technical reasons, such as the inability to catheterize specific SAs originating from the sac due to vessel tortuosity or the dimensions of the aneurysm. Another limitation is the contrast agent load as well as the time needed to complete the embolization procedure. In this scenario, multiple sessions of SA coiling are performed to achieve occlusion of all the planned SAs. Patients with reduced renal function and a glomerular filtration rate < 30 mL/min/1.73 m², those with preexisting neurologic deficit, as well as those with no relevant or small (< 2 mm) SAs at the aortic area planned to be covered by the stent graft are excluded from embolization of the SAs.

Complete exclusion of the aneurysm is performed no sooner than 7 days after the minimally invasive SA coil embolization (MISACE) to allow for preconditioning of the collateral network. All patients undergo standardized postoperative management with at least 24-hour monitoring in the intermediate care unit. The mean arterial blood pressure is kept at > 80 mm Hg, and the administration of any antihypertensive drugs is temporarily paused. In addition, transfusion of blood products is indicated in the first 48 hours after the procedure to maintain a target hemoglobin ≥ 10 mg/dL.

We have treated 57 patients with this technique so far. After the coiling sessions, we have not encountered any

neurologic deficit. We encountered two nonaneurysm-related deaths in patients waiting for stent graft implantation. After complete endovascular exclusion of the aneurysm in 55 patients, we did not observe any instance of spinal cord ischemia. One aneurysm-related death occurred within 30 days after the procedure. MISACE to precondition the paraspinous collateral network is clinically feasible and very encouraging in terms of safety. However, we still have a lot of open questions: What is sufficient coil embolization? Is the reduction of flow sufficient, or do we need to occlude the vessel? Do we need to coil all of the SAs in the aortic area that are planned to be covered by the stent graft? At what level should we start coiling? How many SAs should we coil per session?

Finally, this technique cannot be applied when urgent repair is required. I really feel we form a strong interdisciplinary team.

As you are relatively early in your career, what is the greatest goal you hope to achieve, or what advancement within the field do you hope to contribute to or witness?

I hope procedures of the future will not only treat established pathology but that they will also aim to prevent significant pathology, based on a better understanding of the disease. An example is our project of ischemic preconditioning of the spinal cord with which we hope to contribute to the prevention of spinal cord ischemia after the treatment of complex TAAA. There are also unanswered questions in the field of the vascular surgery. For instance, we need to find the best management of acute asymptomatic type B aortic dissection, we need to lower the amputation rate by finding better ways to treat end-stage critical limb ischemia (ie, "desert foot") by developing new technologies or finding new methods to promote arterial growth, and we need to develop better techniques to assess the effectiveness of revascularization. Another unanswered question is when to treat asymptomatic carotid artery stenosis. We have started to better understand venous pathology, but we have a long journey to address the problem of chronic venous insufficiency. Last but not least, keeping in mind that most of my practice is performed with exposure to x-rays, I hope to witness the era of truly radiation-free interventions. ■

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