

## AN INTERVIEW WITH...

# Tilo Kölbel, MD, PhD

Dr. Kölbel shares his protocols for false lumen occlusion in TEVAR, updates on stroke and spinal cord ischemia prevention, and more.



**Do you have a go-to technique of choice when performing false lumen occlusion after thoracic endovascular aneurysm repair (TEVAR), or is this choice more often dependent on individual patient factors?**

False lumen occlusion is frequently indicated in chronic aortic dissection when the dissection extends into the abdominal aorta. This technique abolishes false lumen backflow from distal entry tears to segmental and bronchial arteries, which can transduce full arterial pressure into the false lumen and cause continued aneurysmal expansion, even when the true lumen of the descending thoracic aorta is fully covered. False lumen occlusion usually requires extra-large embolization tools. Therefore, my preferred technique is the use of a candy-plug device, which is custom made in sizes up to 50 mm in diameter.

**Although there are no set protocols for the timing of intervention, what is your personal threshold for false lumen growth/size and when to intervene?**

In chronic aortic dissection, I follow current recommendations by the European Society for Vascular Surgery (ESVS) and use a threshold of > 55 mm or rapid growth if asymptomatic. As always, many other individual patient factors need to be considered when forming a recommendation for an intervention.

**What is your definition of “uncomplicated” acute type B aortic dissection (TBAD)? What is the role of TEVAR in these cases, and what factors should guide the timing of treatment?**

Uncomplicated cases are those in which there is no rupture or malperfusion and the patient is not symptomatic or hypertensive under optimized medical therapy. I do not agree with colleagues who negate the existence of such patients, as I frequently see uncomplicated patients with acute TBAD in my practice. Recommending prophylactic intervention with TEVAR for uncomplicated patients who are at increased risk of late false lumen expansion due to certain morphologic factors, such as entry tear diameter and location or aortic diameters, doesn't make them complicated. To use correct terms and wording is central in discussing

and describing patients with TBAD. For instance, *true lumen collapse* is a term that should be avoided, as it is a frequently misunderstood CT finding that may simply describe a highly mobile dissection membrane that is temporarily touching the opposite true lumen intima. This term suggests a perfusion problem, which may not exist.

**Can you provide a brief overview of the most recent findings from the STEP 2 study on stroke prevention after TEVAR and how they may inform or direct future practice? What issues are left to tackle in the next phase of the study?**

STEP 2 focuses on studying neurologic endpoints after proximal TEVAR. There is broad agreement in the advanced interventional community that clinically obvious stroke is too rough and insufficient of a neurologic outcome measure for a treatment that has a silent brain infarction rate of 80%, which is associated with cognitive decline. TEVAR is a highly invasive and costly treatment for life-threatening diseases and deserves outcome examination for its most significant procedural complication: cerebral damage. Clinically obvious stroke is not a sufficient measure in the 21st century. As we screen our patients after endovascular procedures for more rare and less disabling renal failure by laboratory parameters, cerebral outcome should be routinely screened by diffusion-weighted MRI, because it may carry significant consequences for our patients.

**What techniques/strategies do you currently use to prevent air emboli from causing strokes post-TEVAR?**

Patient selection is an important part of reducing stroke risk in TEVAR today, although selection should not be abused to keep a personal or institutional stroke rate low. Even patient subsets with a high stroke rate (eg, those with shaggy aorta) may require TEVAR, and an increased stroke risk should not always prevent treatment if natural history carries higher risk of rupture, dissection, and stroke.

We frequently use clamping of the carotid arteries during complex arch interventions if these precerebral vessels are dissected, as during branched arch endograft interventions. Seike et al recently described the use of a specific occlusion balloon for the left subclavian artery to prevent cerebral embolism, both solid and gaseous.<sup>1</sup>

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One source of stroke in TEVAR is the embolization of trapped air from TEVAR devices. To my knowledge, all available endografts release air during deployment, and air bubbles have a high potential of causing permanent cerebral damage. We routinely flush all our aortic endografts in EVAR and TEVAR today with carbon dioxide before flushing with saline, according to instructions for use, in order to exchange air with a less harmful gas that is more easily absorbed in the blood when released during deployment. Early experience shows encouraging results and the technique has already spread to many institutions throughout the world.

**What would you say are the most critical measures in preventing spinal cord ischemia (SCI) during complex endovascular repair, and what are the biggest current challenges?**

SCI is a poorly understood complication that occurs too frequently during and after complex endovascular

repair. I am glad that a number of well-respected research groups worldwide are focused on understanding and preventing this devastating complication. In my experience, a quick and uncomplicated procedure is the best preventive measure, as most SCI happens when a complex repair gets complicated and includes long operating hours and significant blood loss.

Blood pressure management, staging of procedures, and preservation of segmental arteries are probably the most important factors to consider. I expect us to understand SCI much better in 10 years and hope we will have better ways to predict which patients are at risk in order to prevent SCI.

**As an investigator for the PAPA-ARTiS trial, can you share the impetus for and design of this study?**

PAPA-ARTiS is an initiative led by Professor Christian Etz from the Heart Center Leipzig in Germany to study the effect of minimally invasive segmental artery coil

embolization on the occurrence of SCI after open and endovascular thoracoabdominal repair.<sup>2</sup> It is a multicenter, randomized study that is jointly funded by grants from the European Union and German Research Foundation, as the study has both German and broader European arms.

### **Can you tell us about your experience with transcaval embolization of endoleaks?**

The access from inferior vena cava to the aorta from a common femoral approach is straightforward and has several advantages compared with other access techniques. It offers operators a good distance from their favorite position to the region of interest. It is a safe access approach and frequently allows selective catheterization of contributing lumbar arteries.

### **What do you think were the most significant updates in the ESVS 2019 Clinical Practice Guidelines on the Management of Abdominal Aortoiliac Artery Aneurysms (AAAs) that were published earlier this year?<sup>3</sup>**

In my view, the most significant updates in the new ESVS AAA guidelines are the recommendations for endovascular repair in all segments. This is fundamentally different from the drafted National Institute for Health and Care Excellence guidelines.

### **If you had to choose another country to practice in for 1 year, where would you choose?**

I would choose the Netherlands, as my wife is Dutch and lives in the Netherlands. I appreciate the effectively organized national health system in this country with a strong academic orientation. ■

1. Seike Y, Matsuda H, Inoue Y, et al. Balloon protection of the left subclavian artery in debranching thoracic endovascular aortic repair. *J Thorac Cardiovasc Surg*. 2019;157:1336-1345.e1.

2. Petroff D, Czerny M, Kölbelt T, et al. Paraplegia prevention in aortic aneurysm repair by thoracoabdominal staging with 'minimally invasive staged segmental artery coil embolisation' (MIS<sup>2</sup>ACE): trial protocol for a randomised controlled multicentre trial. *BMJ Open*. 2019;9:e025488.

3. Wanhainen A, Verzini F, Van Herzele I, et al. Editor's Choice—European Society for Vascular Surgery (ESVS) 2019 Clinical Practice Guidelines on the Management of Abdominal Aorto-iliac Artery Aneurysms. *Eur J Vasc Endovasc Surg*. 2019;57:8-93.

#### **Tilo Kölbelt, MD, PhD**

Department of Vascular Medicine  
German Aortic Center Hamburg  
University Heart Center  
Hamburg, Germany  
t.koelbel@uke.de

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