# Frans L. Moll, MD, PhD

An expert vascular surgeon details his approaches to managing type II endoleaks and asymptomatic carotid artery stenosis and shares his thoughts on regulation, reimbursement, and the future of stem cell therapy for CLI.

**In your opinion, what kind of technological development in the carotid space is most needed or highly anticipated?**

Stent design is not yet optimal. It might be better if it more closely followed the anatomy of the bifurcation. Open-cell structure should be improved—either with or without drugs. If you have a symptomatic patient with ruptured carotid plaque, current stent design probably needs additional features, such as drugs in or on the stent to heal the rupture. It is likely too dangerous to place a stent in a highly symptomatic patient. Of course, protection devices are useful with flow reversal and so on, but the stent itself needs improvement.

**What is the correlation between asymptomatic carotid artery stenosis and the risk of different ischemic stroke types in patients with clinically manifest arterial disease? How can this information guide treatment?**

I think that in the future, fewer asymptomatic patients will be treated with an intervention because medical therapy and secondary prevention of vascular disease will improve. Ultimately, when the patient is asymptomatic, the first choice will probably be better drugs.

However, at the moment, I think that there is a reason for intervention in a male patient with a high-grade carotid stenosis. When the patient is a woman, it is different because the chances of becoming symptomatic are much lower. When asymptomatic women stop smoking, exercise, lose weight (if needed), and use the right medical therapy, conservative treatment for carotid stenosis works well and is gaining more recognition.

**How should patients with AAAs who have increasing sac size after EVAR, but no detectable endoleak, be approached? What is known about this scenario?**

First, look at the sealing zones. If the sealing zones—both proximal and distal—are okay and if there is a type II endoleak, I follow the patient with a yearly checkup just in case the aneurysm sac grows. If the sac is growing and the sealing zones are still okay, there is a small risk of rupture. In such cases, intervention is needed—either coil embolization, glue, or thrombin injections into the aneurysm sac. There is no final protocol developed yet; based on the available literature, it's still a mixture of treatments and, from a scientific point of view, no single treatment is better than the other. Future studies are needed for both the patients' health care and, from an economic point of view, for the efficiency of health care resources.

**Do you think type II endoleaks need interventional management? If so, what is your usual approach?**

If the sac is not growing, the current philosophy in northwestern Europe is not to intervene. If you feel threatened by liability issues, you may choose intervention for the 100% guarantee. However, when opting for the intervention, you forget sometimes that each intervention has its own morbidity and (sometimes) mortality risk (even though it's very small [< 1%]). It's always a matter of balance between the risk of the intervention and the risk of rupture when an aneurysm is not growing and the sealing zones are adequate.

**What is your preferred imaging modality for identifying endoleaks? When should follow-up imaging be conducted?**

You need contrast-enhanced magnetic resonance (MR), which is already available in some of the developed countries. The contrast should stick to the blood for a longer time because hidden endoleaks need time from the injection of contrast to the time of arrival into the endoleak. In the future, we will take advantage of this new medium, and we can either have contrast-enhanced Doppler scan, ultrasound, or a contrast-enhanced MR scan. The MR scan is more sensitive than the CT scan, but the stent graft needs to be MR compatible. Several stent grafts are not MR compat-

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ible; such cases require the use of contrast-enhanced ultrasound.

**As the inventor of the Moll-Ring Cutter for iliac and SFA remote endarterectomy, a percutaneous venous valve bioprosthesis that became the model for a sutureless percutaneous implantable aortic valve prosthesis, and someone who has participated in stent graft development, what do you feel is the ideal relationship between physicians and industry?**

It comes down to human integrity. We cannot work without each other; we need each other. I do not agree with authorities, government, etc, that this is a dangerous relationship because, fundamentally, industry and doctors should help each other. If you do not help each other, there's a standstill of development and that's very unnatural. Everybody wants to get a better hip prosthesis, a better heart valve, a better stent in their legs or brains, so it would be strange to block this natural desire for progress. Physician-industry relationships are now under a magnifying glass because, like in every community, there are always people looking for the shortcut to become very rich, which is wrong. The same problem is now going on in banking, both in the United States and Europe.

If you are transparent and disclose the fee you get for any inventions and consultancies, then there is nothing wrong with working with industry. The majority of physicians and good companies are looking for better products to increase quality of life and improve health care.

**What are your thoughts on the current processes by which devices gain approval in Europe versus in the United States? Is one better than the other, or do you think a hybrid of the two would be best?**

In the 1970s, everyone in Europe looked at the United States as a paradise for the proper development of new technology—heart valves, heart-lung machines, prostheses, etc. Then, the United States made regulation very strict, so industry went to Europe to test new devices, usually with American money. There were huge American investors, but the products were tested in The Netherlands, Germany, Italy, and elsewhere in Europe. Now, Europe is the one becoming more strict, and the United States is attempting to give priority (a shortcut) to 10 or 20 promising projects in the health care industry. Europe is looking carefully at this new process. If it turns out to be a solid, reliable, and publicly accepted system, Europe will hopefully also take that route.

**Has it become more difficult to receive reimbursement in Europe?**

Reimbursement is a big issue here and differs quite a lot between European countries. We want to have standard reimbursement for everybody, like in the United States of America, by creating a "United States of Europe." But, that is difficult because of the deep-rooted histories of each country. Reimbursement should be possible for each human being. If you are properly insured, then you should give a device or procedure to everyone who needs it.

At the moment, solving the reimbursement problem is not the number one priority because of the current banking scandals in Europe. I hope that within 5 to 10 years the economy will have recovered, all the noses will be in the same direction, and that we will get these reimbursement issues higher on the agenda. Then, reimbursement will be more or less synchronized between the different European countries.

**How do you foresee cell therapy progressing in the management of CLI? What trials and developments are needed to make this a realistic therapeutic option?**

The enthusiasm from 5 to 8 years ago is now tempered because the very promising results from the first experiments are generally a little disappointing in longer-term follow-up. However, I think there is still a lot of promise. We need to continue with deeper research in the field about how to improve the condition of the stem cells and where to harvest the stem cells—do we harvest them from the bone marrow or do we harvest them from mesothelial cells? If you have a patient with insulin-dependent diabetes mellitus, is the stem cell of that patient equally as good as from a patient without this kind of disease? Then, how do you get that stem cell in the right location? Should it be given via an intra-arterial catheter, or should it be given by punctures in the muscles with tiny injections? All of these questions remain unresolved.

It will probably be another 5 to 10 years before the next steps are more clear, but it has been an excellent start. Now, we have to regroup, continue with research, and answer a number of serious questions. Once those have been sorted out, I predict a good future for stem cell therapy. ■

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