

GE Healthcare

# Moving beyond EVAR

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*“ We now treat patients with  
very advanced disease in very  
challenging procedures.”*



# Everything is moving very fast

## A new class of vascular surgeons is emerging in aortic repair



Thanks to major advances in the treatment of large-vessel aneurysms, the movement to treat vascular abnormalities using minimally invasive techniques is accelerating. Abdominal aortic aneurysms (AAA) represent a genuine unmet medical need, affecting an estimated 5% of adults over the age of 65 years diagnosed with this life-threatening condition. Sudden death is nearly certain for patients in the event of a rupture, whereas the risk of mortality is reduced to less than 5% in the surgical repair of the aneurysm.

Repair of AAA using catheter-based procedures further improves a patient's post-operative recovery compared to a conventional intra-abdominal approach in open surgery. So it is not surprising that patient demand is a key driver

encouraging the shift to an intraluminal procedure.

The rapid improvements and increasing availability of grafts and advanced imaging have given many vascular surgeons

the confidence to adopt the technique, such that today it is estimated that 33% of AAA is achieved by endovascular aortic repair (EVAR) in developed European countries.

Increasing clinical evidence of safety and effectiveness are also encouraging vascular surgeons to apply the techniques learned in EVAR to other procedures. Published papers describe a clinical practice where boundaries are dissolving and document the success of introducing endovascular repair for infrarenal abdominal aneurysms, thoraco-abdominal aneurysms, aortic arch aneurysms, and the ascending aorta using endografts. These advanced procedures can be complex and may combine catheter-based techniques with open surgery to minimize overall invasiveness and optimize the patient outcome.

As a result of this paradigm shift, a new class of hybrid vascular surgeon is emerging, one who is uniquely qualified to introduce the endovascular techniques of a cath lab as he also holds the experience and skill to convert to open surgery in the event of complications.



## A pioneer in aortic aneurysm repair

“I was a resident in 1995 when everything changed in vascular surgery. We really invented the first endograft to repair an abdominal aortic aneurysm in Lille”, recalls Stéphan Haulon, MD, PhD.

“It was exciting, a completely new field going beyond conventional open surgery with planning on 3D workstations and working with an imaging system in the OR.”

Internationally recognized as a pioneer of EVAR Prof. Haulon is also an established expert for surgical outcomes for patients after AAA repair as the author of the new Clinical Practice Guidelines for the European Society for Vascular Surgery.

According to the European Society for Vascular Surgery, Prof. Haulon convinced fellow cardiac surgeons that “open surgery is not the gold but the old standard,” during a debate at the 2010 Joint Session with the Society of Vascular Surgery.

Based at the academic center of Lille, Prof. Haulon’s group at the Cardiovascular Hospital performs 350 aortic repairs each year.

# Merging capabilities to create a Hybrid OR

**Combining endovascular techniques with minimally invasive open surgery creates a hybrid approach for aortic repair that requires a hybrid surgical suite. This new setting merges the familiar equipment of an operating room, such as anesthesia or heart-lung machines, with the high-end imaging capabilities and advanced interventional devices typically found in the cath lab.**

Surgeon control over the diverse tools and technology become critical to procedural success demanding a flexible environment. In the event a case needs to be converted to open surgery, a vital requirement is for the cath lab equipment to be quickly moved to the background leaving the surgeon room to operate.

An efficient design of this surgical suite can also aid a surgical team to effectively respond to the increasing demand for EVAR procedures that is expected to grow 15% annually in some European countries.

How to best combine these requirements in a single setting vary from the extensive investment in a fixed system to the elegantly straight-forward approach of a mobile hybrid OR.

The essential elements for the hybrid vascular surgeon in either design are high-performance imaging capabilities with a floating patient table.



**I am not a radiologist,  
I am a surgeon.**

“It becomes important to have a system that is easy to use and fits well within the operating room setting, moving quickly to the side when we need to perform an open surgery,” said Prof. Haulon.

“A motorized C-arm system combined with a floating table was the key for us to be able to move from routine to advanced aortic endovascular repairs.

Once the C-arm is positioned with the floating table, no one touches the C-arm anymore. Controlling the C-arm myself means the procedure can really fly, simpler and faster.

The team has completely changed with the motorized system.

Now the scrub nurse can focus on the various endovascular tools that need to be prepared.

Other people in the room can take care of the patient and bring the various components we need during the endovascular repair.”

# Engineering that responds to changing needs

The C-arm imaging system is a familiar instrument for vascular surgeons in open surgery, highly valued to guide the surgical act.

For endovascular interventions in the Hybrid OR setting, a mobile C-arm becomes a valuable tool for intraoperative imaging.

Multiple viewing modes are important when guiding catheters through an often difficult vascular access route for device introduction and delivery to the target site. The quality of imaging becomes a critical factor for verifying the position of the endograft and its successful deployment. High end imaging capabilities also assure an immediate postoperative evaluation of the repair to identify device failures, detect endoleaks and assess changes in aneurysm morphology.

The OEC\* 9900 Elite C-arm has been engineered to meet these requirements in close collaboration with innovative surgeons, creating a powerful mobile alternative for hybrid procedures. Latest generation capabilities include a motorization of C-arm movement combined with a joystick control and a pedal foot switch with easy access to imaging modes including fluoroscopy, subtracted fluoroscopy, high level fluoroscopy and road mapping.

Intuitive, fingertip control on a tableside panel leaves a surgeon's hands free for the procedure and keeps the focus on the patient unencumbered by managing technology.



## The image I need when I need it.

“With the control panel I am in charge of everything. I can magnify up, switch fluoro modes or change to any angle. I really have complete control of the system,” said Prof. Haulon.

“I want to make sure I have a good image when I need it, but only when I need it. This is perhaps the most important advantage of the OEC 9900 Elite.

The various angles I can achieve laterally, or craniaudal with the very fast motorized control means I am able to look precisely at what I am doing. When I push a wire, I can always follow that wire.”

“Now, a regular EVAR takes between 45 minutes to 1 hour; before it used to take almost one and a half hours” he added.

When I push a wire,  
I can always follow that wire...



# Manage dose without compromising image quality

High-end imaging no longer requires high-energy output with high-risk radiation.

Vascular protocols designed for the OEC 9900 Elite feature advanced power management that maintains image quality while reducing demands on the system whether in the pulse or low-dose modes, resulting in reduced overall radiation levels.

Optimization of technical factors and anatomy profile enable visualization of vessels in the thoraco-abdominal region and penetration of dense anatomy. Superior tube cooling capacity assures optimum generator performance is sustained during long procedures.

According to the patient's anatomy and procedural objectives, a surgeon can adapt the OEC 9900 Elite to achieve the right balance between image quality and dose.

Branch repair of thoraco-abdominal aneurysms can be real nightmares lasting seven or eight hours.

"There is an enhanced cooling system with the OEC 9900 Elite and I have never had to stop a case because of overheating. I am always able to magnify the way I want on whatever area I need to see," said Prof. Haulon.

"The focus is on dose. If I do not pay attention the staff and I will walk out of the OR glowing in the dark. That is why complete control of the system becomes important.

Depending on the moment in the procedure, I can switch from one mode to another, switch from low dose to pulse modes. The control panel gives me access to control everything."



Data subject to change.  
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Source: EUROPEAN SURGICAL PROCEDURE VOLUMES 2010-  
Millennium Research Group.  
Prof. Haulon does consulting work for GE healthcare

**Due to continuous product improvements, product features  
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