HealthManagement
Promoting Management and Leadership

Volume 14 - Issue 3, 2014 - Matrix

EVAR: The Expanding Applications

Author

Prof. **Fabrizio Fanelli** *(EBIR)*

Professor of Radiology

Vascular and Interventional

Radiology Unit

'Sapienza' University of Rome

Rome, Italy

Prof. **Fabrizio Fanelli** *is the Chairperson of the interdisciplinary Endovascular Aortic Symposium*

(EAS), which will be held in Lisbon, Portugal in September 2015.

Key Points

• EVAR is a minimally invasive alternative to surgical repair for patients affected by an abdominal aortic aneurysm.

• EVAR means reductions in time in hospital, blood transfusion, post-operative recovery time and invasiveness.

• Controversies remain over the presence of endoleaks, re-intervention rates and the durability of the endoprostheses.

• A new device design may overcome the limitations associated with stent grafts

Endovascular abdominal aortic aneurysm repair (EVAR) developed in the late 1980s, and has since then been steadily gaining ground as a minimally invasive alternative to open surgical repair (OR) in select patients.

The Evolution of EVAR

The impressive results first reported by the Argentinian surgeon Dr. Juan Parodi convinced many physicians to deepen their knowledge of this field, and soon different specialties – vascular surgery, interventional radiology, cardiology, cardiothoracic surgery and angiology – were involved in the treatment of the aortic pathology, until then historically restricted to pure vascular surgical subspecialties.

Progressive technological improvements facilitated the diffusion of this technique within the many medical specialties, and the satisfying results attained in several studies and trials spurred more and more physicians to pursue investigations in this field.

This led to significant progress regarding endoprostheses' characteristics, the procedural technique and the physicians' skill, making EVAR a universally recognised treatment option for patients affected by an abdominal aortic aneurysm (AAA).

Obvious Successes

At present, many limitations correlated with AAA morphology have been overcome, and inclusion criteria have been extended to ever more complex anatomical situations. As a consequence, the number of patients suitable for EVAR has steadily increased – a paradigm-shift from the early days, when endovascular treatment was reserved only for patients at high risk for OR, such as elderly people or those with co-morbidities.

Use of EVAR was also notably increased when, thanks to technical progress, new systems of mechanical closure for the femoral approach were introduced.

EVAR's popularity among patients and doctors is strictly linked to the dramatic reduction in hospitalisation time, blood transfusion, post-operative recovery time and invasiveness when compared to standard OR. Last but not least, any time traditional surgery has been compared with EVAR an unquestionable advantage has been noticed: a significant reduction in procedural time.

Ongoing Challenges and Possible Solutions

However, controversies remain over the presence of endoleaks (continuous perfusion of the aneurysmal sac), re-intervention rates and the durability of the endoprostheses.

Endoleaks are the most frequent complication reported in the literature. With a frequency ranging from 10-30%, this event can be considered EVAR's Achilles heel. New generation devices have been specifically designed to improve the sealing and to reduce the endoleak rates, but they are not yet fully validated and further research is necessary.

Technological advances have improved the proximal seal in patients with angulated proximal neck. At the beginning of EVAR's history, the proximal neck was the subject of severe restrictions (2 cm minimum length, absence of calcifications or thrombus, angulation >45o). But nowadays, even a complex anatomy can be successfully treated (angulation <45o, length <1.5 cm), and this means that patients who in the past were unsuitable for both surgery and endovascular treatment can now be considered for EVAR.

EVAR improvement is also correlated with the introduction of FEVAR (fenestrated endovascular aortic repair) in the late 1990s. FEVAR is applied to patients whose abdominal aortic branches are to be treated, and requires an individually customised endoprosthesis for each patient's morphological features, which introduces time and cost limitations. Luckily, a number of companies have recently launched a branched stent graft that can fit different anatomies and is available off the shelf.

To preserve the patency of the internal iliac arteries, a specific branched endoprosthesis is now commercially available. This stent graft allows exclusion of an aneurysm involving the common iliac artery, keeping the internal iliac artery patent. This technical improvement permits the indications for EVAR to be extended to patients with an occluded contralateral iliac artery, without resulting in buttock claudication or visceral ischaemia.

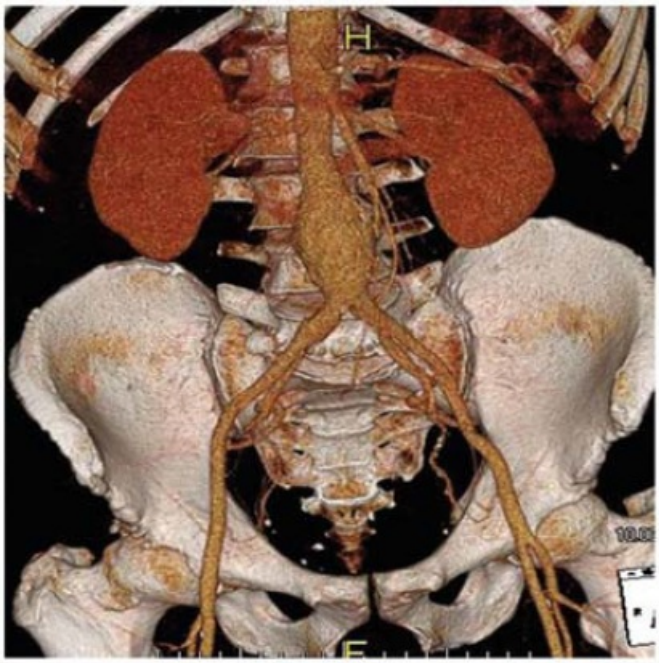

Figure 1.
A 3D reconstruction of a multi-detector CT-angiography shows an aneurysm of the abdominal aorta (Ø 65mm) in a 72-yearold patient. The common iliac arteries are not involved with the aneurysm.

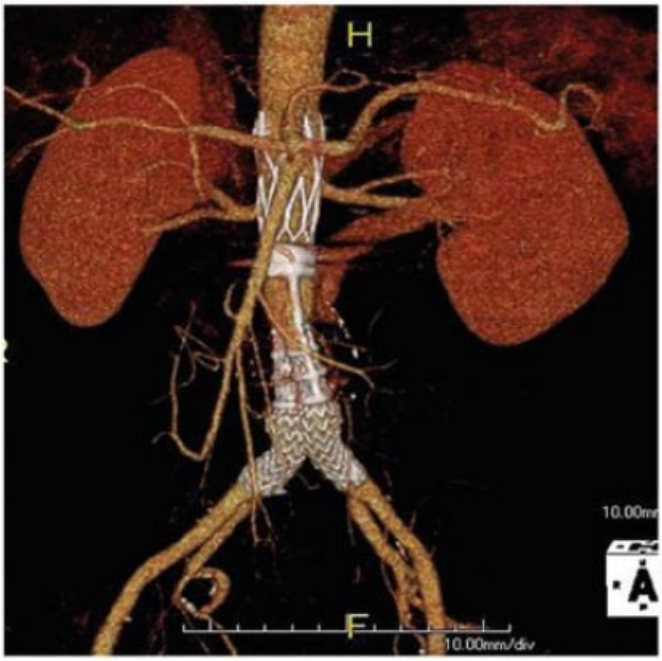

Figure 2.
Multi-detector CT-angiography at 1 year follow-up after EVAR. No reperfusion of the sac is evident. A new generation stent graft was deployed. The sealing rings of the stent graft improve the fixation of the endoprosthesis on the aortic wall reducing the risk of endoleaks.

Towards True Minimal Invasiveness

PEVAR (percutaneous endovascular aortic repair) is a procedure which can be performed with no surgical "cut-down", and consequently EVAR can be considered a true minimally invasive treatment.

The benefits of PEVAR lie, firstly, in the fact that the patient is capable of normal walking soon after being treated, and secondly, in the economic advantages of reduced hospitalisation and convalescence, meaning that working activity can be soon be resumed.

Obviously, PEVAR's technical success depends on accurate patient selection. Fundamental requisites are a femoral artery calibre > 4 mm and absence of parietal calcifications on the anterior wall of the vessel. Results from around the world are satisfying and encouraging, and demonstrate a very low incidence of complications.

More recently, an innovative new device design has been launched, which may overcome many of the limitations associated with stent grafts. Sealing devices, which employ balloon-expandable kissing stents,

endobags and a fast-curing polymer, have been successfully used to form a cast of the lumen. Early results indicate that this might overcome the problems of endoleaks and device migration, as well as being suitable for a wider range of anatomies.

A Team Effort

These advances and more open exciting new possibilities for treating “the silent killer” that is AAA. This plethora of treatment options should be thoroughly investigated to ascertain the optimal indications for each. Interventional radiologists will continue to play a key role, due to their skill in catheter management, but because of the complexity of aortic disease, cooperation with vascular surgeons can be considered fundamental for the continuous evolution of the aortic endovascular therapies.

Published on : Sun, 31 Aug 2014