

Canadian Society for Vascular Surgery consensus statement on endovascular aneurysm repair

Abdominal aortic aneurysm (AAA) occurs in 5% of men and 1% of women over the age of 65. AAA rupture is fatal in 80%–90% of cases when pre-hospital deaths are included. Thus, elective repair should be considered for any AAA with a maximal diameter of 5.5 cm (men) or 5.0 cm (women).¹ Traditional elective surgical repair carries a 4%–5% risk of death. Factors such as increased age and cardiac, respiratory and renal comorbidities can double or triple the risk of perioperative morbidity and death.

Endovascular AAA repair (EVAR) is a minimally invasive catheter-based procedure that offers a viable alternative to open surgical repair. Collapsed grafts (composed of fabric and stents) are introduced over guide wires through small incisions in the femoral arteries, positioned in the aorta under x-ray guidance, and fixed in place with balloon catheters. These devices are held in place by the radial force of the stents and by hooks or barbs that anchor into the aortic wall. Selection of patients with vascular anatomy that meets established criteria improves the chance of complete aneurysm exclusion. For such patients, EVAR reduces the major risks associated with open AAA repair. As is the case with all new surgical procedures, additional training and adequate case volumes are necessary to achieve and maintain expertise.

Since the first case report in 1991, EVAR stent-grafts have evolved from homemade prototypes to commercially manufactured products evaluated in multiple trials. The US Food and Drug Administration initially approved 2 commercial stent-grafts in 1999, and approvals have followed in Canada.

In contrast to open surgery, EVAR does not require an abdominal incision or dissection

and clamping of the aorta. It also avoids significant lower-torso ischemia, minimizes blood loss and reduces the mortality associated with repair as well as the incidence of moderate to severe systemic and local complications.^{2–4} ICU and hospital stays are reduced by more than 50%.⁴ EVAR allows a more rapid return to normal activity than open repair, which can require 3–4 months of recovery time. Although complications are significantly reduced for those who undergo EVAR, technical failures do occur (e.g., incomplete aneurysm exclusion due to “endoleaks,” residual blood leaking into the remaining sac). In one trial, conversion to open repair occurred in only 1.9% of cases.³ Lifelong follow-up is required to monitor the patient for endoleaks, aneurysm enlargement and device migration or failure.

There is an increasing trend toward EVAR for elective AAA repair.² In New York State, EVAR was performed for over 50% of aneurysm patients in 2003. Despite a higher incidence of comorbid conditions in the EVAR group, the mortality associated with open repair was 4.2%, compared with 0.8% for EVAR. The US National Inpatient Sample for 2001 documented that the EVAR group had fewer complications and deaths (1.3% v. 3.8%) and shorter hospital stays compared with the open repair group.⁵

Two randomized prospective trials have recently been published comparing EVAR with open surgery in patients who were healthy enough for open AAA repair. In a study involving 1082 patients, the 30-day mortality was 1.7% after EVAR versus 4.7% after open repair.³ The patients who had undergone EVAR required more secondary interventions (9.8% v. 5.8%); however, most of these were

percutaneous radiological procedures. A smaller study found a similar reduction in operative mortality when EVAR was compared with open surgery.⁴ The incidence of moderate and severe systemic complications was significantly reduced with EVAR (11.7% v. 26.6% for open repair), as was blood loss, incidence of transfusion, and ICU and hospital stay. The mortality benefit is magnified in those judged to be at high risk for open repair: 4.7% in patients undergoing EVAR compared with 19.2% for open repair.⁶ Long-term durability and success is being achieved, although re-intervention rates after EVAR are higher than after conventional surgery.⁷

Summary

EVAR is a minimally invasive approach to AAA repair that lowers operative complication rates and mortality when compared with open surgery. At present, EVAR requires lifelong follow-up because of potential late graft failure; however, with appropriate follow-up the risk of graft failure leading to aneurysm rupture is very low. Internationally, EVAR has become a standard of care for AAA patients with suitable vessel anatomy. Although the device costs exceed those of open repair, at US\$22 862 per procedure the cost-effectiveness of EVAR compares favourably with other life-saving technologies such as coronary artery bypass grafting for left main coronary artery disease (\$9500) and dialysis (\$54 400 per year).⁸ EVAR is continuing to evolve with experience and technologic advances. Devices are being developed and used to improve outcomes for patients with ruptured AAAs and for thoracic, thoracoabdominal and perirenal aneurysms.

Canadian Society for Vascular Surgery recommendations

EVAR is now an accepted part of vascular surgical practice at referral centres. The Canadian Society for Vascular Surgery (CSVS) does not advocate an adjustment to the current thresholds established in the literature for elective aneurysm repair. In the management of an individual patient, all modalities of aneurysm therapy should be discussed before a treatment is selected.

1. The CSVS recommends that EVAR should be the procedure of choice for patients with suitable vascular anatomy who are at intermediate or high risk (6%–10%) for perioperative morbidity or death with open repair.
2. For patients at low risk (2%–4%), open repair remains the current standard. For those with suitable vascular anatomy for EVAR, the final decision should also take into account the patient's wishes. Longer term outcome data are required before EVAR can replace open repair as the treatment of choice for low-risk patients.
3. EVAR procedures require specialized training and co-

operation between specialists with complementary areas of expertise. They should be performed in centres experienced with aneurysm repair and with sufficient EVAR volume to enable appropriate data collection and auditing of results.

4. Appropriate training in endovascular therapies and interventional procedures is required for vascular surgery trainees. Training programs are needed for existing vascular surgeons and interventional radiologists currently in practice to allow this procedure to be safely implemented and disseminated across the country.

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Competing interests: Dr. Lindsay has received travel assistance to attend an interdisciplinary meeting about EVAR sponsored by W.L. Gore & Associates.

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