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Lars Norgren, Thomas Larzon

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Editorial

Endovascular repair of the ruptured abdominal aortic aneurysm

The endovascular technique (EVAR) for elective repair of abdominal aortic aneurysms (AAA) has gained broad acceptance, although great variation exists between the proportion of AAA undergoing EVAR in different hospitals. At present only selected hospitals perform this kind of treatment. Based on the fact that the technical development has been rapid, new devices appear frequently and modifications of existing ones are common, there is still a need to follow up EVAR-treated patients carefully to assess the long-term outcome. Although EVAR causes less trauma to the patient than open surgery, mortality rates of the latter are generally acceptable at approximately 4%.¹ One may therefore conclude that open surgery of elective AAA is still a reasonable treatment option.

The ruptured AAA (rAAA) is quite another challenge to the vascular surgeon. About 40% of those rAAA patients reaching the operating room for open surgery will not survive surgery or the postoperative period.² The question then is to what extent EVAR is suitable for the rAAA, and whether this technique is able to reduce mortality. Ohki and Veith claimed that catheter-based techniques appear to improve outcome for patients with rAAA.³ A study from The Netherlands⁴ concluded that EVAR is feasible in about 40% of rAAA cases. Persistent hypotension and aortic neck morphology were the most common reasons to avoid EVAR. An even lower proportion of feasible patients was found in a French study,⁵ with the same reasons for precluding EVAR. Reported series usually include selected patients for EVAR, those not circulatory unstable and those with favourable neck morphology. Under such circumstances, a 30-day mortality rate as low as 8% for EVAR compared to 53% for open repair has been reported.⁶ With an intention-to-treat all patients by EVAR, Arya, *et al.*⁷ only found 17 out of 51 patients suitable. They reported a 20% reduction of mortality rate in the EVAR group compared to open surgery.

The better way to evaluate the role of EVAR in rAAA would be via a randomized trial that included all patients. Several arguments are used against this approach, raising problems such as unsuitable morphology or persistent hypotension. In a randomized

trial by Hinchliffe, *et al.*,⁸ only 32 out of 103 admitted patients were recruited. Thirty-day mortality was the same for EVAR and open repair (58%). The importance of an established protocol, including a multidisciplinary approach, was pointed out by Mehta, *et al.*⁹ In our first experience, 15 out of 41 patients with rAAA had an endovascular repair, initiated under local anesthesia and with an aortic occlusion balloon inserted through the femoral artery to stabilize hemodynamics. The 30-day mortality rate was 13% after EVAR, and 46% after open repair.¹⁰

In our most recent series, operated on during a 5-year period, 49 patients had an open repair and 44 had an EVAR procedure.¹¹ The proportion of patients with rAAA undergoing EVAR increased from 30% to 78% from the first to the last third of the period. The use of local anesthesia as the single method increased from 15% to 50%. Overall, the 30-day mortality was 43% after open surgery and 11% after EVAR. A mortality as low as 4% (1/24) was recorded during the last third of this time period. Age, sex or proportion of patients refused from surgery did not differ between the periods, neither did the proportion of hypotensive patients vary.¹¹

Some dedicated centers have published encouraging results after EVAR, but there are also centers where improvement has not been obvious. In a recently published Cochrane Review,¹² it was made clear that high-level evidence does not yet exist, while prospective studies at least find as good an outcome after EVAR as after open repair for rAAA. A trend towards lowered mortality, less blood loss and reduced ICU stay was also found. An important issue is whether an abdominal compartment syndrome occurs more frequently after EVAR than after open repair of rAAA due to the amount of blood left in the abdomen and retroperitoneally.¹³ Careful monitoring is of utmost importance with readiness to evacuate blood, as this complication increases mortality.

Patient selection may be one important reason for the variation in outcome that has been published. Another factor might be differences in operative technique. The use of bifurcated or aorto-uni-iliac

stentgrafts might have an impact on the results, as access technique differs and the need for general anesthesia is reduced.

Mortality will also be affected by the proportion of EVAR performed. Hospitals starting with EVAR of rAAA will have to establish new protocols and availability of a 24-hour service. Several challenges therefore remain before one can establish the use of EVAR for rAAA more generally.

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Lars Norgren and Thomas Larzon
 Department of Surgery
 University Hospital
 Örebro
 Sweden

E-mail: lars.norgren@orebroll.se