INVITED COMMENTARY

Popliteal Venous Aneurysm

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Abdominal aortic aneurysm (AAA) repair has evolved significantly during the last two decades. Under many circumstances, endovascular aneurysm repair (EVAR) has largely supplanted open repair. EVAR has been shown to be advantageous in the perioperative period in elective circumstances[1]; nevertheless, it is still unclear whether this holds true during treatment of ruptured aneurysms.

The feasibility of EVAR has been demonstrated for ruptured aneurysms,[2-5] and results have been encouraging when compared with open repair.[6,7] However, comparisons of open repair and EVAR have been plagued by small population sizes, nonrandomized studies, and variability between the open and EVAR groups. In these two studies by Coppi et al and Visser et al, standardization is attempted amongst EVAR and open groups by separating patients into hemodynamically stable and unstable categories, or by excluding all hemodynamically unstable patients, respectively. Prior retrospective studies of ruptured AAA have not attempted to standardize the open and EVAR groups. As a result, a larger number of more unstable, critically ill patients fell into the open group owing to the urgency of their presentation. Only stable ruptured patients were considered for EVAR, thereby creating a favorable bias towards EVAR.

Coppi et al attempt to account for this effect by creating two groups: hemodynamically stable and unstable. Patients were classified as stable if they were conscious or had a systolic blood pressure >80 mm Hg. The authors should be commended for their attempt at separating these categories; unfortunately, these two variables do not entirely define stability. Age, medications, the extent and duration of consciousness, the extent and duration of hypotension, baseline blood pressure, and other variables were not accounted for. Furthermore, the patients were assisted from the time of their presentation by a vascular surgeon and anesthesiologist, a scenario that may not be feasible universally.

Patients were selected for EVAR by their anatomic criteria. This naturally allows a selection bias favoring EVAR. Details such as clamp time, balloon occlusion time, and exact balloon location are not given, which might help determine the risk of procedure-associated morbidity. In addition, details of the patients' stability during the procedure are not given; for example, did open cases have a higher demand for pressors and volume resuscitation? Not surprisingly, the study concludes that patients in the stable group fare better in each outcome measure. A comparison amongst stable and unstable patients between EVAR and open groups would have been interesting to see.

Visser et al also attempt to eliminate selection bias by only including patients who are hemodynamically stable. This is an interesting study with a longer follow-up, out to 1 year. However, patients are once again selected for EVAR or open repair by anatomic criteria, thus creating a bias. Of more importance is that patients who are hemodynamically unstable automatically undergo an open repair and are excluded from this study. This inherently ignores the most interesting question: does a patient with an unstable ruptured AAA fare better with EVAR? Although the patients in this study do have a ruptured AAA by computed tomography imaging, by excluding unstable patients, this study essentially looks at a comparison of urgent EVAR vs urgent open repair. Again, although these patients have a rupture by radiographic imaging, they are clinically stable and may not be much different from elective unruptured patients. In support of this, patients were preferentially treated with bifurcated grafts, just as in the elective EVAR situation.

This study also claims a benefit of EVAR because the aorta is not clamped. This bias is created by excluding unstable patients where balloon occlusion would be necessary. Similar to Coppi et al, this study states that a vascular surgeon, anesthesiologist, and interventional radiologist met the patient in the emergency room (ER) as soon as the ER was notified that a ruptured AAA was en route; however, details are not given about how it was known that these patients had a ruptured AAA before arrival at the hospital. The feasibility of all three specialists arriving in the ER to await the patients may not be universally applicable.

Overall, both studies are quite interesting, and the authors should be commended for gathering these data. Both Coppi et al and Visser et al attempt to compare EVAR vs open repair in patients with a ruptured AAA. Both studies demonstrate that EVAR is feasible, with morbidity and mortality rates equivalent to open repair. The most limiting factors of both studies are that they are small, nonrandomized, and the follow-up is short-term.

Is a prospective, randomized trial of open vs endovascular repair of ruptured aneurysms warranted or even possible? Although it might be optimal to answer this question, patients could not truly be randomized to EVAR because anatomic constraints would guarantee failure in many cases. If patients cross over to open repair because of anatomic constraints, then a selection bias is introduced. For example, patients in both studies with complex aortic necks, significant iliac disease, or both—potentially difficult situations—were repaired with an open technique.

Physicians often do not have the luxury of time necessary for studies to determine eligibility for EVAR. Even in Coppi et al, those patients with severe hemodynamic compromise were rushed to the operating room and underwent aortogram and intravascular ultrasound imaging. These patients were all fortunate enough to undergo EVAR. If the patients failed to be candidates, however, it is unclear whether the time delay incurred by performing the additional imaging studies would have had any adverse effects.

Both studies demonstrated the feasibility of EVAR, but they did not demonstrate any clear advantage over open repair. Some disadvantages were notable. A select number of patients in both studies clearly failed EVAR and subsequently died. These patients may have fared better with open repair, although it is impossible to know. Furthermore, in patients who are hemodynamically unstable, an aortouniiliac graft is favored to halt blood loss. Reports of aortoiliac stent grafts and femorofemoral bypass have demonstrated good results.[8,9] Nevertheless, problems such as graft failure or infection can arise that can cause long-term morbidity.

That said, the improved perioperative results with EVAR in elective circumstances are compelling. Given the high morbidity and mortality associated with open repair of ruptured AAA, improved outcomes would certainly be welcome. Unfortunately thus far, EVAR rupture studies have consisted of small series with significant selection bias. No clear advantage has been demonstrated by EVAR, and firm recommendations cannot be made. While awaiting further study, EVAR for ruptured AAA should be considered on a case-by-case basis, understanding that open repair may be more appropriate in select circumstances.

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