

Routine Computed Tomography Scanning Is Not Needed after Endovascular Aneurysm Repair

NOTES

Geoffrey L. Gilling-Smith, MS, FRCS, Liverpool, UK

Endovascular repair of aortic aneurysm can be performed with lower morbidity and mortality than open surgical repair and this survival advantage is maintained for at least 4 years after operation. An inherent disadvantage of endovascular repair, however, is that the aneurysm remains in situ and susceptible to late rupture should it cease to be isolated from the circulation. For this reason, the integrity of the repair must be monitored throughout the remainder of the patient's life. This commitment to surveillance poses two problems: it is inconvenient for the patient, and it adds significantly to the cost of endovascular repair.

Cost remains an important issue. We may believe that endovascular repair is superior to open repair but those who are responsible for funding and purchasing health care balk at the additional cost of endovascular repair. If endovascular repair is to be accepted as the treatment of choice, the issues of cost and patient acceptance must be addressed. Surveillance protocols should be examined critically to ensure that they are effective, safe, acceptable to patients, and cheap.

The most important risk factors for aneurysm rupture after endovascular repair are graft related endoleak, migration, graft limb dislocation or stent fracture, and fabric tear. Since expansion of the aneurysm may be evidence of persistent or recurrent pressurization of the aneurysm sac and risk of late rupture, surveillance should also include monitoring of aneurysm size.

Historically, surveillance protocols have relied on serial computed tomography (CT) scanning, but this is expensive, time consuming, and hazardous, exposing patients to a substantial cumulative radiation burden and risk of malignancy. Can continued reliance on CT be justified?

The presence or absence of graft related endoleak can be determined by duplex scanning. Migration, impending dislocation of a graft limb, and/or stent graft distortion and fracture can all be detected by plain abdominal radiography. Arguably therefore the only justification for CT is to determine whether or not the aneurysm is expanding.

We retrospectively analyzed our endovascular database in order to determine whether duplex scanning could also be employed to monitor aneurysm size. We identified 99 patients followed up for at least 1 year in whom both CT and ultrasonographic (US) scans had been performed throughout the follow up. For each, CT and US measurements of maximum aneurysm diameter (MAD) were plotted and independently examined by two observers. At each follow-up interval MAD was compared with first postoperative and most recent MAD to determine if the aneurysm was expanding, shrinking, or stable. A change > 5 mm was considered significant. CT and US findings were compared to determine level of agreement.

In three patients CT revealed expansion when US did not. In each case, US revealed expansion at the next follow-up interval. No cause for expansion was identified or intervention required prior to US diagnosis. In 18 patients US revealed expansion when CT did not. In 6 of these expansion was revealed on subsequent CT. In the remaining 78 patients, CT and US were concordant.

We concluded that in our institution duplex scanning can reliably detect expansion of the aneurysm after endovascular repair. Routine CT scanning is therefore unnecessary. Our patients now undergo duplex scanning, plain abdominal radiography and baseline CT scanning 1 month after endovascular repair. Thereafter patients undergo annual duplex scanning and plain abdominal radiography. CT scanning is only performed if duplex scanning is technically unsatisfactory, equivocal, or reveals a problem.

Abolition of routine CT scanning has resulted in a significant saving so that the cost of endovascular repair plus surveillance up to 4 years is close to the cost of open surgical repair. A reduction in the frequency of examinations combined with a very significant reduction in the cumulative dose of ionizing radiation are additional and important benefits for the patient.