Abdominal aortic aneurysm—can we improve on current management?

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Background—One of the challenges of vascular surgery is the emergency repair of ruptured abdominal aortic aneurysm (AAA). Many patients will die of massive haemorrhage before they reach the hospital or the operating theatre. We know from validated audit data supplied by New Zealand surgeons that the operation carries a 40% mortality in this country,\textsuperscript{1} which is similar to outcomes reported in the rest of the world.

Every year, over 400 New Zealanders die from AAA\textsuperscript{2} and many of these are preventable deaths. At present, patients depend on having their aneurysms diagnosed incidentally, and then an elective operation with a 4% risk of mortality\textsuperscript{1} can be done. Because most AAA are asymptomatic until they rupture, this system of “diagnosis by luck” leads to many emergency operations with poor outcomes.

Solution—There is a better way. An ultrasound screening test is an accurate, quick, painless and relatively inexpensive method of finding aneurysms before rupture.\textsuperscript{3} The Multicentre Aneurysm Screening Study (MASS) in the UK invited 33,000 men to have an ultrasound—80% responded and 5% of these men were found to have an aneurysm.\textsuperscript{4} A similar number of men were randomised to a control group without scanning.

After a follow-up of 4 years, AAA-related mortality was lower by 42% (95%CI 22–58%; p=0.0002) in the invited to scan group, and it was 53% lower in the men who actually attended screening. As a result, the previous risk of dying of AAA (3.3 per 1000) was reduced to 1.9 per 1000.

MASS mortality rates were 6% for elective AAA repair and 37% after emergency operation, similar to those in New Zealand. On the basis of this and three other randomised screening trials (which have also shown an advantage for screening), the US Preventive Services Task Force in 2005 recommended one-time screening for men over 65 years who have smoked at any stage.\textsuperscript{5}

Some would argue that this is too limited and that age should be 60 years, as 65 years misses 10% of aneurysms which rupture and also about 22% of aneurysms occur in nonsmokers.\textsuperscript{6} In New Zealand, there is additional reason to scan at 60 years—as although Māori men have an equal incidence of AAA to those of European descent they are diagnosed (47% ruptured) at an average age of 65 years rather than 72 years for non-Māori.\textsuperscript{7} Most would accept early screening of relatives of AAA patients who are at even higher risk—as shown in an Otago study where 19.4% of AAA patients’ siblings were found to have aneurysms.\textsuperscript{8}

AAA screening would not be cheap, but in terms of cost-efficiency, it is in the same realm as breast screening. Costs are projected to reduce with time, and in one study, 13 years’ screening resulted in a reduction of mortality from ruptured AAA of 75% (95%CI 58–84%). “The number needed to screen to prevent one death reduced from
1380 after 5 years to 505 after 13 years. The number of elective AAA operations needed to prevent one death reduced from 6 after 5 years to 4 after 13 years”.

One normal ultrasound scan has been shown to be sufficient to practically exclude ruptured AAA within the lifetime of the patient. Screening has been shown to be of no benefit in women without a family history of AAA. Women have a considerably lower incidence of AAA and present at an age 10 years later than men. In the future, genetic testing may provide even more accurate detection from a young age.

**Who to screen?**—Only people who would be fit for surgery:

- >50 years, close relatives (male and female) of AAA patients
- >60–75 years, all other males, one-time scan

**A surveillance protocol for small aneurysms**—Large aneurysms usually need urgent open or endovascular repair but small aneurysms need surveillance as discussed in this issue of the *Journal* by Buckenham and colleagues (*Abdominal aortic aneurysm surveillance: application of the UK Small Aneurysm Trial to a New Zealand tertiary hospital*; N Z Med J 2007;120(1251). [http://www.nzma.org.nz/journal/120-1251/2472](http://www.nzma.org.nz/journal/120-1251/2472)).

The following simple protocol is suggested for patients fit for surgery.

- Maximum aortic diameter
  - <2.5 cm, normal, no further scans
  - 2.5–2.9 cm, ectatic, repeat scan in 5 years (if fit)
  - 3.0–4.5 cm, small AAA, yearly scan
  - >4.5 cm, 6-monthly scan

Review by Vascular Surgeon for maximum aortic diameter

- Women
  - if AAA >5 cm
- Men
  - if AAA >5.5 cm
- Men and women
  - if >1 cm increase in 1 year or if symptoms develop

**What is the best medical management for small aneurysms?**—Screening will find more small aneurysms. While waiting for surgery, stopping smoking will improve fitness and reduce the rate of aneurysm growth. Hypertension should be well controlled. Both beta-blockers and statins improve the cardiovascular outcome from surgery. There is a suggestion that statins may inhibit the enzymes responsible for weakening the aortic wall. It is also possible doxycycline may have a similar effect, but at present its use is experimental.

Finally, in the US (since January 2007), Medicare have started to fund a single screening ultrasound for men who have smoked and men and women relatives of AAA patients 65 to 74 years of age. With strong evidence now from randomised trials that lives can be saved, perhaps it is time New Zealand considered screening for AAA.

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References:


