THERAPEUTICS

Screening ultrasonography for abdominal aortic aneurysm reduced mortality in older men and was cost-effective in the long term

Kim LG, Scott RA, Ashton HA, Thompson SG. **A sustained mortality benefit from screening for abdominal aortic aneurysm.** Ann Intern Med. 2007;146:699-706.

Clinical impact ratings: GIM/FP/GP ★★★★★☆☆ Cardiology ★★★★★★☆ Geriatrics ★★★★★★☆

QUESTION

In older men, does screening ultrasonography for abdominal aortic aneurysm (AAA) reduce mortality and improve cost-effectiveness in the long term?

METHODS

Design: Randomized controlled trial (RCT) (Multicenter Aneurysm Screening Study [MASS]) and cost-effectiveness analysis from a health service perspective.

Allocation: {Concealed}†.*

Blinding: Blinded {data collectors and outcome assessors}†.*

Follow-up period: Mean 7.1 years (range 5.9 to 8.2 y).

Setting: 4 centers in the United Kingdom.

Patients: 67 770 men 65 to 74 years of age (mean age 69 y) who were registered with a family physician. Exclusion criteria included known AAA, previous surgery for AAA, or terminal illness.

Intervention: Invitation for screening ultrasonography for AAA (n = 33 883) or no invitation for screening (n = 33 887). Patients with aortic diameter (AD) ≥ 3.0 cm had AAA and were invited for recall scans to monitor growth. Those with AD 3.0 to 4.4 cm were rescreened annually; those with AD 4.5 to 5.4 cm were rescreened every 3 months; and those with AD ≥ 5.5 cm, aortic expansion ≥ 1.0 cm/y, or symptoms of aneurysm were considered for elective surgery. Patients with AD < 3.0 cm were not rescreened.

Outcomes: AAA-related mortality (death within 30 d of any AAA surgery or because of AAA with or without rupture or at an unspecified site), all-cause mortality, and cost per quality-adjusted life-year (QALY) gained. Costs were estimated in 2004 to 2005 U.S.$ with a 3% annual discount rate.

Patient follow-up: 98% (intention-to-treat analysis).

MAIN RESULTS

At a mean 7.1 years, the screening group had lower incidences of AAA-related and all-cause mortality than did the no-screening group (Table). The cost-effectiveness was estimated at $19 500 (95% CI 12 400 to 39 800) per QALY gained for AAA-related mortality and $7600 (CI 3300 to ∞) per QALY gained for all-cause mortality. 1-way sensitivity analysis showed that U.S.-based costs for scans and surgeries and a 50% increase in consultation costs led to a cost-effectiveness of $30 800 (CI 19 700 to 62 600) per QALY gained (costs retained at 2000 to 2001 U.S.$).

CONCLUSION

In older men, screening ultrasonography for abdominal aortic aneurysm reduced mortality and was cost-effective in the long term.

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*See Glossary.

†The **Multicentre Aneurysm Screening Study Group.** Lancet. 2002;360:1531-9.

Screening ultrasonography for abdominal aortic aneurysm (AAA) vs no screening in older men at a mean 7.1 years‡

Outcomes	Screening	No screening	RRR (95% CI)	NNS (CI)
AAA-related mortality	0.31%	0.58%	47% (32 to 58)	369 (299 to 542)
All-cause mortality	20%	21%	3.6% (0 to 6.3)	134 (77 to ∞)

‡NNS = number needed to screen; other abbreviations defined in Glossary. RRR, NNS, and CI calculated from control event rates and hazard ratios in article.

COMMENTARY

The 7-year follow-up of the MASS trial by Kim and colleagues clearly showed a sustained and significant reduction in death from AAA in British men who were offered ultrasonographic screening for AAA compared with men who were not offered screening. The benefit of AAA screening may be larger than this RCT suggests because only 79% of men offered screening were actually screened.

The incidence of AAA depends on the characteristics of the person screened: 1) AAA prevalence is about 4 times greater in people who have ever smoked than in nonsmokers, and 2) AAA prevalence is 6 times greater in men than in women (1). If we assume these differences in prevalence, a smoking rate of 50%, and that MASS results apply to women, we can extrapolate number needed to screen (NNS) values from MASS. Given these assumptions, the 5-year NNS to prevent an AAA death would be 335 for a man who ever smoked, 536 for all men, 1340 for a nonsmoking man, 2011 for a woman who ever smoked, 3217 for all women, and 8044 for a nonsmoking woman.

These values compare favorably with published NNS values for other screening strategies—for example, a 5-year NNS of 1251 for mammography to prevent a breast cancer death in women 60 to 69 years of age and a 5-year NNS of 418 to prevent all-cause mortality by screening for dyslipidemia followed by pravastatin treatment (2). The cost-effectiveness analysis for AAA screening in this study also suggests that it is within the range of other accepted screening tests. AAA screening at 65 years of age seems to be especially effective in men who have ever smoked and may also benefit nonsmoking men and women who have ever smoked.

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References

1. **Fleming C, Whitlock EP, Beil TL, Lederle FA.** Screening for abdominal aortic aneurysm: a best-evidence systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2005;142:203-11.
2. **Rembold CM.** Number needed to screen: development of a statistic for disease screening. BMJ. 1998;317:307-12.