

# Screening for abdominal aortic aneurysm reduced death from AAA in older men

The Multicentre Aneurysm Screening Study Group. **The Multicentre Aneurysm Screening Study (MASS) into the effect of abdominal aortic aneurysm screening on mortality in men: a randomised controlled trial.** *Lancet.* 2002;360:1531-9.

## QUESTION

In older men, does ultrasonographic screening for abdominal aortic aneurysm (AAA) reduce death from AAA?

## DESIGN

Randomized (allocation concealed\*), blinded (data collectors and outcome assessors),\* controlled trial with mean 4.1-year follow-up (Multicentre Aneurysm Screening Study).

## SETTING

4 screening and 4 academic centers in England, UK.

## PATIENTS

67 800 men who were 65 to 74 years of age (mean age 69 y) and were identified from family physician and Health Authority patient lists. Family physicians excluded patients (without knowledge of randomization) they considered unfit to be screened, including those with terminal illness, other serious health problems, or previous AAA repair. Follow-up for mortality was 99%.

## INTERVENTION

Men were allocated to be invited ( $n = 33\ 839$ ) or not invited ( $n = 33\ 961$ ) for screening.

The invited group received by mail an invitation on the family physician's letterhead, an information booklet, and a questionnaire. Those accepting the invitation attended a clinic and had an ultrasonographic scan of the abdominal aorta. Scan results were sent to the family physicians. No contact was made with men in the uninvited group with respect to screening.

## MAIN OUTCOME MEASURES

Death from AAA. Secondary outcomes were all-cause mortality, ruptured AAA, and quality of life.

## MAIN RESULTS

80% of men in the invited group accepted the invitation and were scanned. Fewer deaths from AAA occurred in the invited than in the control group (Table). Adjust-

ment for patient age and screening center did not affect the result. Ruptured AAA was also lower in the invited group (Table). Groups did not differ for all-cause mortality. Groups did not differ for anxiety, depression, or health status measures.

## CONCLUSION

In older men, ultrasonographic screening for abdominal aortic aneurysm (AAA) reduced death from AAA without any detectable reduction in quality of life.

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\*See Glossary.

## Invited vs not invited for abdominal aortic aneurysm (AAA) screening at mean 4.1 years†

Outcomes	Invited	Not invited	RRR (95% CI)	NNS (CI)
Death from AAA	0.19%	0.33%	42% (22 to 58)	712 (500 to 1000)
Nonfatal ruptured AAA plus AAA-related deaths	0.24%	0.41%	41% (23 to 55)	589 (334 to 1000)

†NNS = number needed to screen. Other abbreviations defined in Glossary; RRR, NNS, and CI calculated from data in article.

## COMMENTARY

In the study by the Multicentre Aneurysm Screening Study Group, ultrasonographic screening, compared with usual care, decreased aneurysm-related mortality and aneurysm rupture. Causes of death were identified in the entire population, and compliance with the screening program was high. Operative mortality in this study was higher in the control than in the treatment group (21% vs 6.5%,  $P < 0.001$ ), magnifying the benefit of screening. In addition, the results cannot be generalized to women or to men  $> 74$  years of age. In an older population, comorbid conditions compete for death and affect both the results of surgery (increased mortality) and the benefit of screening (reduced life expectancy).

Screening potentially prevents 14 aneurysm-related deaths per 10 000 patients over 4 years, which is a relatively small number compared with the total number of expected deaths (290 deaths per 10 000). This suggests that screening is unlikely to have a substantial effect on the overall burden of deaths at a population level (about 1% of deaths/y in these moderately high-risk patients) or at the individual patient level. The first reason is that not all deaths, even in patients with aneurysms, result from rupture. The second is related to Geoffrey Rose's preventive paradox (1). In a moderately high-risk population, a large proportion will have only small-to-moderately sized aneurysms

(3 to 4.5 cm). Theoretically, offering surgery to these patients would reduce a large number of deaths at a population level but slightly change the risk for death of each individual patient. In addition, surgery carries a substantial risk for mortality and morbidity and is resource-intensive compared with other cardiovascular risk prevention strategies. While screening may be cost-effective in the British nationalized health care system (2), it requires careful scrutiny and consideration of the large number of repeated ultrasonography scans for small (3 to 4.5 cm) aneurysms.

Until further research identifies patients at higher risk for aneurysm rupture, screening is acceptable, but not mandatory, in older men who are suitable candidates for surgery and who would undergo surgery if an aortic aneurysm  $> 5.5$  cm was found.

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## References

- Rose GA. *The Strategy of Preventive Medicine*. Oxford: Oxford University Press; 1992.
- Multicentre aneurysm screening study (MASS): cost effectiveness analysis of screening for abdominal aortic aneurysms based on four year results from randomised controlled trial. *BMJ.* 2002;325:1135.