

Screening for abdominal aortic aneurysms in men

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Gloucestershire's screening project shows the potential benefits of a national programme and how it could be run

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Every year about 6000 men die from a ruptured abdominal aortic aneurysm in England and Wales.¹ Although this represents only about 2% of all deaths in men, the condition is largely preventable. It is also a disease that seems to be increasingly prevalent, at least in Scotland, despite the fact that deaths from other atherosclerotic conditions are reducing.² This article explores the requirements for a national aortic screening programme, using as a model the Gloucestershire aneurysm screening project, which has been running for 13 years.³

Evidence for screening

Ultrasound screening for abdominal aortic aneurysms fulfils all the criteria for a population screening programme,^{4 5} although only in men.⁶ The recent multicentre aneurysm screening study found that screen-

ing reduced the mortality from aneurysm disease in men by 42% after four years of follow up; it is expected, with further study, to show a small but significant decrease in the population mortality.⁷ The study also showed that screening is as cost effective as other current screening programmes, at a cost of £28 000 for each added year of life.⁸

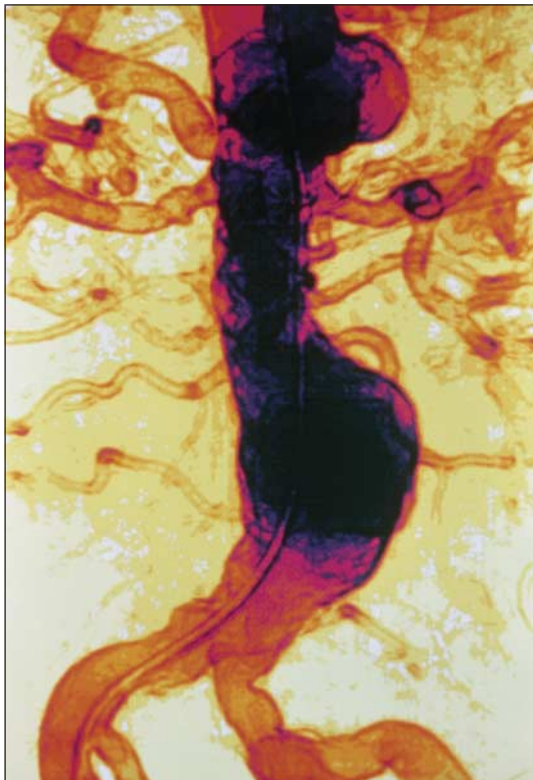
This information builds on data from previous smaller randomised studies,⁹⁻¹¹ and has encouraged debate about the value of a national screening programme for aortic aneurysms.^{12 13} The National Screening Committee in the United Kingdom is currently assessing the evidence before making any recommendation.¹⁴ Our experience in Gloucestershire shows how a screening programme could work.

Gloucestershire aneurysm screening project

Screening for abdominal aortic aneurysm was introduced in Gloucestershire in September 1990. All men reaching the age of 65 who are registered with general practices in the county are offered an ultrasound scan of their abdominal aorta at their local general practice. Gloucestershire has a population of about 560 000, and each year just over 3000 men are invited for screening. The screening programme is run by a nurse coordinator, and the ultrasound scans are done by a small team of sonographers, who are paid on a sessional basis. To offer this service to all of the 65 year old men in the county, we need three to four screening sessions a week; 10 men are examined a hour.

Each of the 85 participating practices is visited once a year in rotation. The practice manager produces a list of men who are eligible for screening and sends out pre-printed invitation letters and information sheets provided by the screening project. Men are informed of the result immediately after their examination. After an initial capital outlay to purchase a portable ultrasound machine, a computer, and a printer, running costs are currently £43 000 a year.

Men with an aorta <26 mm in diameter are reassured and discharged. Thus a single scan can largely rule out aneurysm disease for life in 95% of men.¹⁵ Those with an aorta of 26-39 mm are recalled annually for imaging in the surgery with the current year's 65 year old men (the screening intervals are under review). Men with an aorta ≥40 mm in diameter are referred to the



Ruptured abdominal aortic aneurysm is largely preventable

outpatient clinic of one of Gloucestershire's four vascular surgeons. They have an ultrasound scan every six months because growth patterns become erratic as the aorta enlarges. If the aorta becomes over 55 mm in diameter, elective repair is considered.

After 13 years, the mortality from aneurysm disease among men in Gloucestershire has fallen, together with the number of patients with ruptured aortic aneurysm.³ Because the scheme was introduced progressively without screening all men older than 65 at the start, the number of aneurysm operations in the county has not changed greatly. Over the past decade, the number of elective operations on abdominal aortic aneurysms detected by screening has increased and the number of operations on incidental and ruptured aneurysms has fallen (figure). In addition, mortality from elective repair of screen detected aneurysms (3%) is significantly less than that for incidentally discovered aneurysms (9%).¹⁶ This has led to a fall in overall mortality for elective aneurysm repair in Gloucestershire. Operative mortality fell from 20/306 (6.5%) procedures in 1994-8 to 10/251 (4.4%) procedures in 1999-2003.

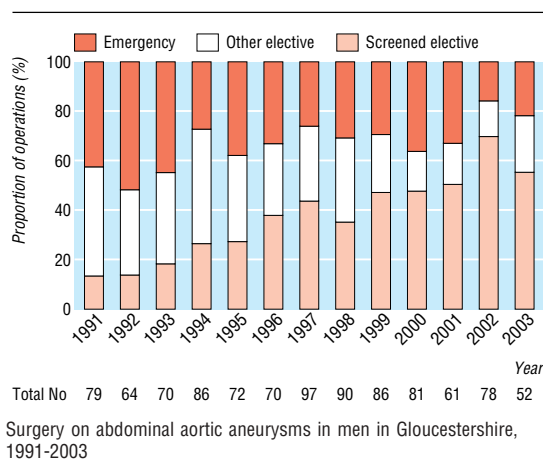
A problem with the scheme is that 15% of men fail to attend for screening, and this group includes a higher proportion of men with aneurysm disease. Also, men who have a ruptured aneurysm before the age of 65 years (about 10% of cases in Gloucestershire) are missed.

National aneurysm screening programme

A national screening programme for aneurysms, like any other screening programme, will never detect all cases; nor will it prevent all ruptures or deaths from rupture. The ideal is to design a cost effective programme that detects the maximum number of aneurysms. The first decision is where to base the programme. The United Kingdom has an advantage of a cohesive system of family doctors, and their surgeries are the ideal place for initial screening. It requires the commitment of family doctors (only one of 86 practices in Gloucestershire declined to take part), together with access to their age and sex registers and a room for scanning. Ultrasound equipment is easily portable, and in Gloucestershire it is necessary to visit each practice only once a year.

The second decision is about screening age. In Gloucestershire we screen at 65, when most men are retired and have more time to focus on their health. Reducing the screening age to 60 would detect most men who have a ruptured aneurysm before they are 65. However, it would double the cost of the initial scans because a second scan would probably be needed at 65. An alternative would be to have a screening age of 65 but also offer screening to high risk men under 65 years— that is, smokers and those with a family history, hypertension, or arterial disease.

If national screening is introduced progressively, elective surgical activity is unlikely to be greatly affected. However, if all men over the age of 65 were screened at the outset, elective vascular services would be overwhelmed. This is the big political decision; to start screening 65 year olds in a particular year could be regarded as unfair, but older men who request screening could be accommodated (as is the case with screening for prostate cancer). The biggest investment



Surgery on abdominal aortic aneurysms in men in Gloucestershire, 1991-2003

required would be in imaging facilities, both mobile services to general practices and in vascular laboratories for follow up of larger aneurysms (40-55 mm). Current investigations are focusing on minimising the number of follow up scans for small aneurysms to maximise effectiveness.¹⁷

National screening will be effective only if the mortality for elective aneurysm repair is minimised. The average mortality in the United Kingdom is 6-7% in randomised trials and large databases.¹⁸⁻²⁰ Quality assurance for the programme will be vital for ultrasonographers and the surgeons doing the repairs. The Vascular Surgical Society of Great Britain and Ireland has started the national vascular database, a voluntary database that includes aortic procedures and that is currently used by about a third of the society.²⁰ Surgeons carrying out elective repairs of screen detected aortic aneurysms could be required to submit data to the database as a method of quality assurance.²¹

Finally, a national screening programme would have the advantage of identifying men with atherosclerotic disease who are also at high risk of myocardial infarction. This group could be targeted for disease modifying behaviour; there is some evidence from the late results of the small aneurysm trial that deaths can be reduced this way.¹⁸ Patients with small aneurysms could also take part in investigations into methods to reduce growth rates of aneurysms.²²

The alternative

The results from open surgery for ruptured abdominal aortic aneurysm have barely improved over the past 50 years; mortality still exceeds 50% in most hospitals.²³ Endovascular repair is feasible, and considerable impetus exists for a fundamental change in the way leaking aneurysms are managed, with centralised units dealing with all ruptured aneurysms.²⁴⁻²⁵ This would, however, require a large dedicated team of surgeons and radiologists available at short notice and is feasible only in large regional centres. An endovascular repair service for ruptured aortic aneurysms would require considerable funding to organise the regional centres and the transport systems required to move patients. A national aneurysm screening programme would avoid the need for such a service because ruptured aortic aneurysms would become rare.

Summary points

Death rates from ruptured aortic aneurysm are around 50%

Aortic aneurysms can be detected with a simple ultrasound examination

Screening has been shown to reduce deaths by 42%

A population screening programme in the United Kingdom could save several thousand lives at reasonable cost

Conclusion

The scientific arguments for a national screening programme for aneurysms are cogent. We believe that the United Kingdom's family doctor based health system puts it in an ideal position to be the first country to start national screening. The final decision is now political. It is a shame that aneurysm disease lacks a cohesive pressure group to encourage the process.

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Lessons from developing nations on improving health care

Donald M Berwick

Evaluation of projects to improve health care in resource poor countries can provide ideas and inspiration to the often stalled efforts in healthcare organisations of wealthy nations

Improvement is, I believe, an inborn human endeavour. My belief arises mostly from watching children. You cannot find a healthy child who does not try to jump higher or run faster. It takes no outside incentive. Children smile when they succeed; they smile to themselves. And so, it is my premise that almost all human organisations contain in their workforce an internal demand to improve their work. It saddens me how few organisations seem to know that, and fewer still act on it. Improvement is not forcing something; it is releasing something.

Nevertheless, improving organisations is not easy. The barriers are many, and those barriers can produce a sense of helplessness and futility. Failing to improve, we feel unfortunate and wish that someone, somewhere, would give us that extra missing resource that we imagine would make change possible. "We want to make care better," goes the complaint, "but they won't let us."

It might help us in the wealthy world to pause for a moment and reflect not on what we lack but on our good fortune. And the best way to do that is to look at those with less in their hands. In the past few years, I

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