About 1–3% of men aged 65 or more will experience rupture of an abdominal aortic aneurysm (AAA) of whom 85–90% will die. If instead operated on electively only 5–7% will die.\(^1\)

An asymptomatic phase with a relatively low-risk treatment, compared with the symptomatic phase, is a good argument for considering screening.

Recently, the Multicentre Aneurysm Screening Study (MASS) group published results from their large randomised screening trial assessing especially AAA specific mortality and cost effectiveness of screening.\(^2,3\) A population-based sample of 67,800 men aged 65–74 years was enrolled, and randomised individually either to receive an invitation for an abdominal ultrasound scan at their general practitioner (\(n = 33,839\)) or not (control group, \(n = 33,961\)). Men in whom AAA, defined as an infrarenal aortic diameter of 3 cm or more, were detected were followed-up with repeat ultrasound scans for a mean of 4.1 years. Surgery was considered if the AAA diameter was or became 5.5 cm in diameter or more, expanded more than 1 cm annually, or became symptomatic. Mortality data were obtained from the Office of National Statistics.

The attendance rate to screening was 80%, and 1333 (4.9%) aneurysms were detected. There were 65 aneurysm-related deaths in the invited group, and 113 in the control group. Consequently, the risk reduction was 42% (95% CI: 22–58; \(p = 0.0002\)), with a 53% reduction (95% CI: 30–64) in those who attended screening. The 30-day postoperative mortality was 6% after elective surgery for an aneurysm, and 37% after emergency surgery.

Consequently, over 4 years there were 47 fewer deaths related to AAA in the invited group than in the control group, at an additional cost of £3.38 million. After adjustment for censoring and discounted at 6%, the mean additional cost of the screening programme was £97.42 (95% CI: 82–113) per patient, and £43,648 (23,056–224,389) per life year gained, equivalent to about £55,329 per quality adjusted life year. This is on the margin of being acceptable, since the maximal acceptable costs in U.K. is expected to be around £47,000 per saved living year.\(^4\) However, the benefit will probably increase over the years, and after 10 years this figure was estimated by the authors to decrease to around £12,295 per life year gained.

It could be questioned whether the assumptions being made for calculating an acceptable cost effectiveness after ten years is present, if endovascular treatment is the first choice of treatment due to the risk of AAA-related death after treatment, and continuous costs for surveillance and secondary interventions.\(^5\)

The sensitivity analyses showed the cost effectiveness was most sensitive to the screening costs. Their screening costs were about twice as high as in our hospital-based screening trial, which is far more rational to organise and perform,\(^6\) and their attendance rate was not much larger than ours at 76%. Consequently, hospital based screening instead may improve the cost effectiveness.
The MASS results compares reasonable with another randomised British study. However, the benefit seems less than in Denmark. Here we found a 68% (41–89%) reduction in AAA-specific deaths at hospital, and the cost per prevented hospital death was estimated to be €9108, equivalent to approximately €1012 per life year saved. This is a far more attractive cost effectiveness. The difference could partly be due to the risk of misclassification of death was limited in the Viborg Study, where most of them were either operated or CT-scanned, while the MASS study also included death outside hospitals where men with a known AAA, who suddenly dies are more likely to be classified as dead by rupture, true or not, and those without a known AAA from the control group who suddenly dies will more likely be classified as a cardiac event. An independent working group tried to adjust for this, but in the end, they could only rely on the accuracy of the death certificates.

The difference in cost-effectiveness could also be due to differences in the management of ruptured AAA. In Viborg County, more than half with ruptured AAA reached operation which is more than usual. However, the postoperative mortality was 66%, which is quite higher than in the MASS trial. Consequently, the “waste” of resources in the treatment of rupture in Viborg County, is considerably larger than in the MASS-trial area. The evaluation of the cost effectiveness of the MASS trial by the U.K. health authorities must take this into consideration.

However, there are several other criteria for screening they must take into consideration. Firstly, it is widely acknowledged that ultrasonography is a cheap, safe, valid and acceptable method of screening. Furthermore, it is favoured by only one scan is needed in case of an initial normal finding, so rescreening is only needed in those with an initial 2.5–2.9 cm wide aorta in 5-year intervals minimising the associated psychological and economic costs. This is important because screening may lead to fear with loss of quality of life (QoL). Consequently, the disease screened for must be a major health problem, which indeed could be questioned concerning AAA.

Furthermore, the treatment must be acceptable with clear indications. The size of an AAA is the only widely accepted prognostic indicator for rupture. The U.K. Small Aneurysm Trial and the similar ADAM study in the U.S.A. gave us a strong evidence based indication. However, no matter what cut-point is chosen, AAAs will still rupture during conservative treatment and patients will still die after surgery for a lesion that would never have ruptured. This ethical problem is serious but insoluble at present.

It could be questioned whether we have an acceptable treatment; surveillance decreases global, generic, and health related QoL and endovascular treatment has uncertain long term results, permanent need for surveillance, risk of secondary interventions and AAA-related death after the initial treatment. Open surgery seems acceptable since survivors have the same QoL as the background population, and very few refuse the offer of surgery but more than 10% of those with sizeable aneurysms have contraindications to surgery.

Nevertheless, these minor problems seem not to outweigh the benefits of screening demonstrated by the MASS trial and us.

However, it is very interesting to speculate whether results from the relative socially privileged areas in the south of England and the relatively rural Viborg County in Denmark are generalizable to other areas, regions, and countries.

At the VSS meeting in Belfast in November 2002, results were also presented from the Western Australian Screening study involving 39 166 65–75-year-old men. In spite of a relatively high prevalence of AAA in the screened group (7.2%), the AAA-specific mortality of AAA was only decreased by 28% in the group offered screening. The main reasons were a low AAA-specific mortality in the control population and a relative low attendance rate of 62% (unpublished data). Consequently, the benefit of screening could vary considerably. AAA-associated and overall mortality rates, motivation for screening, transport opportunities, alertness for AAA, and cost of diagnosis and treatment no doubt differ from nation to nation, especially if endovascular treatment is taken into account, with corresponding differences in cost and benefit balances, and perhaps different recommendations for screening for AAA.

In all, the MASS trial confirms the favourable results from the two smaller randomised studies in U.K. and Denmark, and has certainly given us strong arguments for recommending screening for AAA, at least in U.K. and Denmark. They must be congratulated for a well done high-quality job.

References

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