

REVIEW

Update on Screening for Abdominal Aortic Aneurysm: A Topical Review

S. Svensjö^{a,b,*}, M. Björck^a, A. Wanhainen^a

^a Department of Surgical Sciences, Section of Vascular Surgery, Uppsala University, Uppsala, Sweden

^b Department of Surgery, Falun County Hospital, Falun, Sweden

WHAT THIS PAPER ADDS

Paradoxically, the advent of several national screening programs for AAA coincides with multiple reports indicating a changing epidemiology of the AAA disease: mainly, a decrease in prevalence and mortality from ruptured AAA during the recent decade is evident, with possible implications for the validity of screening for AAA. This review summarizes the most recent data concerning screening for AAA that could affect its justification, and highlights areas with lack of information.

Objectives: Serving as the basis for implementation of several national AAA screening programmes, four large randomised controlled trials provided evidence of a reduction in AAA mortality by ultrasound-based screening among elderly men. Recently, reports of falling AAA prevalence and mortality unrelated to AAA screening have emerged, coinciding with major additional epidemiological changes in the population, as well as improvements in AAA repair. These recent changes may individually, and in concert, affect the rationality of AAA screening. The aim of this paper was to present an up-to-date review of AAA-screening within the context of a rapidly changing AAA epidemiology.

Methods: Topical review of the literature focusing mainly on randomised controlled trials, meta-analyses, and contemporary observational AAA-screening studies.

Conclusions: Summarising RCT results and recent studies; contemporary one-time screening of men for AAA appears highly cost-effective, and seems to remain an effective preventive health-measure. However, several issues regarding screening need to be addressed: most importantly; the current degree of incidental detection of AAAs, the threshold diameter for follow-up, targeted screening in risk groups, and the possible need for re-screening in an elderly population with ever increasing longevity.

© 2014 European Society for Vascular Surgery. Published by Elsevier Ltd. All rights reserved.

Article history: Received 10 April 2014, Accepted 31 August 2014, Available online 7 November 2014

Keywords: Abdominal aortic aneurysm, Screening, Ultrasound, Epidemiology, Vascular surgery

INTRODUCTION

Four large randomized controlled trials (RCTs),^{1–4} randomizing male populations between 1988 and 1999, with AAA prevalence rates of 4–7.2%, to ultrasound based screening or no screening for AAA demonstrated a 40% reduction in AAA specific death.⁵ The Multicentre Aneurysm Screening Study (MASS),⁶ the largest RCT, subsequently demonstrated a 3% reduction in all cause mortality after 13 years' follow up. These results were the basis for initiating national screening programs in Sweden, the UK, and the USA.^{7,8}

Since the time of randomization in these influential studies, reports of a changing epidemiology^{9–12} of AAA disease have been published, and screening detected prevalence rates of 1.1–1.7% have been reported.^{9,13,14} Concurrently, major improvements in surgical management of AAA have been established. AAA repair with improved short- and long-term outcomes^{12,15,16} is offered to healthier¹⁷ and increasingly long lived populations.¹⁸

The aim of this topical review is to summarize the up to date evidence concerning AAA screening, identify areas lacking information, and to suggest possible directions for future research.

AAA screening evidence base

AAA is a disease exceptionally well suited to screening, and ultrasound based screening for AAA meets all criteria for a screening program according to the WHO.¹⁹ After the first population based AAA screening study by Collin et al.,²⁰ in

DOI of original article: <http://dx.doi.org/10.1016/j.ejvs.2014.09.007>

* Corresponding author. S. Svensjö, Department of Surgical Sciences, Section of Vascular Surgery, Uppsala University, 75185 Uppsala, Sweden.

E-mail address: sverker.svensjo@ltdalarna.se (S. Svensjö).

1078-5884/\$ — see front matter © 2014 European Society for Vascular Surgery. Published by Elsevier Ltd. All rights reserved.

<http://dx.doi.org/10.1016/j.ejvs.2014.08.029>

Table 1. Overview of the randomized population based screening trials.

Characteristic	Chichester, UK	Viborg, Denmark	MASS, UK	Western Australia
Number randomized	15,775	12,628	67,800	41,000
Gender	Men and women	Men	Men	Men
Age (years)	65–80	65–73	65–74	65–79
Recruitment	1988–1990	1994–1998	1997–1999	1996–1998
AAA repair at	6 cm	5 cm	5.5 cm	—
Attendance	68%	76%	80%	70%
Prevalence of AAA	4% (7.6% in men)	4%	4.9%	7.2%
Last follow-up	15 years	14 years	13 years	11 years
Last published follow-up	2007	2010	2012	2008
Hazard ratio AAA mortality, last follow-up	0.89 (0.60–1.32)	0.34 (0.20–0.57)	0.58 (0.49–0.69)	—
Hazard ratio all-cause mortality, last follow-up	1.0 (0.90–1.12)	0.98 (0.93–1.03)	0.97 (0.95–0.99)	0.99 (0.94–1.04)
Degree of incidental detection at last follow-up ^c	35.5% ^a	46.0%	42.0% ^b	—

AAA = abdominal aortic aneurysm.

^a Study at this follow up lacks differentiation between emergency surgery for ruptured and intact AAA.

^b Rate of repair for symptomatic intact AAAs not stratified for attenders vs. non-attenders in invited group. Symptomatic repairs thus excluded from calculation.

^c Incidental detection and repair rate. Ratio of intact AAA repair in control group vs. invited screened group, $[\text{Rate}_{\text{Control}}/\text{Rate}_{\text{Screened}}]$. Estimated from tabulated data in publications.

1988 in Oxford, UK, four large randomized AAA screening trials^{1–4} were launched and delivered their long-term results (Table 1). The trials, conducted in the UK, Denmark, and Western Australia, recruited subjects during 1988–1999, and follow up data are available up to 15 years.^{6,21–23} A Cochrane meta-analysis of the four RCTs in 2007 concluded that an invitation to screening for elderly men reduced AAA specific mortality by 40% after approximately 3–5 years of follow up.⁵ A meta-analysis of all cause mortality including all four RCTs found a 2.7% reduction in all cause mortality after 11–15 years of follow up.²⁴

In the Multicentre Aneurysm Screening Study (MASS), after 13 years, 46 deaths from AAA were prevented by inviting 10,000 men to screening, which implied that 217 men would have to be invited to prevent one death from AAA. Invitation to screening reduced the risk of AAA death by 42% and 52% for those actually attending screening. The number of elective AAA repairs conducted in the invited group was twice that of the control group, and the number of emergency repairs was halved.

In Gloucestershire, UK, AAA screening has been offered to 65 year old men since 1990, and after 20 years the number of repairs for ruptured AAA has steadily decreased, indicating a beneficial effect of AAA screening. However, over the same time period the AAA prevalence in 65 year old men fell from 4.8% to 1.1%.¹³ Thus, an important contributing cause of decreased AAA emergency surgery may also be an overall decrease of disease occurrence.

A screening trial in Huntingdon 1991–2003, using a stepped wedge design, demonstrated a 45% AAA mortality reduction, and it was estimated that each prevented death from AAA extended the lifespan by 6.9 years.²⁵

Abdominal ultrasound and diagnosis

All four screening RCTs employed a maximum infrarenal aortic diameter of 30 mm or more, measured by ultrasound, as the diagnostic criterion for an AAA. There is, however, no

clear consensus on how to measure the maximum aortic diameter.²⁶ In MASS inner to inner (ITI) wall measurement was used,²⁷ and consequently it is used in the current UK National Health Service AAA screening programme (NAAASP); in Gloucestershire the outer margin of the anterior wall to the inner margin of the posterior wall (leading edge to leading edge [LELE]) was measured,²⁸ also adopted in the national Swedish AAA screening programme⁸; in Huntingdon the outer to outer walls (OTO) was measured, previously used in the UK small Aneurysm Trial and adopted in the current UK intervention criteria.²⁹

A recent study evaluated the various methods of measurement, and concluded that all methods have high variability and that differences between the methods may impact clinical decision making.³⁰ Further analysis of data from that study suggested that the estimated AAA prevalence could vary from –22% (ITI) to +36% (OTO), depending on the method chosen.

Changing epidemiology and surgical management

Until the late 1990s and early 2000s, prevalence rates of 4–9% among elderly men were reported.^{1,4,31–33} Indications of rising prevalence rates were also reported at this time,^{34,35} as well as increasing rupture rates and mortality up until the early 2000s.^{11,36,37} During the past decade, however, multiple studies report prevalence rates below 2% in 65-year-old men.^{9,13,14} Similar findings of low AAA prevalence (2.3%) were also evident when screening 70-year-old men in Sweden.³⁸ Falling rates of rupture and AAA mortality unrelated to AAA screening were also reported.^{10,11}

The dominating and modifiable risk factor for AAA is smoking.^{9,32,39,40} It has been estimated that smoking causes 75% of all AAA cases in the population.^{9,32} In many western countries the smoking rate has fallen significantly over the last decades.^{9,11,37} Reduced smoking rates seem to markedly coincide with falling rates of AAA prevalence in Sweden (Fig. 1) a pattern that is evident for AAA mortality as

Download English Version:

<https://daneshyari.com/en/article/5957759>

Download Persian Version:

<https://daneshyari.com/article/5957759>

[Daneshyari.com](https://daneshyari.com)