Abdominal aneurysm screening guidelines

JAMA Clinical Guidelines Synopsis

Screening for Abdominal Aortic Aneurysm

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GUIDELINE TITLE Screening for Abdominal Aortic Aneurysm

DEVELOPER US Preventive Services Task Force

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PRIOR VERSION February 1, 2005

FUNDING SOURCE Agency for Healthcare Research and Quality

TARGET POPULATION Asymptomatic adult men aged 65 to 75 years who have ever smoked

MAJOR RECOMMENDATIONS

- Screen 1 time for abdominal aortic aneurysm (AAA) with ultrasonography in men aged 65 to 75 years who have ever smoked (grade B).
- Selectively offer screening for AAA in men aged 65 to 75 years who have never smoked (grade C).
- There is too little evidence to recommend for or against screening for AAA in women who have ever smoked (grade I).
- Do not screen for AAA in women who have never smoked (grade D).

Summary of the Clinical Problem

Abdominal aortic aneurysms are defined by an aortic anteroposterior diameter of 3 cm or more.[1] Population-based ultrasound screening and autopsy studies suggest a prevalence of any AAA in adults older than 50 years of 4% to 8% in men and 1% to 1.3% in women.[2] Risk factors for AAA include age, male sex, having ever smoked, and family history of AAA. Abdominal aortic aneurysms often remain asymptomatic until rupture, a complication associated with mortality rates as high as 75% to 90%.[2] Risk of rupture varies with aneurysm diameter (annual risk of 0% in aneurysms 3-3.9 cm, 1% in aneurysms 4-4.9 cm, and 11% in aneurysms 5-5.99 cm).[3] Outcomes for emergency surgical intervention are also poor, with combined in-hospital and 30-day mortality rates of 40%.[2] Ultrasonography is a safe and cost-effective screening tool that is highly sensitive (94%-100%) and specific (98%-100%) for detecting AAAs.[1,2]

Characteristics of the Guideline Source

The guideline[4] was written by the US Preventive Services Task Force (USPSTF), which is an independent volunteer panel of nonfederal experts in prevention and evidence-based medicine (**Table**). The task force is composed of primary care physicians and experts in methodology and health behavior. The guideline was developed in coordination with a systematic review sponsored by the Agency for Healthcare Research and Quality (AHRQ). A conflict of interest disclosure is completed by task force members prior to each meeting to provide information to AHRQ on potential financial, business/professional, and intellectual conflicts of interest related to the topics addressed.

Evidence Base

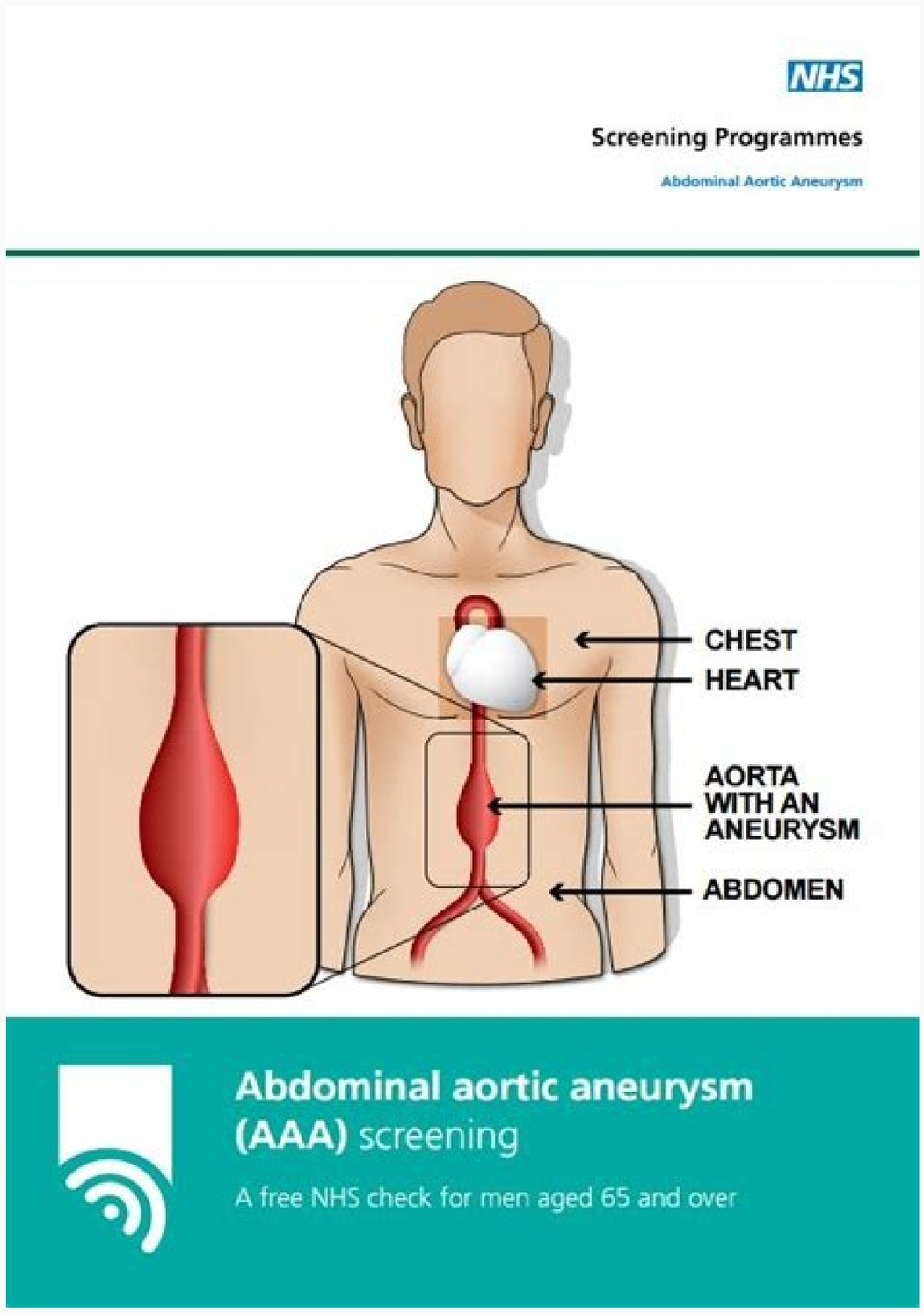
A systematic review was conducted to update the 2005 USPSTF guideline on screening for AAA and identified 68 studies of 1-time screening with ultrasonography for AAA in asymptomatic adults.[5] Four large, population-based randomized trials were considered to be of good or fair quality (the Multicenter Aneurysm Screening Study [MASS] from the United Kingdom, Chichester [also UK], Viborg County [Denmark], and the Western Australian Screening Trial).[3] Most of these studies enrolled predominantly white men older than 65 years. MASS was the largest, with more than 65 000 participants.[1,5] Only the Chichester trial examined women, enrolling 9342 women aged 65 to 80 years.[6]

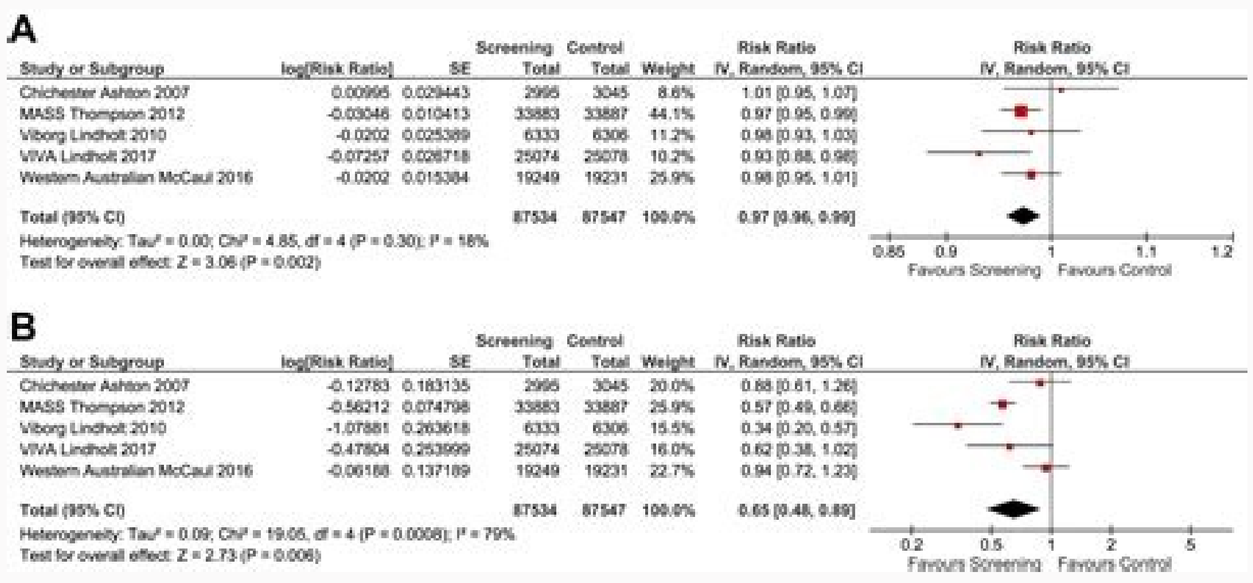
Benefits and Harms

Results from the 2 highest-quality trials (MASS and Viborg) found a relative reduction in AAA-specific mortality of 42% to 66% in men aged 65 to 75 years who had ever smoked, beginning 3 years after the initial screening and persisting up to 15 years. In MASS, an invitation to screen was associated with decreased AAA rupture for up to 13 years (relative risk [RR], 0.57; 95% CI, 0.49-0.67; absolute risk reduction [ARR], 6/1000 screened]. The Viborg and MASS trials both showed fewer emergency surgeries in the screened groups at all time points, including pooled point estimates at the 13- to 15-year follow-up (RR, 0.42; 95% CI, 0.32-0.54; ARR, 2.6/1000 screened).[3,5] The 2 fair-quality trials showed no reduction in AAA-specific mortality.[1,3] Men who

Table. Guideline Rating

Rating Standard	Rating
1. Establishing transparency	Good
2. Management of conflict of interest in the guideline development group	Good
3. Guideline development group composition	Good
4. Clinical practice guideline–systematic review intersection	Good
5. Establishing evidence foundations and rating strength for each of the guideline recommendations	Good
6. Articulation of recommendations	Fair
7. External review	Good
8. Updating	Good
9. Implementation issues	Fair





Harms of screening for abdominal aortic aneurysm: is there more to life than a 0·46% disease-specific mortality reduction?

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For every 10 000 people invited to screening, 46 men avoid dying from a ruptured abdominal aortic aneurysm.[1,2] But for every avoided death, four men are diagnosed with an aneurysm that would never have been detected or caused health problems in their lifetime without screening; they have been overdiagnosed, which causes substantial physical and psychological harms for many of them.[1]

The benefits of screening are intuitive and appealing. However, some types of screening have harms that can outweigh these benefits, but they are not as easily recognised. Overdiagnosis is the most important harm of many types of screening and it is a principal reason why societies do not offer screening for prostate cancer, ovarian cancer, lung cancer, or neuroblastoma.[3] It is also important in the dispute about breast screening.[4] But despite its flaws, screening is very popular in developed countries. In screening for abdominal aortic aneurysms, overdiagnosis arises because many small aneurysms, which are those most often detected at screening, either do not grow or grow very slowly. Additionally, some large aneurysms will never rupture. Comorbidity is common in those targeted (men aged >65 years) and death from other causes is therefore also common.

Screening for abdominal aortic aneurysm was introduced in Sweden,[5] the UK,[6] and the USA[7] during the 2000s on the basis of reduced disease-specific mortality documented in four randomised trials from the 1980s and 1990s, which included 137 214 men aged 65 years or older.[2] A US Preventive Services Task Force (USPSTF) review[2] estimated a 50% relative risk reduction after 13–15 years' follow-up. However, because the risk of death from a ruptured abdominal aortic aneurysm was slightly below 1%, the apparently impressive effect translated into an absolute risk reduction of 0·46%.[2] As expected, this reduction was insufficient to reduce overall mortality.[2]

Screening for abdominal aortic aneurysms doubles the use of preventive surgery,[2] which has a mortality rate of 3–5%[2] and an overall complication rate previously estimated at 32%,[8] which might not be substantially different today.[9] The most important complications are impotence,[8] myocardial infarction, respiratory failure, renal failure, ischaemic colitis, spinal cord ischaemia, and prosthetic graft infections.[8] These complications mean that overtreatment can lead to substantial harms. To weigh the benefit against these harms, they must be quantified with the same diligence as the benefit. However, overdiagnosis and overtreatment were not quantified in the systematic reviews.[10] A focus on the benefits of screening is common; a systematic review of randomised cancer screening trials found that overdiagnosis was quantified in only 7% of all trials.[10] In screening for abdominal aortic aneurysm, a recently published estimate based on the randomised trials indicates that for 10 000 men invited to screening, 176 were overdiagnosed, 37 of these underwent unnecessary elective surgery (ie, they were overtreated), and two of them died because of this overtreatment.[1] Surgery-related mortality might be diminishing, which would reduce screening-related harms. But, since screening results in more surgery for small, overdiagnosed aneurysms, current population data are difficult to interpret.

A crucial complicating factor is the substantial drop in incidence during the past decades.[11] A UK study found a reduction in incidence from 4·8% to 1·1% (77%) between 1990 and 2009.[12] This drop was probably due to reduced tobacco use. The randomised trials on which screening is based were thus done when the incidence was much higher than today. When incidence decreases, the absolute benefit also decreases. Therefore, the absolute reduction in disease-specific mortality estimated from the randomised trials is no longer valid. Moreover, smoking increases the growth rate of aneurysms and doubles the risk of rupture.[13] Therefore, a drop in tobacco use decreases rupture rates, increasing the rate of overdiagnosis relative to the benefit. Consequently, the benefit-harm ratio is probably less favourable today.[1] This development emphasises the importance of constant reassessment of the continued justification for established screening programmes.

Although the physical harms of screening are theoretically easy to quantify, the psychological harms are more difficult, but apply to many more individuals. Qualitative studies of men's experiences of being diagnosed with an asymptomatic aortic aneurysm indicate important problems.[14,15] In these studies, the risk of rupture has been described as a sensation of "a ticking bomb inside your stomach"[15] and a man under surveillance for a small screening-detected aneurysm stated: "...well, there's no point in talking about it because, if something happens then it happens, there's nothing to be done about it...it's just that...(sigh)...(clears throat, starts crying)...if one starts talking about it then one starts thinking, right, and that's no good..."[14] However, because these studies are qualitative, the results cannot quantify the problem precisely and might not be generalisable. The available quantitative studies of the psychological harms were deemed insufficient in both the USPSTF review[2] and the Cochrane review[8] partly because they used generic (as opposed to diagnosis-specific) questionnaires.[2] Generic questionnaires have a low validity in a screening context because they do not capture

The Accuracy of Abdominal Palpation to Detect Aortic Aneurysm in 99 Subjects With Disease and 101 Subjects Without Disease, Each Examined by 2 Internists*

Examinations	No. of Examinations	Sensitivity	Specificity	Likelihood Ratios	
				Positive	Negative
All	400	68	75	2.7	0.43
First examination per subject	200	69	75	2.8	0.42
Second examination per subject	200	67	74	2.6	0.45
Examiner A	156	66	74	2.5	0.46
Examiner B	145	68	70	2.3	0.46
Examiner C	99	70	83	4.1	0.36
First 10 per examiner	30	76	67	2.3	0.36
First 25 per examiner	75	73	80	3.7	0.33
Examiner remained blind	388	67	76	2.7	0.44
Aorta was palpable	268	88	56	2.0	0.22
Positive = "definite" only	400	44	92	5.3	0.61
Girth					
<100 cm†	164	91	64	2.5	0.14
≥100 cm†	236	53	83	3.2	0.56
Abdomen "obese"	180	46	84	2.9	0.64
Abdomen "not obese"	220	89	66	2.6	0.17
Abdomen "tight"	111	52	89	4.7	0.54
Abdomen "not tight"	289	74	68	2.3	0.38
Abdomen ≥100 cm† and not tight	158	61	78	2.8	0.50
Abdomen ≥100 cm† and aorta palpable	125	82	59	2.0	0.30

*See text for details and P values.
†A 100-cm girth is approximately a 40-in waistline.

Medicare guidelines for abdominal aortic aneurysm screening. Abdominal aorta screening guidelines. Abdominal aortic aneurysm screening guidelines. How often should you be screened for abdominal aortic aneurysm. Extended screening guidelines for the diagnosis of abdominal aortic aneurysm. Is abdominal aortic aneurysm screening necessary.

Number: 0702 Aetna considers one-time ultrasound screening for abdominal aortic aneurysms (AAA) medically necessary for men 65 years of age or older. Aetna considers AAA screening experimental and investigational for all other indications because its effectiveness for indications other than the one listed above has not been established. Background The U.S. Preventive Services Task Force (USPSTF) recommends one-time screening for abdominal aortic aneurysm (AAA) by ultrasonography in men aged 65 to 75 who have ever smoked. This recommendation was based on the results of published randomized controlled clinical studies of screening for abdominal aortic aneurysms (Scott et al, 1995; Vardulaki et al, 2002; Scott et al, 2002; Lindholt et al, 2002; Ashton et al, 2002; Norman et al, 2003). The USPSTF found good evidence that screening for AAA and surgical repair of large AAAs (5.5 cm or more) in men aged 65 to 75 who have ever smoked (current and former smokers) leads to decreased AAA-specific mortality. The USPSTF found that there is good evidence that abdominal ultrasonography, performed in a setting with adequate quality assurance (i.e., in an accredited facility with credentialed technologists), is an accurate screening test for AAA. The USPSTF also identified, however, important harms of screening and early treatment, including an increased number of surgeries with associated clinically-significant morbidity and mortality, and short-term psychological harms. Based on the moderate magnitude of net benefit, the USPSTF concluded that the benefits of screening for AAA in men aged 65 to 75 who have ever smoked outweigh the harms. The USPSTF made no recommendation for or against screening for AAA in men aged 65 to 75 who have never smoked. Although the USPSTF found good evidence that screening for AAA in men aged 65 to 75 who have never smoked leads to decreased AAA-specific mortality, there is a lower prevalence of large AAAs in men who have never smoked compared with men who have ever smoked; thus, the USPSTF determined that the potential benefit from screening men who have never smoked is small. The USPSTF also weighed the harms of screening and early treatment, and concluded that the balance between the benefits and harms of screening for AAA is too close to make a general recommendation in this population. The USPSTF recommended against routine screening for AAA in women. The USPSTF explained that, because of the low prevalence of large AAAs in women, the number of AAA-related deaths that can be prevented by screening this population is small. The USPSTF concluded that the harms of screening women for AAA outweigh the benefits. The USPSTF reported that one-time screening to detect an AAA using ultrasonography is sufficient. They concluded that there is negligible health benefit in re-screening those who have normal aortic diameter on initial screening. The USPSTF concluded that, for most men, 75 years may be considered an upper age limit for screening. Patients can not benefit from screening and subsequent surgery unless they have a reasonable life expectancy. The USPSTF explained that increased presence of co-morbidities for people aged 75 and older decreases the likelihood that they will benefit from screening. It is generally recommended that patients with AAA of 5.5 cm or greater seek open surgical repair. Open surgical repair for an AAA of at least 5.5 cm leads to an estimated 43 % reduction in AAA-specific mortality in older men who undergo screening. However, there is no current evidence that screening reduces all-cause mortality in this population. The USPSTF reported that, in men with intermediate-sized AAAs (4.0 to 5.4 cm), periodic surveillance offers comparable mortality benefit to routine elective surgery with the benefit of fewer operations. The USPSTF found no evidence to support the effectiveness of any intervention in those with small AAAs (3.0 to 3.9 cm); the USPSTF noted, however, that, there are expert opinion-based recommendations in favor of periodic repeat ultrasonography for these patients. Repeat abdominal ultrasound testing every 6 months has been recommended for men with abdominal aortic aneurysms greater than 4 cm in diameter, and every 2 years for men with smaller abdominal aortic aneurysms (Lederle, 2003). Color flow duplex ultrasound scanning has been used as an surveillance modality for clinically significant endoleaks in patients who have undergone endovascular repair of AAAs. Sun (2006) systematically reviewed the findings of diagnostic value of color duplex ultrasound (US) in the follow-up of endovascular repair of AAAs. Studies comparing the diagnostic accuracy of color duplex US with that of computed tomographic (CT) angiography were included, and analysis was performed of the detection of endoleaks and measurement of aneurysm diameter. A total of 21 studies (39 separate comparisons) met the criteria and were included for analysis. Pooled estimates of sensitivity, specificity, positive-predictive value (PPV), negative-predictive value (NPV), and accuracy of color duplex US compared with CT angiography (with 95 % confidence interval [CI]) were 66 % (52 to 81 %), 93 % (89 to 97 %), 76 % (65 to 87 %), 90 % (86 to 95 %), and 91 % (86 to 97 %), respectively, for unenhanced color duplex US; and 81 % (52 to 100 %), 82 % (68 to 97 %), 58 % (26 to 90 %), 95 % (87 to 100 %), and 98 % (91 to 100%), respectively, for enhanced color duplex US. The sensitivity in the detection of endoleak was significantly improved with contrast material-enhanced color duplex US compared with unenhanced color duplex US ($p < 0.05$); however, no significant difference was found regarding the specificity, PPV, NPV, and accuracy between unenhanced and enhanced color duplex US ($p > 0.05$). Color duplex US was insensitive in measurement of aneurysm diameter compared with CT angiography in most situations. The authors concluded that color duplex US is not as accurate as CT angiography and can not replace CT angiography in the follow-up of endovascular aortic repair of AAAs. However, the use of contrast material-enhanced color duplex US resulted in improvement of diagnostic accuracy in the detection of endoleak and warrants further study. Kim et al (2007) estimated the benefits, in terms of AAA-related and all-cause mortality, and cost-effectiveness of ultrasonography screening for AAA in a group that was invited to screening compared with a group that was not invited at a mean 7-year follow-up. Population-based sample of 67,770 men aged 65 to 74 years were included in this analysis. Patients with an AAA detected at screening had surveillance and were offered surgery after pre-defined criteria were met. Mortality data were obtained after flagging on the national database. Unit costs obtained from large samples were applied to individual event data for the cost analysis. The hazard ratio was 0.53 (95 % CI: 0.42 to 0.68) for AAA-related mortality in the group invited for screening. The rupture rate in men with normal results on initial ultrasonography has remained low: 0.54 rupture (CI: 0.25 to 1.02 ruptures) per 10,000 person-years. In terms of all-cause mortality, the observed hazard ratio was 0.96 (CI: 0.93 to 1.00). At the 7-year follow-up, cost-effectiveness was estimated at $19,500 (CI: $12,400 to $39,800) per life-year gained based on AAA-related mortality and $7,600 (CI: $3,300 to infinity) per life-year gained based on all-cause death. Inclusion of deaths from aortic aneurysm at an unspecified site, which may include some thoracic aortic aneurysms, may have under-estimated the treatment effect. The authors concluded that these findings from a large, pragmatic randomized trial showed that the early mortality benefit of screening ultrasonography for AAA is maintained in the longer term and that the cost-effectiveness of screening improves over time. In a Cochrane review on screening for AAA, Cosford and Leng (2007) concluded that there is evidence of a significant reduction in mortality from AAA in men aged 65 to 79 years who undergo ultrasound screening. However, there is insufficient evidence to demonstrate benefit in women. Eckstein and colleagues (2009) stated that ultrasonography of the abdominal aorta is a safe and technically simple method of detecting AAAs. These investigators performed a meta-analysis of population-based, randomized controlled trials (RCTs) of ultrasonographic screening for the detection of AAA. A total of 4 RCTs showed that ultrasonographic screening was associated with a significant lowering of AAA-related mortality in men aged 65 to 80 after it had been performed for 3 to 5 years (risk reduction 44 %, odds ratio [OR] 0.56, 95 % CI: 0.44 to 0.72) and after it had been performed for 7 to 15 years (risk reduction 53 %, OR 0.47, 95 % CI: 0.25 to 0.90). Screening of AAA was also associated with a significant lowering of the overall mortality after 7 to 15 years, but not in the first 5 years. Ultrasonographic screening led to a significant increase in the number of elective AAA operations performed and to a 50 % reduction of the number of emergency operations for ruptured AAA. The authors concluded that ultrasonographic screening for AAA is a technically simple diagnostic test that is associated with a major reduction of AAA-related mortality. In view of the higher prevalence of AAA among the elderly, it is recommended that all men aged 65 or older and all men and women with a family history of AAA should be systematically screened. Koelemay et al (2009) noted that the evidence-based guideline "Diagnosis and treatment of abdominal aortic aneurysm" is applicable to all patients with an atherosclerotic fusiform or ruptured AAA. An AAA with a diameter less than 5.5 cm is treated conservatively and monitored by sonographic surveillance. All patients are advised secondary prevention with anti-platelet therapy, statin therapy, treatment of hypertension and smoking cessation. Depending on co-morbidity, the indication for an operation is an AAA diameter of 5.5 cm. The anatomical characteristics of the AAA guides the choice for an open operation or endovascular aneurysm repair (EVAR). In view of the lower peri-operative mortality, EVAR is the treatment of choice. Due to the high prevalence of AAA in siblings of patients with an AAA, the screening of these family members should be considered. Brown et al (2013) stated that small AAAs (3.0 cm to 5.4 cm in diameter) are monitored by US surveillance. The intervals between surveillance scans should be chosen to detect an expanding aneurysm prior to rupture. These researchers performed a meta-analysis to limit risk of aneurysm rupture or excessive growth by optimizing US surveillance intervals. Individual patient data from studies of small AAA growth and rupture were assessed. Studies were identified for inclusion through a systematic literature search through December 2010. Study authors were contacted, which yielded 18 data sets providing repeated US measurements of AAA diameter over time in 15,471 patients. Abdominal aortic aneurysms diameters were analyzed using a random-effects model that allowed for between-patient variability in size and growth rate. Rupture rates were analyzed by proportional hazards regression using the modeled AAA diameter as a time-varying covariate. Predictions of the risks of exceeding 5.5-cm diameter and of rupture within given time intervals were estimated and pooled across studies by random effects meta-analysis. Abdominal aortic aneurysms growth and rupture rates varied considerably across studies. For each 0.5-cm increase in AAA diameter, growth rates increased on average by 0.59 mm per year (95 % CI: 0.51 to 0.66) and rupture rates increased by a factor of 1.91 (95 % CI: 1.61 to 2.25). For example, to control the AAA growth risk in men of exceeding 5.5 cm to below 10 %, on average, a 7.4-year surveillance interval (95 % CI: 6.7 to 8.1) is sufficient for a 3.0-cm AAA, while an 8-month interval (95 % CI: 7 to 10) is necessary for a 5.0-cm AAA. To control the risk of rupture in men to below 1 %, the corresponding estimated surveillance intervals are 8.5 years (95 % CI: 7.0 to 10.5) and 17 months (95 % CI: 14 to 22). The authors concluded that in contrast to the commonly adopted surveillance intervals in current AAA screening programs, surveillance intervals of several years may be clinically acceptable for the majority of patients with small AAA. Thompson et al (2013) noted that small AAAs (3.0 to 5.4 cm in diameter) are usually asymptomatic and managed by regular US surveillance until they grow to a diameter threshold (commonly 5.5 cm) at which surgical intervention is considered. The choice of appropriate surveillance intervals is governed by the growth and rupture rates of small AAAs, as well as their relative cost-effectiveness. These investigators provided the evidence base for small AAA surveillance strategies. This was achieved by literature review, collation and analysis of individual patient data, a focus group and health economic modelling. These researchers undertook systematic literature reviews of growth rates and rupture rates of small AAAs. The databases MEDLINE, EMBASE on OvidSP, Cochrane Central Register of Controlled Trials 2009 Issue 4, ClinicalTrials.gov, and controlled-trials.com were searched from inception up until the end of 2009. They also obtained individual data on 15,475 patients from 18 surveillance studies. Systematic reviews of publications identified 15 studies providing small AAA growth rates, and 14 studies with small AAA rupture rates, up to December 2009 (later updated to September 2012). The authors developed statistical methods to analyze individual surveillance data, including the effects of patient characteristics, to inform the choice of surveillance intervals and provide inputs for health economic modelling. They updated an existing health economic model of AAA screening to address the cost-effectiveness of different surveillance intervals. In the literature reviews, the mean growth rate was 2.3 mm/year and the reported rupture rates varied between 0 and 1.6 ruptures per 100 person-years. Growth rates increased markedly with aneurysm diameter, but insufficient detail was available to guide surveillance intervals. Based on individual surveillance data, for each 0.5-cm increase in AAA diameter, growth rates increased by about 0.5 mm/year and rupture rates doubled. To control the risk of exceeding 5.5 cm to below 10 % in men, on average a 7-year surveillance interval is sufficient for a 3.0-cm aneurysm, whereas an 8-month interval is necessary for a 5.0-cm aneurysm. To control the risk of rupture to below 1 %, the corresponding estimated surveillance intervals are 9 years and 17 months. Average growth rates were higher in smokers (by 0.35 mm/year) and lower in patients with diabetes (by 0.51 mm/year). Rupture rates were almost 4-fold higher in women than men, doubled in current smokers and increased with higher blood pressure. Increasing the surveillance interval from 1 to 2 years for the smallest aneurysms (3.0 to 4.4 cm) decreased costs and led to a positive net benefit. For the larger aneurysms (4.5 to 5.4 cm), increasing surveillance intervals from 3 to 6 months led to equivalent cost-effectiveness. The authors concluded that surveillance intervals of several years are clinically acceptable for men with AAAs in the range 3.0 to 4.0 cm. Intervals of around 1 year are suitable for 4.0 to 4.9-cm AAAs, whereas intervals of 6 months would be acceptable for 5.0 to 5.4-cm AAAs. These intervals are longer than those currently employed in the UK AAA screening programs. Lengthening surveillance intervals for the smallest aneurysms was also shown to be cost-effective. Future work should focus on optimizing surveillance intervals for women, studying whether or not the threshold for surgery should depend on patient characteristics, evaluating the usefulness of surveillance for those with aortic diameters of 2.5 to 2.9 cm, and developing interventions that may reduce the growth or rupture rates of small AAAs. On behalf of the USPSTF, Guirguis-Blake et al (2014) systematically reviewed evidence about the benefits and harms of ultrasonography screening for AAAs in asymptomatic primary care patients. Data sources included MEDLINE, the Database of Abstracts of Reviews of Effects, the Cochrane Central Register of Controlled Trials (January 2004 through January 2013), clinical trial registries, reference lists, experts, and a targeted bridge search for population-based screening RCTs through September 2013. English-language, population-based, fair- to good-quality RCTs and large cohort studies for AAA screening benefits as well as RCTs and cohort and registry studies for harms in adults with AAA were selected for analysis. Reviews of 4 RCTs involving 137,214 participants demonstrated that 1-time invitation for AAA screening in men aged 65 years or older reduced AAA rupture and AAA-related mortality rates for up to 10 and 15 years, respectively, but had no statistically significant effect on all-cause mortality rates up to 15 years. Screening was associated with more overall and elective surgeries but fewer emergency operations and lower 30-day operative mortality rates at up to 10- to 15-year follow-up. One RCT involving 9,342 women showed that screening had no benefit on AAA-related or all-cause mortality rates. The authors concluded that one-time invitation for AAA screening in men aged 65 years or older was associated with decreased AAA rupture and AAA-related mortality rates; but had little or no effect on all-cause mortality rates. LeFevre (2014) reported the update of the 2005 UUSPSTF recommendation on screening for AAA. The USPSTF commissioned a systematic review that assessed the evidence on the benefits and harms of screening for AAA and strategies for managing small (3.0 to 5.4 cm) screen-detected AAAs. These recommendations apply to asymptomatic adults aged 50 years or older. The USPSTF recommends 1-time screening for AAA with ultrasonography in men aged 65 to 75 years who have ever smoked. (B recommendation). The USPSTF recommends that clinicians selectively offer screening for AAA in men aged 65 to 75 years who have never smoked. (C recommendation). The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for AAA in women aged 65 to 75 years who have ever smoked. (I statement). The USPSTF recommends against routine screening for AAA in women who have never smoked. (D recommendation). Abdominal Aortic Aneurysm Screening in Women Ulug and colleagues (2016) stated that although women represent an increasing proportion of those presenting with abdominal aortic aneurysm (AAA) rupture, the current prevalence of AAA in women is unknown. The contemporary population prevalence of screen-detected AAA in women was investigated by both age and smoking status. These researchers performed a systematic review of studies screening for AAA, including over 1,000 women, aged at least 60 years, done since the year 2000. Studies were identified by searching Medline, Embase and CENTRAL databases until January 13, 2016. Study quality was assessed using the Newcastle-Ottawa scoring system. A total of 8 studies were identified, including only 3 based on population registers. The largest studies were based on self-purchase of screening. Altogether 1,537,633 women were screened. Overall AAA prevalence rates were very heterogeneous, ranging from 0.37 to 1.53 %: pooled prevalence 0.74 (95 % confidence interval [CI]: 0.53 to 1.03) %. The pooled prevalence increased with both age (more than 1 % for women aged over 70 years) and smoking (more than 1 % for ever smokers and over 2 % in current smokers). The authors concluded that the current population prevalence of screen-detected AAA in older women is subject to wide demographic variation. However, in ever smokers and those over 70 years of age, the prevalence is over 1 %. Chabok and associates (2016) noted that 4 randomized trials of men aged 65 to 80 years showed that aneurysm-related mortality was reduced by 40 % by ultrasound screening. Screening is considered economically viable when the prevalence of abdominal aortic aneurysm (AAA) is 1.0 % or higher. This is not the case for women, in whom the prevalence of AAA is less than 1 %. These investigators determined the prevalence of AAA 3.0 cm or larger in women screened with ultrasound imaging, the risk factors associated with AAA in this population, and whether high-risk groups can be identified with an AAA prevalence of 1 % or greater. Demographic data and risk factors were collected from the first 50,000 women who attended for private cardiovascular screening in the UK. Tests included ultrasound screening for AAA, ankle brachial pressure index (ABPI), carotid duplex imaging for carotid atherosclerosis, and electrocardiography for atrial fibrillation. AAA was detected in 82 of 50,000 women screened; these aneurysms were rare below the age of 66 years (7 of 24,499). In the 66 to 85 years age group there were 72 AAAs in 25,170 women (0.29 %). Univariable analysis demonstrated that a history of stroke/transient ischemic attack (TIA), hypertension, smoking, atrial fibrillation, ABPI of less than 0.9 and internal carotid artery stenosis of at least 50 % were associated with an increased prevalence of AAA (p

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