

Population-based screening for abdominal aortic aneurysm (AAA)

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Executive summary

Health Council of the Netherlands



In an abdominal aortic aneurysm (AAA), the major artery in the abdomen is locally dilated. The dilatation can burst, which is then referred to as an AAA rupture, in which case the risk of death is substantial. If the patient reaches the hospital in time, an emergency operation can be performed. This operation comes with a high level of risk and is not always beneficial: in 30% of these emergency procedures, the patient dies during the operation or shortly afterwards. The condition occurs predominantly in men aged over 65 and in specific high-risk groups such as elderly people who are or were smokers. An AAA can be detected early with an ultrasound scan. Once detected, preventive surgery on AAAs is possible in order to avoid rupture. In the Netherlands, AAAs are detected in the regular care for the individual patient. This may be a result of targeted screening on the basis of a higher risk profile, or by coincidence, for example during an abdominal examination for another complaint. The State Secretary for Health, Welfare and Sport (VWS) asked the Health Council for advice about the desirability

of a systematic population-based screening programme for AAA in the Netherlands. To answer this question, the *Abdominal Aortic Aneurysm Committee* has been set up. The committee applied the criteria of the normative framework that has been developed earlier by the Health Council to come to its advice.

AAA is a serious condition

A widening of the abdominal aorta of 30 mm or more is defined an AAA; at a diameter of 55 mm or more, preventive surgery is indicated in order to avoid a rupture. Between 1 and 2% of men aged 65 may have an undetected AAA. They occur three to four times more often in men than in women. An AAA does not lead to symptoms or complaints and therefore often remains undetected, but the high risk of death when it ruptures makes AAA a serious condition. Not all mortality cases from AAA are registered as such. The committee estimates that the total mortality from AAA ruptures in the Netherlands is 355 per annum. These occur mostly in elderly people who either die suddenly of a rupture

outside the hospital setting or do not reach the hospital in time for an operation or who die during emergency surgery. In addition, around 62 people per year die during preventive surgery on intact AAAs (that have not yet ruptured); about 2,600 of such operations are performed annually.

The number of fatalities due to AAA ruptures has decreased rapidly since the turn of the century; it is now only a third of what it was at that time. This is a result of better detection and treatment as well as a lower prevalence, probably due to the falling numbers of smokers and a better approach to cardiovascular disease.

In the Netherlands, many AAAs are detected in the regular care sector and then successfully treated

In the Netherlands, AAAs are detected within regular patient care by the GP or a specialist, for example in people who have a higher risk of an AAA because they are smokers with a cardiovascular condition or because they have a family member who was diagnosed with an



AAA. In a large number of cases, AAAs are discovered by chance in people who undergo abdominal imaging for some other complaint. Once detected, an AAA should be checked regularly to monitor its growth. The current approach to detecting and monitoring AAAs is not standardised in the Netherlands but does seem to be effective. The mortality due to AAA-ruptures has decreased and is lower than in other countries.

In 2017, 2,600 preventive AAA-surgery operations were carried out in the Netherlands. That number has increased strongly over the past 20 years and is higher than in other countries, relative to the population size. In the UK and Sweden, where population-based screening programmes for AAA are in place, the number of operations per capita is only half of that in the Netherlands, while the indication for surgery is the same and AAA is just as prevalent as in the Netherlands. The committee derives from this that detection rate is high in the Netherlands. The risk of death during or after a preventive operation has decreased over recent

years and is now 1.7%. The risk of severe complications is 3-5%.

The risk of death in the Netherlands after an AAA rupture is estimated to be around 50%, which is lower than in many other Western countries. This is partly because the mortality risk during or after surgery is lower in the Netherlands, and partly because a larger proportion of patients are expected to reach the hospital in time, because ambulance care and the care system as a whole are well-organised in the Netherlands and the distances to hospitals are relatively small.

Added value of governmental involvement and the risk-benefit ratio

A relatively large number of AAAs is already detected in individual patient care in the Netherlands and patients are operated upon successfully. The question is whether a national population-based screening programme has a sufficiently large effect on AAA-mortality to justify the impact such a governmental intervention has on people's personal lives. A national

population-based screening programme is a much more intrusive way to achieve timely detection of AAAs than the current approach. If a screening programme is decided upon, its usefulness must clearly outweigh the risks that can also arise from population screening.

Research in a few other European countries has shown screening to be effective

Studies in other countries have proven that population screening for AAA by offering a single abdominal ultrasound scan to men at the age of 65 years can be effective. In four long-term studies abroad that started in the period 1991 to 2004, AAA mortality was compared between groups who were invited for screening and control groups not invited. The researchers concluded that screening men aged 65 is effective and, under the given circumstances, could prevent an estimated 32 deaths per 10,000 men invited in the longer term. In countries where a population screening programme was introduced (Sweden and the



UK), it has been shown that one-time screening of men at age 65 is effective in reducing AAA mortality. The ultimate effect of the screening programmes in these countries was estimated to reduce the AAA mortality by 10 to 30 per 10,000 men invited.

In other groups within the population (women or men at older age), insufficient evidence was generated for the effectiveness of an AAA population screening programme.

Risk-benefit ratio of AAA screening would be unfavourable in the Netherlands

The risk-benefit ratio of a population-based screening programme depends on a variety of factors and can be different for each country. To provide properly grounded advice for the Netherlands, the committee has estimated what the risk-benefit ratio could be for implementing a population-based screening programme in the Netherlands. The committee has based the estimates on data on AAA surgery and mortality in the Netherlands as well as on findings from countries that have introduced screening. The

most favourable scenario was assumed: single screening of men at 65 years of age.

Each year, approximately 100,000 men in the Netherlands reach the age of 65 years. The committee estimates that the maximum number of AAA fatalities that could be prevented in the longer term in that group is 120 to 130 per year, i.e. 12 to 13 per 10,000, at the lower end of the reduction estimated for the UK and Sweden.

There are also significant drawbacks to a population-based screening programme.

Screening leads to over-diagnosis and over-treatment: additional diagnoses and treatments that would otherwise not be made and that have no direct benefit to the person involved but can engender serious risks. There is also a risk of false positive diagnoses and of increasing the level of concern about AAA in the population.

Population screening for AAA among men aged 65 would mean in the Netherlands that 100,000 men per year are invited to take part, the majority of whom will undergo an examination.

This would lead to about 1500 diagnoses of AAA

annually. Of those 1,500, it is estimated that 667 would undergo preventive surgery in the longer term, of which about two thirds are over-treatment because they would not have caused any distress. Preventive AAA operations come with a risk of serious complications (3 to 5%) and a mortality risk (1.7%).

Population-based screening for AAA and subsequent preventive operations are estimated to prevent a maximum of 120-130 deaths from AAA-rupture per year in the Netherlands, but at the same time, an estimated 10 to 12 men will die as an effect of the screening and approximately 30 men will have serious complications. Because the number of AAA deaths prevented by population screening is limited and the risks are considerable, the committee's opinion is that the risk-benefit ratio for a population-based screening programme in the Netherlands is not favourable.



Recommendation

In the Netherlands, many cases of AAA are already detected and successfully treated through regular patient care, more so than in some countries where a population-based screening programme is set-up. The mortality from AAA has decreased over the last years. The committee concludes therefore that there is insufficient reason to implement a national, governmental population-based screening, which is a much more intrusive method than regular patient care. Also on the basis of the estimated risk-benefit ratio, the committee's recommendation is that an AAA screening programme should not be set up in the Netherlands. The health gain in all probability

would be limited – too limited to compensate for the considerable risks that it would introduce.

The committee advises to explore whether the current policy can be optimised in order to retain and, if possible, strengthen the positive trend towards increased numbers of preventive operations and lower AAA mortality. The follow-up of patients with a small AAA diagnosed could, for example, be improved. The committee sees possibilities for detecting more AAAs by intensifying the risk-based approach within the care sector, focusing on the family members of known AAA patients and on people at higher risk for cardiovascular disorders and additional risk factors.



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