SPECIAL COMMUNICATION

Screening for abdominal aortic aneurysm: A consensus statement

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THE PROBLEM

Treatment of abdominal aortic aneurysm (AAA) with minimally invasive techniques has recently gained tremendous national and international attention. However, enthusiasm for this new technique has diverted attention from an equally important issue, that of early detection or screening for aneurysms. Over the past 20 years, despite advances in diagnostic imaging and in general medical care of patients, there has been essentially no change in the number of patients seen in US hospitals with ruptured AAA.[1] Approximately 15,000 persons die of ruptured AAA and dissections each year.[2] However, this may be the tip of the iceberg. It is estimated that 300,000 persons per year die suddenly without receiving medical care.[3] Furthermore, studies have shown that the incidence of ruptured AAA in cases of sudden death ranges from 4% to 5%.[4-6] Thus the yearly death rate from ruptured AAA could be as high as 30,000. This is comparable to a yearly mortality of 32,000 for prostate cancer and 42,000 for breast cancer.[2] The foregoing data strongly emphasize the increasingly recognized[7] need for a strategy that will enable early detection of aneurysms.

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COST AND EFFICACY OF SCREENING

When evaluating the cost and effectiveness of screening programs, four important issues must be considered: cost, invasiveness, and accuracy of the screening test; prevalence of the disease; efficacy of interventions to treat the disease; and cost of these interventions. Screening for AAA can be performed with a simple noninvasive ultrasound study. It is well-documented that a limited ultrasound examination is extremely accurate in identifying the presence of AAA.[8] The prevalence of AAA is quite high if selected populations are screened. For example, the incidence of AAA larger than 3 cm in all men older than 60 years is 4% to 8%.[9-14] If patients have cardiovascular risk factors, such as smoking, hypertension, or history of peripheral arterial disease, the incidence of AAA increases two to five times.[15] The prevalence of AAA larger than 3 cm in women older than 60 years is only 1.5%.[9,16-19] However, in female patients with a family history of aneurysm or with multiple cardiovascular risk factors the incidence of AAA is also two to three times higher than in those without these factors.[20] The efficacy of treatment of large aneurysms is profound. The yearly incidence of rupture and death in patients with AAA larger than 5.5 cm is 16%, compared with periopoerative mortality of 2% to 6% for open repair.[1,10,13,14,19,21-24] Moreover, recent data suggest that the mortality rate for endovascular AAA repair may be as low as 1%.[25] Thus patients with large aneurysms clearly benefit from repair.

As of yet, there is no definitive treatment for "small" aneurysms, and a screening program will identify many of these. Nevertheless, rate of growth of small AAAs is relatively predictable. With appropriate surveillance, early identification of small aneurysms is quite beneficial for those patients with aneurysms that enlarge and reach treatment thresholds. In addition, emerging data suggest that medicines such as doxycycline, and risk factor modification may retard aneurysm expansion.[26-29] Early identification of aneurysms will enable application of these treatments and analysis of their efficacy.

Although AAA repair with open or endovascular techniques is expensive, the cost more than doubles if repair is performed emergently.[1] When these various factors were

incorporated into a Markov decision analysis model, AAA screening was found to be cost-effective.[8] The cost per quality-adjusted life year saved for screening men older than 60 years was $11,285. This number compares favorably with the cost-effectiveness of other well-accepted interventions, such as coronary artery bypass grafting ($26,117)[30] or hemodialysis ($54,400).[31] Of interest, the cost-effectiveness of AAA screening appears to be similar to that of screening mammography ($16,000-$20,000).[32] As might be anticipated, AAA screening is not cost-effective in patients older than 84 years.[8]

PROSPECTIVE STUDIES

The benefit of screening for AAA has been demonstrated in six prospective randomized studies.[10,11,13,14,19,21-23] Although these studies were performed in multiple countries, with variable patient cohorts, the findings are surprisingly similar. Male patients of various ages were invited to participate in ultrasound screening, and subsequently aneurysm-related mortality rates in the screened and unscreened populations were compared. Patient response to the request for screening was high (74%-84%), and follow-up ranged from 4 to 10 years.[10,13,14,19,21-23] In screened patients the authors observed a remarkable 45% to 49% reduction in incidence of ruptured AAA[10,13] and a 21% to 68% decrease in aneurysm-related deaths.[10,13,14,19,21] The largest of these studies was a recently published randomized trial in the United Kingdom that involved 70,495 men ages 65 to 74 years.[10] Eighty percent of patients responded to the request for screening. Mortality associated with elective AAA repair was 6%. At 4 years the authors found a 42% reduction in deaths from AAA in the invited group. Moreover, the mortality curves for screened and unscreened patients in this trial continue to diverge after 4 years.

CONTROVERSIAL ISSUES

Several concerns have been raised about the utility of population-based screening for AAA. It has been proposed that patients who are found to have "small" aneurysms will experience a diminished quality of life related to concern about rupture.[33-35] Level of anxiety, however, appears to diminish when a prudent plan of treatment is provided.[35,36] As with any screening program, there will be patients who do not participate. However, similar screening programs within and outside the United States enjoy acceptance rates that range from 75% to 88%.[10,14,37,38] Moreover, very little cost is incurred for patients who do not participate in screening. Aortic aneurysm disease is one of the least-known killers in American society. Initiation of an educational program to inform seniors and their physicians of this disease will increase the rate of response to screening and constitute an important step in a strategy to prevent death from aneurysm rupture. Last, critics have suggested that screening may identify a large number of patients who are unfit for surgery.[33] However, Irvine et al[23] found that patients identified through screening were healthier than those in whom aneurysms were discovered incidentally. Moreover, endovascular techniques will also likely reduce the percentage of patients who are unfit for aneurysm repair.

RECOMMENDATIONS

On the basis of available data we recommend baseline ultrasound screening for AAA in the following patient cohorts:

- All men aged 60 to 85 years
- Women aged 60 to 85 years with cardiovascular risk factors
- Men and women older than 50 years with a family history of AAA.

Patients who appear unfit for any intervention should not be screened. On the basis of available data we recommend subsequent surveillance of screened patients as follows:

- Aortic diameter less than 3 cm, no further testing
- AAA 3 to 4 cm in diameter, yearly ultrasound examination
- AAA 4 to 4.5 cm in diameter, ultrasound examination every 6 months
- AAA greater than 4.5 cm in diameter, referral to a vascular specialist.

CONCLUSIONS

There are compelling data that in appropriately selected patient cohorts identification of AAA can save lives at a cost to society that compares favorably with other well-accepted interventions. Inasmuch as reimbursement remains the major impediment to acceptance of aneurysm screening, we strongly encourage that insurers adopt a policy that allows payment for this life-saving test.

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