Introduction

• Abdominal aortic aneurysm (AAA) is a pathological condition characterized by an abnormal, localized dilatation of the lower part of the aorta. The general consensus for defining an AAA is aortic diameter ≥1.5 times the normal diameter at the level of the renal arteries, which typically equates to a minimum diameter of 3.0 cm to be considered an AAA.

Objective

• The objective of this study is to estimate the number of prevalent cases of AAA and deaths attributable to AAA.

Materials and Methods

• A disease-modeling software program, DisMod II (World Health Organization), was used to assess AAA burden via a multi-state life table where differential equations define relationships between incidence, prevalence, and disease-specific mortality:

\[
\begin{align*}
\frac{dS_a}{dt} &= -iS_a + n_a C_a \\
\frac{dC_a}{dt} &= (f_a - n_a)C_a + iS_a \\
\frac{dD_a}{dt} &= f_a C_a
\end{align*}
\]

- \(S_a\): number of healthy people at age \(a\)
- \(C_a\): number of diseased people at age \(a\)
- \(D_a\): number of dead people at age \(a\)
- \(i\): incidence
- \(r\): remission
- \(f\): case fatality
- \(n\): number of healthy people at age \(a\)

• Input data included age- and sex-specific population, age- and sex-specific all-cause mortality, and cubic spline interpolation of size- and sex-specific relative risk (RR) of death estimates for persons with AAA compared with persons without AAA, adjusted for age, ethnicity, height, weight, smoking, and cardiovascular disease history. Confidence intervals were calculated via a monte carlo simulation (parametric bootstrapping).

Results

• There were 2,347,339 (90% CI: 2,178,188–2,519,827) prevalent cases of AAA in the United States in 2013, resulting in 41,371 (90% CI: 34,888–47,102) deaths attributable to AAA.
• Prevalence of AAA was greatest in the 60–64 years age group for both men and women, while AAA-attributable deaths peaked in the 80–84 years age group for both men and women (Fig 1).
• Small AAAs (infrarenal diameter 3.0–3.9 cm) accounted for 72.7% of the total prevalent cases and 59.1% of attributable deaths, compared with large AAAs (infrarenal diameter 4.0 cm) accounting for 27.3% of the total prevalent cases and 40.9% of deaths (Fig 2, Fig 3).
• Females constituted 21.1% of prevalent cases and 45.2% of deaths, compared with males constituting 79.0% of prevalent cases and 54.8% of deaths (Fig 2, Fig 3).
• Among men ≥55 years of age, 2.01% of all-cause deaths (90% CI: 1.67%–2.32%) were attributable to AAA, compared with 1.34% of all-cause deaths among women ≥55 years of age (90% CI: 1.18%–1.48%) (data not shown).

Conclusion

• The burden of mortality attributable to AAA is more than twice that of current estimates from the American Heart Association and Centers for Disease Control and Prevention.
• This study reveals that females account for a disproportionately high percentage of deaths despite constituting a low percentage of prevalent cases.
• Screening guidelines should be amended to target both sexes, rather than males only.

References


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