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Prevalence of Abdominal Aortic Aneurysm in Men Aged 65—74 Years in a Metropolitan Area in North-East Spain

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WHAT THIS PAPER ADDS

The prevalence of abdominal aortic aneurysm (AAA), detected by measuring the internal diameter, in men aged 65—74 years in a Metropolitan area in north-east Spain was 2.3% (95% CI 1.30—3.77%). This low prevalence is consistent with previous reports in northern Europe during the past decade. AAA diagnosis was associated with smoking, myocardial infarction and being taller than the median. The association with height might have implications for the definition of AAA in a southern European population.

Background: A declining prevalence of AAA and a shift in the distribution towards the older population have been observed during the last decade in Europe. The aim was to estimate the current screening prevalence of AAA in men aged 65—74 years in a metropolitan area in north-east Spain and to identify associated risk factors.
Methods: A cross sectional prevalence study in men registered in L'Hospitalet Primary Healthcare Services (Barcelona, Spain) was performed. There were 619 randomly selected subjects (expected prevalence of aneurysm, 5%; accuracy of estimation, ±2%; loss to follow up, 30%). Exclusion criteria were life expectancy <1 year, limited quality of life, previous diagnosis of AAA, prior aorto-femoral surgery, and non-Caucasian. The following were measured: internal diameter of the infrarenal abdominal aorta using ultrasound, cardiovascular risk factors, personal (heart disease, stroke, peripheral vascular disease) and family history (AAA), physical examination, and blood tests. We estimated the prevalence and 95% confidence interval of AAA, and used logistic regression analysis to identify risk factors for AAA.
Results: Among the 651 individuals included in the analysis the prevalence of aneurysm was 2.30% (95% CI, 1.30—3.77%). In the regression analysis, AAA was associated with smoking (0—10, 11—20, or >20 cigarettes/day), diagnosis of myocardial infarction, and being taller than the median (165 cm).
Conclusions: The current screening prevalence of AAA among men aged 65—74 years in a metropolitan area in north-east Spain is similar to that in northern Europe. Smoking, myocardial infarction, and height were associated with the presence of AAA.

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INTRODUCTION

Abdominal aortic aneurysm (AAA) is a widening of the abdominal aorta that is often asymptomatic. The main risk is rupture, which has a prehospital mortality rate of 59—83%.[1] AAA can be diagnosed non-invasively using abdominal ultrasound, which has 95% sensitivity and almost 100% specificity.[1,2] Ultrasound studies indicate that AAA has a prevalence of 4.1—14.2% and 0.35—6.2% among men and women over 65 years of age, respectively.[3,4] The main risk factors are reported to be male gender, advanced age, and

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smoking.[1,3,4] A positive family history of AAA, coronary artery disease, cerebrovascular disease, atherosclerosis, hypercholesterolemia, and hypertension has also been found to be associated with AAA, and diabetes mellitus is a protective factor.[1,3,4] Various systematic reviews have shown a 40—50% reduction in AAA mortality as a result of screening programs among men at 65 years of age, although it is not clear whether these programs improve all-cause mortality, and the results are still the subject of debate.[1,5—7]

Screening programs implemented in various countries in Europe during the last decade, and other studies, have highlighted a decline in the prevalence of detected AAA, currently reported to be 1.8—2.6% at 65 years of age.[8—11] An epidemiological change has also been observed, with increasing numbers of admissions for non-ruptured aneurysms and elective surgery in individuals over 75 years, and decreasing numbers in younger individuals,[12] suggesting a shift in the distribution of AAA towards the older population. These changes are thought mainly to be due to a decrease in the prevalence of smoking, the main modifiable risk factor for AAA,[9,10,12,13] and increased life expectancy, which lengthens the period for development of the disease.

In light of these changes, it might be necessary to reassess screening strategies for AAA, particularly the screening age for men. Therefore, it is now especially important to know the current prevalence of AAA among 65—74 year old men and the associated risk factors. A study conducted among 65 year old men in a rural area in the north of Spain in 2009 reported an AAA prevalence of 4.7%,[14] which is relatively high. This study measured the maximum external diameter; a 2—5 mm difference between the external and internal diameters[2,15] can result in a marked difference in prevalence estimates. More recently, another study performed among 65—80 year old men in a rural health care center in Spain reported a prevalence of 3.3% (95% CI, 1.1—5.5%).[16] In this case, ultrasound measurements were performed by general practitioners without diameter specification and the results have yet to be validated.

The objective of the present study was to estimate the current prevalence of AAA in men aged 65—74 years in a metropolitan area in north-east Spain using ultrasound measures of the internal diameter of the aorta, and to identify associated risk factors.

METHODS

We performed a cross sectional prevalence study. Our target population was the 12,122 men aged 65—74 years registered at the 13 centers of the L'Hospitalet Primary Health Services, Barcelona, an urban area with a total population of 251,848 (municipal register 2007). We computed a required sample size of 619 subjects, assuming a population prevalence of 5%,[3,4] 5% bilateral alpha risk, 2% accuracy, and 30% loss to follow up. Subjects were selected according to a computer based random sampling process from the registered lists of the 13 primary care centers. The number of subjects was proportional to the registered population in each center. An invitation letter was sent to all subjects explaining the objective and the procedures of the study, and informing them that they would be contacted to arrange an interview at the health care center. A telephone number was also included for further information. A reminder letter was sent after 2 months. The exclusion criteria were severe disease (life expectancy $<$ 1 year), limited quality of life (home care, institutionalization, or Barthel index $<$ 90), previous diagnosis of AAA, aorto-femoral surgery, and non-Caucasian ethnicity (initially established by phone according to birthplace and confirmed during the interview). This group was excluded to ensure sample homogeneity because of the high predominance of Caucasian origin and reported differences in AAA prevalence according to ethnicity.[17,18] Data were collected during interviews conducted by five general practitioners visiting the various health care centers, by reviewing clinical histories, and by physical examination; an appointment for blood extraction was issued if there were no available data for the previous 6 months. Aortic ultrasound was performed at the reference center by four specialists in radiology.

Following a pilot study, interviews were conducted between September 2007 and June 2010.

Variables

Aneurysm was defined as a maximum internal aortic diameter (infrarenal, anteroposterior, or transverse) $\geq$ 30 mm. We also collected data on age, anthropometric measures (height, weight, body mass index [BMI] = kg/m^2, body surface area,[19] and waist circumference measured at the iliac crest), systolic and diastolic blood pressure (mean of two measures), smoking (non-smoker, active smoker, ex-smoker; number of pack-years), and blood assays (total, low-density lipoprotein [LDL] and high-density lipoprotein [HDL] cholesterol, triglycerides, and glycemia in mmol/L). We considered hypertension (previous coded diagnosis, or pharmacologic treatment), diabetes mellitus (DM) (previous coded diagnosis or pharmacologic treatment), hypercholesterolemia (total cholesterol $\geq$ 6.2 mmol/L or pharmacologic treatment), obesity (BMI $\geq$ 30 kg/m^2), abdominal obesity (waist circumference $>$ 102 cm), and metabolic syndrome.[20] Data on personal history of cardiovascular diseases (angor pectoris, myocardial infarction, intermittent claudication, cerebral vascular disease) were obtained from clinical histories, and family history from the clinical interview.

All participants were thoroughly informed about the aims of the study during the first visit, and gave written consent. The study protocol was approved by the Clinical Research Ethics Committee of Jordi Gol Institute for Primary Care Research (Institut d'Investigació en Atenció Primària [IDIAP]) (7Z07/001).

Statistical analysis

We performed a descriptive analysis, computing mean and standard deviation, measures for quantitative variables, and proportions with 95% CI for qualitative variables. Smoking was analyzed using the following variables: habit (non-smoker; active, or ex-smoker), tobacco consumption in active