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Making the Case for Cardiovascular Screening in Irish Males: Detection of Abdominal Aortic Aneurysms, and Assessment of Cardiovascular Risk Factors

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Abstract *Introduction:* AAA screening programmes have proven to be beneficial and cost effective worldwide for males greater than 65 years of age, with 4.9% males of 65–75 years of age having an un-diagnosed AAA at screening, resulting in a 42% reduction in the risk of rupture in an English population. This study assessed the incidence of AAA and risk factors for atherosclerosis in Irish males of 55–75 years.
Methods: From April 2006 to December 2007, males between the ages of 55 and 75 years, living within the catchment area of Blanchardstown Hospital were invited for AAA screening using duplex ultrasound and cardiovascular risk factor screening.
Results: 1.9% (17/904) of the study population had previously un-diagnosed aneurysms detected, with sizes ranging from 3.0 cm to 5.8 cm (0.6% in 55–65 years old (yo) and 4.2% in 65–75 yo, $p < 0.01$). 33% (302/904) of patients had hyperlipidaemia, while 16% of those with a previous diagnosis of hyperlipidaemia, were inadequately controlled on the test date. 31% of patients had a single elevated blood pressure reading, meriting further investigation for possible hypertension. 3% (28/904) of all patients had a raised glucose levels which had not previously been identified and of those who had a previous history of DM, 46% had abnormal glucose levels. 16% of patients (93/573) were morbidly obese (BMI > 30) and 64% (292/573) were overweight.
Conclusion: The incidence of AAAs in 65–75-year-old men is similar to international figures. This study confirms that screening for hyperlipidaemia, hypercholesterolaemia, obesity and

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hypertension may be worthwhile in all males over 55 years, while AAA screening should be reserved for 65–75-year-old Irish males.

Introduction

Cardiovascular disease accounted for 43% of all deaths in Ireland in 1997.[1] The incidence of abdominal aortic aneurysms (AAAs) has increased in the last two decades, due in part to an ageing population, with increasing number of smokers and also improved detection.[2] Ruptured AAAs cause 1.3% of all deaths among males between the ages of 65–85 years.[2] One third of untreated AAAs will rupture, with an associated mortality rate of 65–85%, (half of these deaths occurring prior to arriving to surgery)[3–5]. However, elective repair of these aneurysms has a reported mean 30-day mortality of 2–6%.[6,7]

AAA screening by ultrasound fulfils all WHO criteria for screening and is non-invasive using duplex ultrasound, with a sensitivity of 98.9% and a specificity of 99.9%.[8–12] AAA screening programmes have proven to be beneficial and cost-effective worldwide for males greater than 65 years of age,[13]with 4.9% males of 65 years of age and over having an un-diagnosed AAA at screening, resulting in a 42% reduction in the risk of rupture[14] in an English population. In Gloucestershire a population screening programme performed ultrasound scanning for all men at age 65. If the aorta was less than 26 mm in diameter they were reassured and discharged, as aneurysm disease can be ruled out for 95% of these patients.[15–20]

Risk factors for AAA formation include male sex, smoking, atherosclerosis as well as age[21] therefore AAA screening provides an opportunity to identify patients with atherosclerotic risk factors. This would allow intervention to reduce both AAA expansion rates, and also to reduce other cardiovascular risk factors to improve future outcome.

This study assessed the incidence of screening detected AAAs in a population of Irish males from 55 to 75 years of age, with a view to identifying the ideal age group for screening. Furthermore patients were stratified for cardiovascular risk factors, to see if they might potentially benefit from medical/behavioural management.

Materials and Methods

A cardiovascular risk factor study was initiated by the vascular department in Connolly Hospital, Blanchardstown in Dublin from April 2006 to December 2008. Males between the ages of 55–75 years, living within the catchment area of the hospital, who were identified from the registers of General Practitioners, were studied. Exclusion criteria included patients with terminal medical conditions or a previous history of AAA.

These patients were invited to attend the vascular unit for AAA and cardiovascular risk factor screening. Patients fasted for a minimum of eight hours to enable a fasting lipid and triglyceride profile to be obtained and also to reduce bowel gas thereby improving ultrasound imaging of the aorta. Ethical approval was granted by the hospital's ethical committee and informed consent was obtained from every patient in the study.

The screening programme consisted of three parts:

- Duplex ultrasound of aorta
- Clinical risk factor assessment
- Fasting lipid profile

Duplex ultrasound of the aorta was performed in a standard way by a team of accredited vascular technologists with the patients in a supine position using a curvilinear 3.5 MHz transducer ultrasound probe (General Electric Logic 9). The protocol was taken from the Society for Vascular Technology of Great Britain and Ireland.[22] If the aortic diameter was less then 26 mm, the patients were discharged, as aneurysm disease can be ruled out in 95% of these patients.[23] Follow-up was defined as per international guidelines.

A clinical nurse specialist met with each patient. Their blood pressure, height, weight and body mass index (BMI) were recorded. Normal blood pressure values were defined as less than 140 mmHg systolic and 90 mmHg diastolic. Finger prick tests were performed for total cholesterol, triglyceride and glucose estimation using the Cholestech LDX® System (Cholestech, California). Normal BMI was defined as between 18 and 25.[24] Normal cholesterol values, including high density lipoprotein (HDL) and low density lipoprotein (LDL), as well as triglyceride values were defined per standard guidelines.

A fasting serum total cholesterol of 5.0 mm/mol or greater was classed as hypercholesterolaemia. An abnormal glucose was defined as a fasting serum glucose of 7.0 mm/mol or greater.[25] All abnormal finger prick tests were confirmed using standard blood samples. The nurse specialist discussed the patient's lifestyle and advised them on changes which would help them prevent or control their risk factors.

The results of the risk profile and the recommendations for treatment were referred back to the family practitioner for follow-up. Patients with AAAs were followed up in the Vascular Diagnostic Unit of Connolly Hospital.

Statistical comparison between the two groups was by Chi-squared test with $p < 0.05$ considered significant.

Results

Using the general practitioners' register, 1414 patients were invited to attend and a total of 904 patients accepted the invitation (64%). Of these, 568 (63%) were aged between 55 and 64 years (Group A) and 336 (37%) were aged between 65 and 75 years (Group B). The two groups were analysed together and then compared to assess their relative risks.