Prevalence of risk factors and of coronary artery disease, ischemic stroke, carotid arterial disease and lower extremity peripheral arterial disease in 96 patients undergoing elective surgery for an abdominal aortic aneurysm

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Ninety-six patients (77 men and 19 women), with a mean (± SD) age of 77±9 years, underwent elective surgery between 2006 and 2007 for an abdominal aortic aneurysm (AAA) greater than 5.5 cm in diameter. Of the 96 patients with an AAA, 31 (32%) were smokers, 85 (89%) had hypertension, 78 (81%) were treated with statins for hypercholesterolemia and 24 (25%) had diabetes mellitus. As well, 71 (74%) had coronary artery disease, 17 (18%) had a previous ischemic stroke, 19 (20%) had carotid arterial disease and 37 (39%) had peripheral arterial disease of the lower extremities.

Key Words: *Abdominal aortic aneurysm; Carotid arterial disease; Coronary artery disease; Ischemic stroke; Peripheral arterial disease*

Risk factors for abdominal aortic aneurysm (AAA) are advancing age, male sex, smoking (1-4), hypertension (2-4) and hypercholesterolemia (1,3,4). Patients with an AAA have an increased prevalence of other atherosclerotic vascular disease such as coronary artery disease (CAD), cerebrovascular disease and lower extremity peripheral arterial disease (PAD) (4,5).

The present study reports the prevalence of risk factors for atherosclerotic vascular disease and the prevalence of coexistence of other atherosclerotic vascular disease in all 96 unselected consecutive patients who underwent elective surgery between 2006 and 2007 for an AAA greater than 5.5 cm in diameter.

METHODS

The patients included all 96 unselected consecutive patients (77 men and 19 women) who had an AAA greater than 5.5 cm in diameter, documented by computed tomography, and underwent elective surgery for an AAA at Westchester Medical Center/New York Medical College (Valhalla, New York, USA) between 2006 and 2007. The mean (± SD) age of the patients was 77±9 years (range 59 to 90 years). The prevalence of current smoking, hypertension, hypercholesterolemia, diabetes mellitus and coexistent atherosclerotic vascular disease in the 96 patients was investigated.

Hypertension was diagnosed if the patient was being treated with antihypertensive drug therapy (85 patients) or if the blood pressure was 140/90 mmHg or greater. Hypercholesterolemia was diagnosed if the patient was being treated with statins for hypercholesterolemia (78 patients) or if the fasting serum total cholesterol was 5.18 mmol/L or greater. Diabetes mellitus was diagnosed if the patient was being treated with hypoglycemic drug therapy for diabetes mellitus (24 patients) or if the fasting blood glucose was 7.0 mmol/L or greater on two consecutive occasions.

CAD was diagnosed if the patient had coronary angiographic evidence of significant CAD with a greater than 50% obstruction of at least one major coronary artery, a documented myocardial infarction or typical angina pectoris with stress test-induced myocardial ischemia. All patients had a stress test to detect myocardial ischemia. Ischemic stroke was diagnosed by a neurologist and confirmed by brain computed tomography in all patients with ischemic stroke. Symptomatic PAD was diagnosed if the patient had clinical manifestations of PAD of the lower extremities, as diagnosed by a vascular surgeon, and an ankle-brachial index less than 0.90. Carotid arterial disease was diagnosed if the patient had a greater than 60% obstruction of a carotid artery diagnosed by carotid duplex ultrasonography using grey-scale, colour-flow and velocity criteria.

RESULTS

Table 1 shows the mean age and prevalence of sex, current smoking, hypertension, hypercholesterolemia and diabetes mellitus in the 96 patients with an AAA. Table 2 shows the prevalence of CAD, previous ischemic stroke, PAD of the lower extremities and carotid arterial disease in the 96 patients with an AAA.

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TABLE 1
Mean age and prevalence of sex, current smoking, hypertension, hypercholesterolemia and diabetes mellitus in 96 patients with an abdominal aortic aneurysm

Variable	Result
Age, years (mean ± SD)	77±9
Men	77 (80)
Women	19 (20)
Current smoking	31 (32)
Hypertension	85 (89)
Hypercholesterolemia	78 (81)
Diabetes mellitus	24 (25)

Data presented as n (%) unless otherwise indicated

TABLE 2
Prevalence of coronary artery disease, ischemic stroke, lower extremity peripheral arterial disease and carotid arterial disease in 96 patients undergoing elective surgery for an abdominal aortic aneurysm >5.5 cm in diameter

Variable	Result
Coronary artery disease	71 (74)
Ischemic stroke	17 (18)
Lower extremity peripheral arterial disease	37 (39)
Carotid arterial disease	19 (20)

Data presented as n (%)

DISCUSSION

Advancing age is a major risk factor for AAAs (1-4). In the present study, the mean age of the 96 patients with an AAA was 77±9 years. Of the 96 patients with an AAA, 77% were 70 years of age and older, and 94% were 65 years of age and older. Male sex is also a major risk factor for AAAs (1-4). In the present study, 80% of the 96 patients with an AAA were men.

Smoking is another major risk factor for AAAs (1-4). In the present study, 32% of the 96 patients with an AAA were current smokers. Three studies (2-4) have found hypertension to be a risk factor for AAAs. In the present study, 89% of the 96 patients with an AAA had hypertension.

Three studies (1,3,4) have found hypercholesterolemia to be a risk factor for AAAs. In the present study, 81% of the 96 patients with an AAA had hypercholesterolemia. Statins should be administered to patients with an AAA and hypercholesterolemia (4,6,7). In the present study, statins were administered to 81% of the 96 patients with an AAA. One must not conclude that all patients with AAAs should be treated with statins.

Although diabetes mellitus is a major risk factor for CAD, ischemic stroke, lower extremity PAD and carotid arterial disease, it was not previously reported to be a risk factor for AAAs (1-4). In the present study, 25% of the 96 patients with an AAA had diabetes mellitus. This does not imply that diabetes mellitus is a risk factor for AAAs.

There is a high prevalence of coexistence of atherosclerotic vascular disease in patients with an AAA (4,5). In the present study, of 96 patients with an AAA, 74% had CAD, 18% had a previous ischemic stroke, 39% had lower extremity PAD and 20% had carotid arterial disease. Because cardiovascular mortality is the major cause of death in patients with AAA as well as with CAD, ischemic stroke, lower extremity PAD and carotid arterial disease, patients with an AAA should have intensive treatment of modifiable risk factors and be treated with antiplatelet therapy, statins, antihypertensive therapy and beta-blockers to reduce cardiovascular events and mortality (4). It is the risk factors that are being treated and not the AAA.

The prevalence of current smoking, hypertension, hypercholesterolemia and diabetes mellitus in the present study was similar in patients with carotid arterial disease, symptomatic peripheral arterial disease and AAAs.

CONCLUSION

Modifiable risk factors must be detected and treated in patients with an AAA to reduce perioperative, postoperative and long-term cardiovascular events and mortality. A larger study is required to more accurately define the true prevalence of these risk factors and avoid sample size bias. Patients with AAAs and modifiable risk factors should be screened for CAD with stress testing for myocardial ischemia, PAD and carotid arterial disease.

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