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Atherosclerotic Carotid Artery Plaque in Master/Veteran Athletes: Do They Need Screening?

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ABSTRACT

The existence of obstructive carotid artery stenosis and its coexistence with coronary artery disease is common. Also Master/Veteran athletes are involved in this often asymptomatic vascular disease. With this article, the author reports the cases of two veteran athletes with significant left internal carotid artery stenosis, one of whom resulted symptomatic for transient hyposthenia of the right lower extremity as well as known to have outcomes of myocardial revascularization for obstructive multivessel coronary artery disease. This paper describes the presence of dangerous carotid stenosis in veteran athletes and in particular the frequent coexistence of both coronary and carotid artery atheromasia disease worthy of revascularization, and it discusses if sports preparticipation screening is needed.

Keywords: Carotid stenosis; Carotid US sonography; Veteran athletes; Sport preparticipation screening

INTRODUCTION

It is well known that practicing regular physical activity results in lower risk of vascular disease and mortality in both healthy men and women,[1-2] than in patients with vascular disease.[3]

However, the mechanisms by which physical activity influences this risk have not been fully elucidated. A beneficial effect on treatment of the traditional risk factors for vascular disease, such as high blood pressure, lipid profile, and its effects on platelet aggregation, has been attributed.[4-5]

It follows that physical activity may also have direct positive effects on vascular structure and function through improved endothelial function.

Yet, some studies report that associations between physical activity and risk of future vascular events on patients with vascular disease or vascular risk factors did not change after further adjustment for traditional risk factors.[3]

Carotid wall characteristics such as Carotid Intima Media Thickness (CIMT), Carotid Artery Stenosis (CAS), end-diastolic lumen diameter, and stiffness are measures of vessel function and structure.[6]

Higher levels of these characteristics are known to increase the risk of stroke, other cardiovascular events, and mortality.[7] Several studies conducted in the general population have examined the association of physical activity with CIMT and stiffness markers. Most studies have found an association between a higher level of physical activity and lower carotid or aortic stiffness.[8]

The etiology of ischemic stroke is multifactorial and includes the following factors: hypoperfusion due to hypotension in the presence of a severely stenotic carotid artery, microembolization from an ulcerated carotid plaque, and macroembolization from atherosclerosis of the ascending aorta. In addition, many risk factors for stroke coexist in patients undergoing revascularization for CAD.

CASE REPORT

The first case involves a 70-year-old recreational sportsman subject who had previously undergone myocardial revascularization by PTCA for asymptomatic multi-vessel coronary artery disease presenting to our center for a follow-up visit. After the maximal cycle-ergo-meter stress test which was negative for the reduced coronary reserve, we proceeded to vascular ultrasound of the aortic trunks for a reported transient weakness of the right lower limb with subsequent fall to the ground and inability to move the offending limb for several minutes. EchocolorDoppler examination of the carotid arteries showed an in-homogeneous concentric plaque at the bifurcation of the left common carotid artery extended to the internal carotid artery, with stenosis of more than 80% of the lumen and high peak systolic flow velocity (PSV) with aliasing (Figure 1). The second 60-year-old amateur athlete subject with multiple cardiovascular risk factors underwent first-time sports preparticipation screening for eligibility, and despite a negative cycle-ergo meter stress test he had an excessive increase in blood pressure during the test, so he underwent echocolorDoppler examination of the extra-cranial vessels. Sub-critical obstructive carotid atheromasia of the left internal carotid artery with a heterogeneous vulnerable plaque and eccentric stenosis greater than 75% (Figure 2) was also evident in this amateur athlete. Both subjects were referred for further diagnostic investigation with angioTC of extra-cranial arterial vessels which confirmed obstructive lesions of the left internal carotid artery, with a clear indication for revascularization surgery.

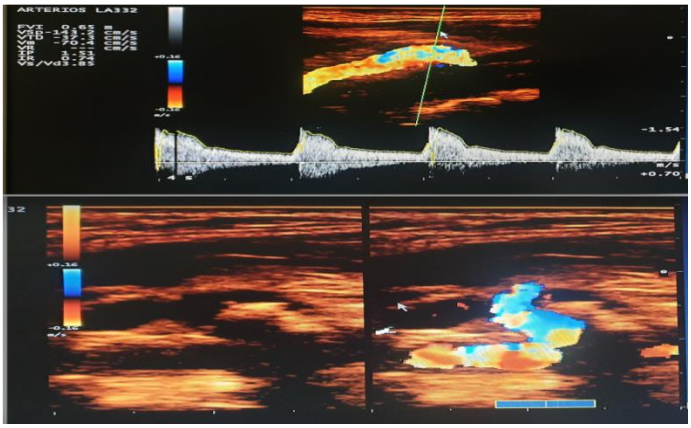

Figure 1: Shows an in-homogeneous concentric plaque to the internal carotid artery with stenosis of more than 80% of the lumen and high peak systolic flow velocity (PSV).

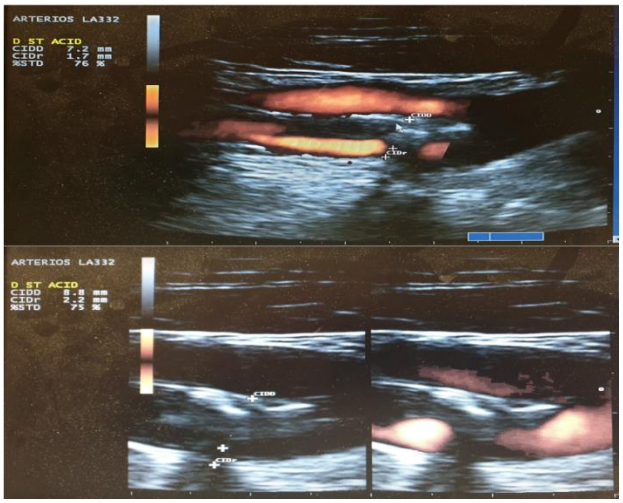

Figure 2: Shows a heterogeneous vulnerable plaque and eccentric stenosis greater than 75% to the internal carotid artery with high CV risk.

DISCUSSION

In order to detect carotid artery stenosis at 60% to 99% the usual screening test is carotid duplex sonography which is widely available and has excellent sensitivity (94%) and specificity (92%).[9]

When carotid US is equivocal or when additional anatomical information is needed, for example when an intervention is planned, CT-Angiography (CTA) or MR-Angiography (MRA) are other non-invasive diagnostic test options. Grading of the stenosis is most often based on the North American Symptomatic Carotid Endoarterectomy Trial (NASCET) criteria. However, MRA often overestimates the degree of stenosis and assessment of calcified lesions with CTA is limited. Both CTA and MRA present difficulties in distinguishing subtotal and complete arterial occlusion.[10]

The purpose of this short paper is to illustrate the asymptomatic presence and/or coexistence of high-risk coronary and carotid atherosclerotic disease in two veteran subjects who regularly participate in high level cardiovascular sports, such as running and cycling. These events could happen in sports individuals thought to be at lower risk of cerebral stroke. The asymptomatic or paucisymptomatic existence of significant carotid atheromasia in masters or veteran athletes suggests the importance of further investigating preparticipation sports screening by echocolorDoppler examination of the supra-aortic artery trunks and in particular investigating the presence of obstructive carotid stenosis at high risk for stroke. This is caused for the increased participation in competitive sports activity by older athletes and because of antiquated legal regulations, so screening investigations need to be implemented by increasingly thorough examinations to rule out vascular pathology such as significant carotid atherosclerosis, which is predominantly asymptomatic in veteran athletes.

Take home messages.

1. Carotid artery atheromasia with significant stenosis is often present in veteran athletes with cardiovascular factors risk;
2. Veteran athletes should be screened for cardiovascular disease by Ultrasound vascular sonography;
3. Sports preparticipation screening must be improved in veteran athletes;
4. Sport doctors should have more skills about ultrasound vascular sonography.

Conflict of interest: Nothing to declare

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