SSA17-05

Advanced Atherosclerotic Disease with Intraplaque Hemorrhage is Present in Non-Stenotic Carotid Arteries of Diabetic Patients

Sunday 11:25-11:35 AM | SSA17-05 | NA

PURPOSE

Diabetic patients have an increased risk of ischemic cerebrovascular events with worse outcomes than the non-diabetic population. Carotid artery stenosis currently stratifies patient risk but, even without significant stenosis, intraplaque hemorrhage (IPH) may predict cerebrovascular events. We report the prevalence of IPH in an asymptomatic diabetic population without carotid artery stenosis, using 3-dimensional (3D) magnetic resonance imaging (MRI) and investigate its association with carotid artery wall volume.

METHOD AND MATERIALS

Patients were recruited from a prospective dietary trial between 2010 and 2013, with a carotid intima-media thickness (IMT) > 1.2mm and non-stenotic carotid arteries on ultrasound. All were asymptomatic type 2 diabetic patients who underwent baseline 3D T1-weighted black blood imaging for visualization of intraplaque hemorrhage (3D-MRIPH) and 3D- time of flight imaging. Carotid artery vessel wall (VW) volumes and IPH volumes were determined bilaterally for a standard 32 mm segment centered at each carotid bifurcation, using a validated approach with the software, VesselMASS (Medis, Netherlands). Descriptive statistics as well as repeated measures linear regression analyses were performed.

RESULTS

159 patients were included with mean age 63.1 + 7.9 years, 62.3% male, 17.9% with a smoking history and 69.2% on hypertensive medication. The prevalence of IPH was 23.3% (n=37) with five patients exhibiting IPH in both carotid arteries. VW volume of the IPH positive carotid arteries was found to be significantly different from IPH negative arteries (β=0.15mm3 SE=0.03, $p<0.01$) and independent from other factors that affected VW volume - age (β=0.01yrs SE=0.002, $p<0.01$), sex (β=0.21 SE=0.04, $p<0.01$), BMI (β=0.22 SE=0.10, p=0.03) - when adjusted (none significant) for disease duration, smoking, blood pressure, and medications (statins, anti-hypertensive, anti-platelet).

CONCLUSION

IPH can be found in the absence of carotid artery stenosis in asymptomatic diabetic patients and is associated with an increased carotid artery wall volume as measured by 3D-MRI. It represents a biomarker of advanced atherosclerotic disease and may identify individuals at higher risk of cardiovascular disease.

CLINICAL RELEVANCE/APPLICATION

3D MRI can identify high risk cardiovascular biomarkers, such as intraplaque hemorrhage, in diabetic patients before onset of stenosis.