Vasa Vasorum Enhancement on Computerized Tomographic Angiography Correlates With Symptomatic Patients With 50% to 70% Carotid Artery Stenosis

Carotid artery stenosis is a risk factor for stroke. The benefit of carotid endarterectomy for severe (≥70%), symptomatic internal carotid stenosis has been shown to be significant in major trials compared with medical therapy. The benefit of carotid endarterectomy for 50% to 70% symptomatic and asymptomatic carotid stenosis is less clear. Thus, the identification of specific carotid plaque features that allow further risk stratification of patients at risk of stroke is extremely important. A vulnerable plaque has high-risk features thought to have increased risk of stroke. Plaque neovascularization and adventitial vasa vasorum (VV) have been shown to have important role in the pathogenesis of the vulnerable plaque. Dr Romero and colleagues have previously demonstrated that enhancement of the VV on computer tomography angiography (CTA) in patients with ≥70% carotid stenosis is associated with increased risk of vascular events. This study sought to determine whether a similar relationship exists in patients with moderate 50% to 70% internal carotid stenosis stenosis.

Four hundred twenty-eight patients with 50% to 70% internal carotid stenosis stenosis fulfilled all inclusion criteria from a 4-year retrospective CTA review. One hundred three (24%) plaques were enhancing, 202 (47%) were calcified, and 123 (29%) were nonenhancing-noncalcified. Symptomatic plaques were found in 32% (n=33) of the enhancing lesions, 21% (n=42) of the calcified plaques, and 18% (n=22) of the nonenhancing-noncalcified plaques. The proportion of symptomatic individuals with enhancing VV plaque was double that of the other groups combined (P=0.015; odds ratio, 1.92). Multivariate logistic regression analysis showed that this association between VV enhancement and symptomatic individuals remained after controlling for cardiovascular risk factors. These important findings, similar to those demonstrated previously by Romero and colleagues in patients with ≥70% internal carotid stenosis stenosis, show the importance of VV enhancement in vulnerable plaques. It is possible, when further validated, that VV enhancement may be a marker used in risk stratification of patients with carotid stenosis.

CLOTBUST-Hands Free: Pilot Safety Study of a Novel Operator-Independent Ultrasound Device in Patients With Acute Ischemic Stroke

The benefit of intravenous tissue-type plasminogen activator (tPA) in the treatment of acute ischemic stroke is well known. However, only 20% to 30% of patients achieve complete arterial recanalization within 2 hours of intravenous-tPA, and up to one third of those with any recanalization experience reocclusion. Adjunctive strategies, including mechanical catheter-based devices, are often used to augment the reperfusion benefit of intravenous-tPA. Sonothrombolysis is the enhancement of clot dissolution with low-power 2-MHz transcranial Doppler ultrasound energy and has been shown to be a safe, promising adjunctive therapy to intravenous-tPA. This phase II trial was a prospective, single-arm, open-label, noncontrolled safety study of 2-hour exposure to 2 MHz pulsed-wave ultrasound combined with standard-dose intravenous-tPA (0.9 mg/kg) in acute ischemic stroke. The trial used a hands-free transcranial Doppler device that delivers energy through both temporal windows and the suboccipital window via 18 separate transducers. Twenty patients were enrolled in this study. Large-vessel occlusions (70% middle cerebral artery occlusion, 15% terminal internal carotid stenosis, 15% vertebral artery) were confirmed by pre-tPA transcranial Doppler or CTA. After 2 hours of ultrasound exposure, follow-up transcranial Doppler or CTA revealed recanalization in 50% of patients (8/20 complete [40%] and 2/20 partial [10%]). No recanalization was seen in patients with vertebral or internal carotid stenosis occlusions. No patients developed symptomatic intracranial hemorrhage. The small sample size of this study limits reliable conclusions from this study. However, the hands-free device seems safe and may aid recanalization compared with intravenous-tPA alone. The Combined Lysis of Thrombus With Ultrasound and Systemic Tissue Plasminogen Activator (tPA) for Emergent Revascularization in Acute Ischemic Stroke (CLOTBUST-ER) is an ongoing phase III trial that will provide more evidence as to the efficacy of this treatment modality. See p 3376.

Serum Alkaline Phosphatase and Phosphate in Cerebral Atherosclerosis and Functional Outcomes After Cerebral Infarction

Studies have shown that elevated levels of alkaline phosphatase and phosphate are associated with atherosclerotic disease in the coronary and peripheral arteries and with increased risk of cardiovascular events and mortality. This study aimed to determine whether the same relationship exists with the intracranial and extracranial cerebral vasculature and functional outcome after stroke. This was a retrospective study of 1034 patients with first-ever stroke. Six hundred twenty-three patients (59%) had evidence of cerebral atherosclerosis, which was defined as stenosis ≥50% in the intracranial or extracranial vasculature. The levels of alkaline phosphatase and phosphate were not associated with atherosclerosis of the intracranial or extracranial vasculature. Elevated alkaline phosphatase levels were associated with poor functional outcome (modified Rankin scale score ≥2 at 3 months). The mechanism behind this association is uncertain. Alkaline phosphatase is elevated under inflammatory conditions, poor nutrition, and infection, all of which may lead to poor functional outcome after stroke. Thus, it is not possible to determine whether high levels of alkaline phosphatase was a marker for poor prognosis after stroke or the cause. Further studies may be needed to further elucidate this relationship. See p 3547.