

Significance of Carotid Plaque Echomorphology in Embolization Risk during Carotid Artery Angioplasty and Stenting

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Purpose

Although carotid artery stenting (CAS) has emerged as a treatment alternative to carotid endarterectomy, stroke owing to procedural-related embolization remains a major concern. The purpose of this study was to evaluate the significance of carotid plaque echomorphology by means of normalized gray-scale analysis in embolization risk during carotid artery angioplasty and stenting.

Methods

All patients undergoing CAS with a cerebral protection device during a recent 38-month period were analyzed. Preoperative carotid duplex scanning was analyzed using normalized gray-scale median (GSM) based on two anatomic reference points: blood (GSM of 0) and adventitia (GSM of 190). The plaque echodensity was determined by the normalized GSM of the pixels of the carotid plaque. The incidence of CAS-associated embolization as detected by the neuroprotection device was analyzed in relation to plaque echomorphology and relevant clinical variables.

Results

A total of 234 CAS procedures were performed in 213 patients (79 male; overall mean age 68 years) with a mean luminal stenosis of 85%. Eighty-two plaques (35%) were associated with transient ischemic attacks, 91 plaques (39%) were associated with stroke, and 61 plaques (26%) were asymptomatic. One hundred seventy-one lesions (73%) were de novo plaques, whereas 63 lesions (27%) were radiation-induced or recurrent stenosis. Neuroprotection-detected embolization occurred in 136 CAS procedures (58%).

The mean GSM value was 29 ± 14 for plaques associated with embolization and 68 ± 21 for plaques without embolization ($p < .03$). The incidence of embolization was increased with hypoechoic plaque (GSM < 20 , Spearman correlation, $p = .042$, $r = -.23$). However, no correlation was found between embolic incidence with the degree of stenosis, preoperative symptoms, or cardiopulmonary morbidities.

Conclusions

Allie DE, Hebert CJ, Lirtzman MD, et al. Critical limb ischemia: a global epidemic. A critical analysis of current treatment unmasks the clinical and economic costs of CLI. *Eurointerventions* 2005;1:75-84.