#1 COMPARISON OF VASCULAR SMOOTH MUSCLE CELL APOPTOSIS AND FIBROUS CAP MORPHOLOGY IN ATHEROMATOUS PLAQUES FROM SYMPTOMATIC AND ASYMPTOMATIC CAROTID DISEASE

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Objective: Plaque stability has been shown to play a significant role in determination of the clinical presentation of carotid disease. Atheromatous plaque instability leading to embolization is considered to be related to vascular smooth muscle cell (VSMC) apoptosis and fibrous cap morphology. It is not yet known which of these two factors contributes more to the stability of the carotid plaque. We evaluated the apoptotic activity and fibrous cap and compared their role in symptomatic and asymptomatic carotid disease.

Methods: Carotid plaques were collected from thirty two symptomatic and asymptomatic patients. The thickness and area of fibrous cap was measured using scanalytic analysis of scion images from hematoxylin and eosin and Gomori's trichrome stained specimens at x100 magnification. In-situ apoptotic detection was done using TUNEL in 6μm frozen section. Apoptosis of VSMC isolated from 10 of these plaques was measured by Fluorescent Activated Cell Sorter (FACS). Macrophages were quantified by immunostaining for CD68 expression.

Results: Table below shows the range with mean in parenthesis.

Carotid Disease	Fibrous Cap		% of Apoptotic nuclei	CD68 Expression
	Thickness	Area		
Symptomatic(16)	0.01– 0.06 mm (0.035)	0.016-0.040(0.027)	18-28(23.88)	0.017-0.030(0.023)mm^2
Asymptomatic(16)	0.05– 0.21mm (0.13)	0.012-0.069(0.033)	6-15(9.93)	0.01-0.03(0.016)mm^2
p value	0.0001	0.118	0.0001	0.0006

The percentage of apoptotic nuclei in the in-situ specimen correlated with the in vitro VSMC apoptosis measured by both TUNEL and AnnexinV method.

Conclusion: Reduced fibrous cap thickness and increased apoptosis in the plaque appear to be equally associated with symptomatic carotid disease. The area of the fibrous cap does not correlate with the stability of the plaque.