

Carotid plaques in patients with TIA and Stroke have unstable characteristics compared to plaques in asymptomatic and amaurosis fugax patients.

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Introduction: Carotid artery atherosclerotic disease may remain clinically silent or be responsible for a variety of clinical presentations of cerebral ischemic events. It is suggested that a higher grade of carotid artery stenosis correlates with more clinical symptoms. It is unknown whether plaque phenotype is associated with clinical presentation.

Methods: Athero-Express is an ongoing longitudinal study, with the objective to investigate the etiological value of plaque characteristics for long-term outcome. For this cross-sectional study we included 404 patients with a carotid endarterectomy (CEA). The plaques were freshly harvested and stained and semiquantitatively analysed for the presence of macrophages, smooth muscle cells (SMC), collagen, calcifications and thrombus. The plaques were divided into three phenotypes based on the overall presentation and especially on the amount of fat: fibrous (30.2%), fibro-atheromatous (35.6%) and atheromatous (34.2%). At baseline clinical symptoms and duplex measurements were recorded from the medical record.

Results: Clinical symptoms were present as follows: ipsilateral (minor) stroke (26.5%), transient ischemic attack (TIA: 36.1%), amaurosis fugax (AFX: 13.9%) or asymptomatic (23.5%) Atheromatous plaques were significantly more prevalent in

symptomatic patients (stroke / TIA) whereas fibrous plaques were more frequently observed in patients with no symptoms or amaurosis fugax (table 1; p=0.001). Collagen staining was less evident in symptomatic patients compared to those patients who presented without symptoms or AFX (p<0.001). No relation was observed between duplex measured stenoses and plaque type or clinical symptoms. In addition, the degree of SMC or macrophage staining, calcifications and thrombus presence did not differ among patient groups. Cardiovascular risk factors were distributed equally over the different plaque categories.

Conclusion: Carotid territory ischemic events are associated with the presence of atheromatous plaques whereas the plaques of asymptomatic patients are more fibrous with more intense collagen staining. The plaque phenotype of patients with amaurosis fugax resembles the plaque phenotype of asymptomatic patients

		Symptoms		stroke	AFX	p - value
		NO	TIA			
Thrombus	Not present	29.8%	32.2%	33.6%	39.3%	0.68

	Present	70.2%	67.8%	66.4%	60.7%	
Macrophage	Moderate	45.2%	44.2%	46.6%	57.8%	0.51
	Heavy	54.8%	56.3%	54.7%	44.6%	
SMC	Moderate	30.9%	35.4%	36.8%	25%	0.41
	Heavy	69.1%	64.6%	63.2%	75%	
Collagen	Minor	15.2%	30.65	22.4%	16.1%	<0.001
	Moderate	50%	54.9%	60.7%	48.2%	
	Heavy	34.8%	14.6%	16.8%	35.7%	
Calcifications	Minor	43.2%	50.7%	52.3%	42.9%	0.44
	Heavy	56.8%	49.3%	47.7%	57.1%	
Plaque overall	Fibrous	41.1%	22.6%	22.4%	46.4%	0.001
	F-atheromatous	28.4%	36.3%	41.1%	35.7%	
	Atheromatous	30.5%	41.1%	36.4%	17.9%	
Duplex stenosis	50 - 64%	1.2%	0.9%	6.0%	2.3%	0.21
	65 - 89%	30.5%	39.7%	38.1%	34.1%	
	90 - 100%	68.3%	59.5%	56%	63.6%	

Table 1