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THE STUDY OF CAROTID ATHEROSCLEROSIS PLAQUE BIOMECHANICS PATIENTS WITH METABOLIC SYNDROME USING MULTIPLE TRACKING TECHNIQUES

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Objectives To analyse the changes of the systolic radial velocity, rotation rate, circumferential strain and strain rate on the corresponding vascular of plaque and without plaque, the cupular part of the fibrous cap and the shoulder of plaque using Multiple Tracking Techniques (MTT), and evaluate of carotid atherosclerosis plaque biomechanics patients with coronary artery disease.

Methods 120 patients with metabolic syndrome (MS) were underwent the high frequency ultrasound scanning in this study. Dynamic imaging was acquired from the short axis views in all subjects. All above images were stored for off-line analysis with dedicated MTT workstation and all mechanical parameters were collected, including the peak velocity, strain and strain rate of the intima of plaque and without plaque, the cap and shoulder of plaque on the corresponding carotid. The above parameters at different points of carotid intima were compared and studied.

Results The systolic radial velocity, rotation rate, circumferential strain and strain rate of carotid short axis with without plaque were increased significantly than those with plaque ($p < 0.05$). The circumferential strain and strain rate of plaque shoulder were greater significantly than that of fibrous cap ($p < 0.05$).

Conclusions The MTT technique could detect the elasticity of blood vessel wall, sclerosis and the mechanism asynchrony of the carotid artery, and could be used as the predictive parameter and quantisation for atherosclerosis and vulnerable plaque.