Whole-body MRA in risk groups
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The understanding of the link between obesity, metabolic syndrome and atherosclerosis and its clinical manifestation such as myocardial infarction, stroke or intermittent claudication is increasing. In this progress of knowledge whole-body magnetic resonance angiography (WBMRA) and whole-body MRI are the ideal imaging methods since they can be repeated for a global assessment of atherosclerosis in risk groups for cardiovascular events. Whole body MR angiographic examinations are mainly performed to assess atherosclerosis of all vascular regions (except coronary arteries) of the body, e.g in patients with diabetes mellitus (1). Other clinical indications are systemic inflammatory vascular disease such as Takayasu arteritis (2).

To obtain a global estimation of atherosclerosis by WBMRA Hansen et al divided the arterial tree into 5 territories (carotid, aorta, renal, upper and lower leg) comprising 26 vessel segments, and assessed according to its degree of stenosis or occlusion. A total atherosclerotic score (TAS) was created for each individual by summing the scores for all territories (3).

In a study comprising 306 subjects aged 70 were recruited from a general elderly population who underwent WBMRA Framingham risk score (FRS) correlated to TAS, as well as to the 5 individual vascular territories. Of the parameters included in the FRS, male gender, systolic blood pressure, cigarette pack-years and HDL cholesterol contributed to the significance, while blood glucose and LDL cholesterol did not (3). In the same cohort TAS predicted major cardiovascular events (MACE) during a 5-year follow-up time, independently of major cardiovascular risk factors (4).

It has recently been observed that the presence and extent of clinically unrecognized myocardial scars on MRI is a strong predictor of major adverse cardiac events including cardiac death in patients with suspected coronary artery disease, but without a history of myocardial infarction. The results of a study by Ebeling Barbier et al (5) suggest that MRI-detected clinically unrecognized myocardial infarctions are not associated with manifestations of significant atherosclerosis in the rest of the body assessed by WBMRA, whereas clinically recognized myocardial infarctions are.

Visceral adipose tissue has proinflammatory characteristics in patients with obesity, insulin resistance and endothelial dysfunctions. Both visceral adipose tissue and endothelial dysfunction have shown to be related to TAS (6-7).

One limitation of WBMRA is that it measures the luminal narrowing and not the true plaque burden or the vulnerability of the plaque. In the future, if MR sequences for characterization of plaque morphology and inflammation grade could be performed together with WBMRA, information on plaque vulnerability, and plaque within the vessel wall, can be added to TAS. Another limitation is that coronary arteries are not included in TAS and in the WBMRA examination, which means that a major contributor to cardiovascular events is not evaluated.

References
6. Hansen T et al Visceral adipose tissue and adiponectin levels are related to atherosclerosis as assessed by whole-body magnetic resonance angiography in an elderly population. Atherosclerosis 205:163-167; 2009.