

Concomittant diseases in patients with coronary artery disease

K. Brauck¹, M. Forsting¹, S. C. Goehde¹

¹Department of Diagnostic and Interventional Radiology, University Hospital Essen, Essen, Germany

Introduction:

Coronary artery disease is an important cause for premature death in the developed countries. The risk factors are cigarette smoking, diabetes mellitus, arterial hypertension, hypercholesterolemia and others. The existence of coronary risk factors causes not only structural changes like atherosclerosis in coronary arteries but also in peripheral vessels. The aim of this study was to determine the occurrence of cardiovascular concomittant diseases in patients with coronary artery disease in contrast to patients without a coronary artery disease.

Methods and Material:

Subjects: 64 Patients (age: 53-77 years) with proven coronary artery disease and 96 healthy volunteers (age: 55-75 years), the latter recruited from the clients of a local insurance company, were examined.

MRI Examination: All MRI examinations were performed on a 1.5T whole-body System (Magnetom Sonata, Siemens AG, Erlangen). Whole-body-angiography was performed from the carotids to the ankles on a rolling table platform (AngioSurf®) with a 5-station contrast-enhanced 3D spoiled gradient echo sequence. The examination of the brain contained a T2-w TSE, TOF, T1pKM, T1-2 SE, FLAIR, diff.-w, MR of the heart consisted of 3D late-enhancement, HASTE and Cine-sequences in long and short axes.

Results:

Besides the known coronary artery disease the following pathologies were observed in the coronary heart disease group: Head: 25.8% minor microangiopathy, 18.8% (n=12) major microangiopathy. In addition to the major microangiopathy 1 patient (8.3%) showed a stenosis of 50-70% of the renal artery, 3 patients (25%) showed a reduction of the brain volume and 2 patients (16.7%) showed a cerebral infarction. Overall in 9.4% of the patients (n=6) a stenosis of 50-70% of the carotid artery, in 12.5% of the patients (n=8) a stenosis of 50-70% of the renal artery (Fig. 1) and in 21.9% of patients (n=14) a stenosis >50% of the aorta or of the pelvic-femoral-arteries were obtained. Among the cardiac results we observed pathologies of a heart valve in 21.9% of the patients (n=14) and hypertrophy of the left ventricle in 29.7% (n=19) of the patients.

In 30.2% of the healthy volunteers a minor microangiopathy was detected, additional 10.4% of the patients showed a major microangiopathy. In addition to a major microangiopathy only 1 patient showed a reduction of the brain volume. Altogether 2 of the patients showed a stenosis of 50-70% of the carotid artery, 2 showed a stenosis of 50-70% of the renal artery and 2 showed a stenosis >50% of the aorta or of the pelvic-femoral-arteries, which is up to ten times less than in the cardiovascular patient group.

Discussion:

In this study the healthy volunteer group demonstrates a low prevalence of the examined vascular diseases; only microangiopathic changes are quite common in both groups, potentially being a natural expression of age. In the cases of non-coronary heart diseased a whole body screening examination seems to be questionable. The coronary heart disease group showed a high prevalence of relevant peripheral pathologies correlating to the known coronary artery disease. Especially the high prevalence of renal and carotid stenoses might lead to deterioration of disease by increase of arterial blood pressure and the occurrence of strokes. Screening examinations seem to be reasonable because conservative and interventional treatment exist for vascular diseases. The other argument for a comprehensive screening in risk populations is, that up to 90% of all peripheral arterial disease cases are missed if only clinical symptoms are used for diagnosis. Peripheral arterial disease can thus be used as a positive predictive marker for cardiovascular disease, as 70% of all patients with peripheral arterial disease have a concomittant cardiovascular disease, which is the most frequent cause for premature death. MR whole body angiography might thus play an increasing role in secondary prevention of vascular disease, as it is the first and only method for visualizing the whole arterial system in one setting, additionally avoiding the use of nephrotoxic contrast agents and ionizing radiation.



Fig. 1: Significant internal carotid artery stenosis (left) and renal artery stenosis (right) from whole body MR angiography