Whole-Body-MRI with a rolling table platform to detect bone metastases

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Introduction
Bone metastases occur with many primary cancers. They considerably influence the quality and length of a patient’s life. At present radionuclide scintigraphy is the gold standard for detecting bone metastases whereas the role of MRI is mostly limited to assess uncertain lesions located in any single skeletal region [1]. Recently, the availability of faster gradients and rapid table motion have opened the possibility for whole body MRI [2,3] The aim of this study was to compare the results of rapid whole-body MRI of the skeletal system with findings of nuclear scintigraphy in patients with bone metastases.

Methods
Eighteen patients who had undergone radionuclide scintigraphy were included in this study, which was conducted in accordance with the regulations set forth by the local ethics committee. MRI could not be performed in two cases because of claustrophobia. Sixteen patients with known bone metastases were examined by MRI (1.5T Sonata, Siemens). Patients were placed on a rolling table platform (BodySURF = system of unlimited rolling field of view) capable of pulling the patient through the magnet bore as well as through a phased array surface coil. Three different image sets (T1-GRE and HASTE with breathhold, TIRM LOTA without breathhold) were collected in the coronal plane. In addition, the spine was imaged in the sagittal plane (T1-GRE, HASTE).

Five stations (head, thorax, abdomen, pelvis, femoral/knee) were imaged in succession. The mean exam time amounted to 40 min. No contrast agents were administered. MRI findings were compared to the results obtained by scintigraphy.

Results
MRI revealed excellent correlation with scintigraphy regarding the detection and characterization of metastatic lesions. A total of 28 metastases were identified on bone scintigraphy. 24 lesions were detected in identical locations with MRI. Both patients had lesions in other locations which were identified with MRI. MR did reveal 4 lesions not suspected on bone scintigraphy. Of these, one lesion was later confirmed at biopsy. Thus the overall sensitivity and specificity amounted to 85.7 and 89.3 % respectively.

Discussion
Whole Body MRI screening for bone metastases correlated well with bone scintigraphy. Merely rib lesions were missed. Use of the rolling table platform permits rapid imaging based on three different contrast mechanisms of the entire skeletal system with surface coil image quality. MRI is thus emerging as an attractive alternative for the diagnosis and follow-up of bone metastases. Its value may lie in the ability to identify lesions of primary tumors known to be missed on scintigraphy. Furthermore, MRI offers the advantage of simultaneously imaging the thoracic, abdominal and pelvic organs.

References