PP-195

Comparison of whole-body low-dose computed tomography (WBLDCT) and x-ray skeletal survey in the detection of bone lesions in patients with multiple myeloma

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Objective: To compare whole-body low-dose 64-slice multidetector computed tomography (WBLDCT) with conventional radiography in the detection of bone lesions in patients with Multiple Myeloma.

Material and Methods: A total of 20 patients with known Multiple Myeloma (15), Smoldering Myeloma (2), MGUS (1) and Solitary Plasmatocytoma (2) underwent WBLDCT and conventional skeletal survey in a seven-month period. Scanning parameters were based on reference data (tube voltage 120- 140 kV; tube current 40 mAs) which allow significant reduction of effective radiation dose , estimated less than two fold higher than the mean radiation dose of conventional x-ray skeletal survey. Two experienced radiologists evaluated in consensus the skeletal surveys while another group of two experienced radiologists evaluated blindly WBLDCT scans for bone lesions in axial and multiplanar reformatted images. Extra-osseous findings were also recorded.

Results: WBLDCT showed 38 bone lesions in 8 patients, while 21bone lesions in 5 patients were seen in skeletal survey. WBLDCT showed a total of 17 lesions more than x-rays, all of them were <1 cm in diameter and located in posterior vertebral elements, clavicles, scapulae and iliac bones. Both CT and x-rays showed the same number of lesions in skull and upper and lower extremities. WBLDCT allowed early diagnosis in two asymptomatic and one symptomatic patients with negative skeletal survey. WBLDCT showed spinal and foraminal stenosis due to space occupying lesions in 3 patients; the degree of stenoses could not be estimated on x-rays. In addition, WBLDCT demonstrated extra-osseous findings in 3 patients (pulmonary infections, nephrolithiasis).

Conclusion: WBLDCT reveals more lesions compared with skeletal survey, with significantly lower radiation exposure compared to conventional MDCT. WBLDCT seems to be more sensitive in detecting small (<1cm) osteolytic lesions , especially in parts of skeleton that are difficult to visualize on conventional radiographs, such as clavicles, spine, pelvis whereas related extra-skeletal pathologies, such as nephrolithisis, can be shown. Improved sensitivity in the detection of bone involvement may lead to more accurate staging and prompt treatment planning in patients with multiple myeloma.