FERUMOXTRAN-10 ENHANCED MRI IN NONINVASIVE DETECTION OF LYMPH NODE METASTASES; FIRST RESULTS IN THE WORK-UP OF PROSTATE CANCER IN A CLINICAL SETTING

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Introduction:
Detection of lymph-node metastases of prostate cancer prior to surgery is essential in the approach to treatment. With ferumoxtran-10 (lymphotrophic superparamagnetic nanoparticles) enhanced MRI lymph node metastases can be detected non-invasively (1). Sensitivity and specificity of this new technique performed in a clinical setting are evaluated.

Methods:
120 consecutive patients with prostate cancer and intermediate to high risk for nodal metastases were included in our hospital between 2003 and 2005. Inclusion criteria were histopathology proven prostate cancer with prostate specific antigen (PSA) > 10, Gleason score > 6, or a T3 malignancy. Patients underwent CT scan followed by MRI scan of the pelvis 24 to 36 hours after intravenous administration of ferumoxtran-10. Acquired data were independently analysed by two MRI radiologists without previous experience in analysing ferumoxtran-10 enhanced MRI scans. Consensus was obtained. Pelvic lymph node dissection (PLND) was performed within 6 weeks after MRI examination. MRI findings were correlated with histopathology.

Results:
120 consecutive patients were included. Eleven patients did not undergo PLND. Histopathology revealed positive lymph nodes in seventeen patients. MRI was true positive in 16/109 (figure 1a&b), FP in 1/109, FN in 2/109 and TN in 90/109. CT was true positive in 8/109, FP in 4/109, FN in 10/109 (figure 1c) and TN in 87/109. Sensitivity, specificity, accuracy, PPV and NPV were respectively 89%, 99%, 97%, 94% and 98% for MRI, and 44%, 96%, 87%, 67% and 91% for CT. In one false negative MRI the metastases in the lymph nodes were sub-millimetre (<0,2mm.). In 5/17 (29%) MRI revealed positive lymph nodes outside the field of view of the standard PLND (the obturator fossa), whereas the lymph nodes in the obturator fossa were negative.

Conclusion:
Ferumoxtran-10 enhanced MRI performed in a clinical setting of a general hospital showed a sensitivity of 89% and a specificity of 99% for the detection of lymph node metastases in prostate cancer. Additional positive lymph nodes outside the obturator fossa are found. Therefore MRL seems a very promising and reliable technique for future workup in patients with prostate cancer.

(1) Noninvasive detection of clinically occult lymph-node metastases in prostate cancer. MG. Harisinghani, JO. Barentz et al. N. Engl J Med 348; 25 june 19, 2003

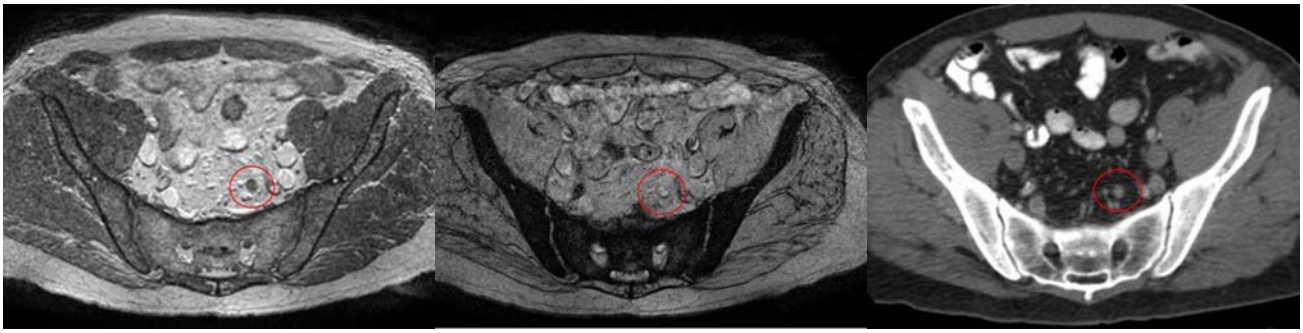

Figure 1a 1b 1c

Figure 1:
a: axial proton density weighed image shows small rounded lymph node 7 mm in diameter
b: corresponding axial T2 * (FFE) weighed image shows increased signal intensity, positive lymph node
c: corresponding axial CT image of this lymph node situated outside the obturator fossa
Histopathology of this lymph node revealed lymph node metastasis.