To determine the clinical value of two novel molecular imaging techniques: $^{11}$C-choline positron emission tomography (PET)/computed tomography (CT) and ferumoxtran-10 enhanced magnetic resonance imaging (magnetic resonance lymphography [MRL]) for lymph node (LN) treatment in prostate cancer (PCa) patients. Therefore, we evaluated the ability of PET/CT and MRL to assess the number, size, and location of LN metastases in patients with primary or recurrent PCa. A total of 29 patients underwent MRL and PET/CT for LN evaluation. The MRL and PET/CT data were analyzed independently. The number, size, and location of the LN metastases were determined. The location was described as within or outside the standard clinical target volume for elective pelvic irradiation as defined by the Radiation Therapy Oncology Group. Subsequently, the results from MRL and PET/CT were compared. Of the 738 LNs visible on MRL, 151 were positive in 23 of 29 patients. Of the 132 LNs visible on PET/CT, 34 were positive in 13 of 29 patients. MRL detected significantly more positive LNs ($p<0.001$) in more patients than PET/CT ($p=0.002$). The mean diameter of the detected suspicious LNs on MRL was significantly smaller than those detected by PET/CT, 4.9 mm and 8.4 mm, respectively ($p<$...
In 14 (61%) of 23 patients, suspicious LNs were found outside the clinical target volume with MRL and in 4 (31%) of 13 patients with PET/CT. In patients with PCa, both molecular imaging techniques, MRL and (11)C-choline PET/CT, can detect LNs suspicious for metastasis, irrespective of the existing size and shape criteria for CT and conventional magnetic resonance imaging. On MRL and PET/CT, 61% and 31% of the suspicious LNs were located outside the conventional clinical target volume. Therefore, these techniques could help to individualize treatment selection and enable image-guided radiotherapy for patients with PCa LN metastases.