Oncologic Imaging

# SS 1916
## Haematological maligancies and lymphadenopathy revisited

Moderators:
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## B-1293 14:00

Whole-body MRI with DWI in lesion detection, staging and response evaluation in FDG-avid lymphomas: comparison with 18F-FDG-PET/CT

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Purpose: To assess diagnostic capability of WBMRI with DWI in lesion detection, staging and response evaluation in FDG-avid lymphomas, namely Hodgkin lymphoma (HL) and diffuse large B-cell lymphoma (DLBCL), in comparison with PET/CT.
Methods and Materials: 16 patients with histologically proven HL and DLBCL underwent both 18F-FDG-PET/CT and WBMRI with morphological sequences and DWI (b values=0-50-1000) for initial staging and for treatment response evaluation. For each patient, 30 nodal and extra-nodal stations were evaluated. We assessed diagnostic accuracy of WBMRI in comparison with PET/CT for Ann Arbor staging. We also assessed sensitivity, specificity, PPV, NPV and accuracy of WBMRI in nodal and extra-nodal lesion detection, and concordance between the two imaging modalities in evaluating response to therapy. Gold standard was represented by PET/CT and concordance between the two modalities was assessed with Cohen's kappa.
Results: Sensitivity, specificity, PPV, PPN and accuracy for nodal and extra-nodal lesions were respectively 83.7, 96.3, 85.4, 95.8 and 93.8% for WBMRI with a very good agreement with PET/CT (k=0.81). Although these differences, there was a perfect agreement (16/16) between WBMRI and PET/CT in Ann Arbor staging. At the end of treatment WBMRI and PET-CT demonstrated excellent agreement in evaluating response to therapy (k=0.92) with only two discordant cases.
Conclusion: WBMRI with DWI, compared to PET/CT, showed a very good agreement and diagnostic accuracy in staging and therapy response assessment of FDG-avid lymphomas, and has the potential to be a "radiation-free" alternative modality in these patients.

## B-1294 14:08

Whole-body MRI, FDG-PET/CT and bone marrow biopsy, for the assessment of marrow involvement in patients with newly diagnosed lymphoma

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Purpose: To compare whole-body MRI (WB-MRI) with diffusion-weighted imaging (DWI), FDG-PET/CT, and bone marrow biopsy (BMB), for the evaluation of bone marrow involvement (BMI) in patients with newly diagnosed lymphoma.
Methods and Materials: Two independent radiologists and one nuclear medicine specialist reviewed all WB-MRI and FDG-PET/CT scans prospectively performed on 104 patients with newly diagnosed lymphoma (53 males; 47 Hodgkin; mean age: 44, range 15-86) between 2013 and 2015. The delay between imaging scans and BMBs was up to 10 days. The diagnostic accuracy of WB-MRI (1.5 Tesla MR scanner, with T1w, T2w-STIR and DWI sequences) was evaluated using BMB and FDG-PET/CT as the reference standard. We applied Cohen's kappa coefficient to assess the inter-observer agreement in WB-MRI interpretation and to compare WB-MRI, FDG-PET/CT and BMB. The Student's t test was done to compare pelvic marrow ADC values of patients with positive and negative BMB. A p-value of <0.01 was considered significant.
Results: Inter-observer agreement was excellent (k=0.937). Agreement between WB-MRI and FDG-PET/CT was excellent, with a k=0.935. Agreement between WB-MRI and BMB was moderate (k=0.489), and fair between FDG-PET/CT and BMB (k=0.370). WB-MRI and FDG-PET/CT were falsely negative in four indolent non-Hodgkin lymphomas with BMI<30% of marrow cellularity. Conversely, WB-MRI and FDG-PET/CT detected all cases with a BMI>30% of marrow cellularity. Mean ADC values in patients with positive and negative BMB were not significantly different (p=0.049).
Conclusion: WB-MRI and FDG-PET/CT are valuable tools for the assessment of BMI.

## B-1295 14:16

Whole-body diffusion-weighted MR and FDG-PET/CT in Hodgkin lymphoma: predictive role before treatment and early assessment after two courses of chemotherapy

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Purpose: To evaluate whether whole-body MR has a predictive role before treatment and may assess the response after two courses of chemotherapy in comparison to FDG-PET/CT.
Methods and Materials: We reviewed the whole-body MR and FDG-PET/CT scans performed on 41 patients (20 males, mean age: 32.6, 15-66; 21 females, mean age: 30.8, 16-56) with newly diagnosed Hodgkin Lymphoma, before and after two courses of chemotherapy (ABVD) between 2013 and 2016. We used the Multivariate GEE model to assess the statistical association between being-responder and baseline-$SUV_{max}$, pre- and post-treatment-ADC and size, percentage change of ADC and size during chemotherapy, site of disease, bulky and stage.
Results: After two ABVD, 10/41 patients (24%) were positive on interim-PET. Mean baseline-$SUV_{max}$ was 11.18±5.58 (3.1-28.0) and baseline-ADC was 0.70±0.14 mm$^2$/s (0.39-0.98). Mean post-treatment-$SUV_{max}$ of non-responder lesions was 5.68±3.13. Post-treatment-ADC was 1.83±0.34 mm$^2$/s (1.31-2.90) in responder lesions and 1.01±0.27 mm$^2$/s (0.49-1.48) in non-responder ones (p<0.001). There was a significant difference also based on post-treatment-size (p=0.009) and bulky (p=0.002). There was no significant difference based on baseline-$SUV_{max}$ (p=0.713), baseline-ADC (p=0.253), percentage change of ADC (p=0.058), size changes (p=0.085), site of disease (p=0.209), stage (p=0.290), baseline-size (p=0.064).
Conclusion: Baseline-$SUV_{max}$ and ADC do not have a predictive role. The occurrence of bulky is the most helpful imaging parameter to predict suboptimal response after two courses of chemotherapy. Post-treatment-ADC is useful for identifying non-responder lesions, whereas size changes are not helpful.

## B-1296 14:24

Whole body MRI with DWI as surveillance imaging for lymphoma patients

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Purpose: The aim of our study was evaluating diagnostic performance of Wb-MRI-DWI in periodical surveillance after therapy and for recurrence identification in lymphoma patients compared with PET-CT.
Methods and Materials: 71 patients with previous lymphoma diagnosis (31 HL and 40 NHL) underwent to Wb-MRI-DWI for surveillance (mean 2,4 examination/patient for 42 mounts). When disease relapse was suspected, definitive diagnosis was obtained with FDG PET-CT or biopsy.
Results: During surveillance, Wb-MRI-DWI correctly identified all 13 patients with recurrence (4 HL, 7 DLCL, 3 FL, 1MCL, 1 ATCL). Only in 1 case both Wb-MRI-DWI and PET-CT suspected disease but biopsy was negative. Sensitivity and specificity, respectively, were 1.00 (I.C. 95% 0.77-1) and 0.98 (0.91-1) with NPV 1.00 (0.94-1) and PPV 0.93 (0.69-0.99).
Conclusion: Wb-MR-DWI thanks to its high sensitivity and NPV is a feasible examination for periodical surveillance in lymphoma patients.

## B-1297 14:32

Comparing whole-body CT with x-ray skeletal survey for staging monoclonal plasma cell disease: results from an international, blinded reader study

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Purpose: To compare the sensitivities of Whole-Body Low-Dose CT (WBLDCT) and conventional skeletal survey (CSS) for bone lesions due to monoclonal plasma cell disease.
Methods and Materials: CSS and WBLDCT from 8 international centres were read in consensus by 3 radiologists blinded for the presence of focal osteolyses or osteoporosis. Differences in sensitivity were tested with the exact McNemar test.
Results: 160/308 patients were previously untreated, and of these, 56 had smoldering multiple myeloma (SMM) according to CSS. 80/160 untreated patients were free of lesions with either modality, and 33 had lesions visible on both. In 38 patients, lesions were only visible with WBLDCT, and in 9 they were detected on plain films only (OR, 4.22 (p<0.0001)). WBLDCT was superior to CSS for the iliac bones, the thoracic and lumbar spine, and the ribs, but not for the proximal extremities. Osteoporosis was diagnosed with WBLDCT only in 29, with CSS only in 10, and with both techniques in 63 /157 patients (OR, 2.9 (p=0.003)). Out of the 56 patients with SMM, 12 (21.4 %) showed lytic bone lesions on WBLDCT (p=0.0005).

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