with DS based on Q.Clear reconstructions, 29 patients were responders (DS 1-3) and 15 were non-responders (DS 4-5), including 3 with progression. Only one non-responder (DS 4) was found to be responder (DS 3) on EARL reconstructions. Concerning response evaluated with ΔSUV, 24 patients were responders on Q.Clear reconstructions (ΔSUV<-66%) and 5 were non-responders. Only 2 responders were classified as non-responders on EARL reconstructions; these patients had a low baseline tumor metabolism on EARL reconstructions (SUVmax < 10) which is a well-known limitation of ΔSUV. ***Conclusion:*** In patients with diffuse large B-cell lymphoma, the use of digital PET/CT and Q.Clear algorithm improve tumor-to-background ratio, with a limited impact on the interpretation of tumor response to chemotherapy, based on Deauville score and ΔSUV. ***References:*** None

EPS-005

Is visual residual lymphoma on FDG PET concordant with it's quantitative assessment?

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Aim/Introduction: ^{18}F-FDG PET/CT is the current standard of care for aggressive lymphoma. Based on the NCCN guidelines (2018) and Consensus of the International Conference on Malignant Lymphomas Imaging Working Group (2014) the FDG PET assessment is visual. However, in clinical practice, SUV_{max} is often used to derive the Deauville score as it is considered less subjective. The aim of this study is to compare the visual and quantitative assessment for residual or resolved lymphoma. ***Materials and Methods:*** Consecutive patients with Hodgkin's lymphoma or diffuse large B-call lymphoma following chemotherapy referred for FDG PET/CT from January, 2016 to October, 2019 with a Deauville score of 3 and 4 based on SUV_{max} (3=above mediastinal blood pool and below liver, 4=above liver) were included. All lesions with a Deauville score other than 3 and 4 or small size (<1.0 cm) were excluded. Visual assessment was performed by experienced radiologist (Reader 1) and technologist (Reader 2) independently for Deauville score. Both were blinded to clinical and other imaging results including SUV_{max} of the lesions. SUV_{max} of tumor lesions, liver and mediastinal blood pool was measured by an experienced nuclear medicine physician. Both the visual and quantitative Deauville score as well as the score between two readers were compared with Cohen's Kappa. ***Results:*** 120 lesions from 100 patients (age: 58.0± 19.2, F:M=36:64) were analyzed. The mean tumor and liver SUV_{max} was 3.65 ±1.0 and 3.1±0.5 respectively, with 56 lesions (47%) at the Deauville score 4 category. The percentage agreement between quantitative and visual assessment was 73% for both readers. The agreement by taking into account the chance agreement was 43% for Reader 1 and 52% for Reader 2 with Cohen's Kappa calculation. Of note there were 32 lesions (27%) scored 3 by Reader 1 but scored 4 by SUV_{max}. There agreement between readers was fair with a Cohen's Kappa at 0.38 (38% of agreement). ***Conclusion:*** A lesion with a Deauville score of 4 following chemotherapy is usually considered residual lymphoma while a score of 3 is resolved or borderline lymphoma. There appears to be suboptimal agreement between the visual and quantitative methods. The difference in approaches should receive more attention as this could lead to changes in patient's management and continues to be a challenge to all reporting and referring physicians. ***References:*** None

EPS-006

Comparison of ^{68}Ga-PSMA and ^{18}F-FDG PET/CT Uptake in Different Lymphoma Subtypes: Preliminary Results

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Aim/Introduction: Few reports have documented the uptake of radiolabeled Prostate-Specific Membrane Antigen (PSMA) in lymphomas [1,2]. It is not known how PSMA uptake varies among various histological subtypes and how it correlates with 18F-FDG uptake in lymphomas. This study aimed to compare 68Ga-PSMA and 18F-FDG in different lymphoma subtypes. ***Materials and Methods:*** Nine randomly selected patients with biopsy-proven lymphoma -median age 43 (32-70) years, 5 female - were submitted to whole-body ^{18}F-FDG and ^{68}Ga- PSMA PET/CT (time interval: 1-6 days between procedures). Lymphoma subtypes included: nodular-sclerosis Hodgkin's lymphoma (HL; 2 patients); diffuse large B-cell lymphoma (DLBCL; 1); marginal-zone lymphoma (2); MALT lymphoma (ML; 1); follicular lymphoma (FL; 1); lymphoplasmacytic lymphoma (1); and B-cell non-Hodgkin's lymphoma, unspecified (BCNHL-U; 1). Eight patients were under initial staging, and 1 (HL) with disease relapse after treatment. Two experienced nuclear physicians analyzed the images by consensus. The intensity of tracer uptake was visually classified as marked, moderate or mild. The affected sites (lymph node chains, spleen, diffuse bone marrow involvement and non-lymphatic focal lesions) were counted in both sets of images and their respective maximum SUV (SUVmax) were measured. ***Results:*** PSMA PET/CT was positive in all patients except for one with ML. FDG PET/CT was positive in all patients. At visual analyses, FDG uptake was higher than PSMA uptake in all patients, except for one patient with BCNHL-U (both tracers with similar low-intensity uptake). The intensity of FDG and PSMA uptake was respectively classified as marked in 3/9 and 0/8 patients, moderate in 4/9 and 1/8 and mild in 2/9 and 7/8. One patient (FL) presented a "mismatch" uptake pattern with different

parts of an extensive lesion presenting predominant uptake of PSMA or FDG. Brain infiltration in one patient (DLBCL) was more easily identified on PSMA than on FDG images. FDG detected a total of 58/58 and PSMA 43/58 affected sites in all patients with a median SUVmax of respectively 5.4 (2.0-31.1) and 2.8 (1.3-5.4), p<0.0001. The median SUVs of the 43 lesions with uptake of both tracers was respectively 5.5 (2.0-28.9) and 2.8 (1.3-P5.4) for FDG and PSMA, p<0.0001. ***Conclusion:*** Distinct lymphoma subtypes present PSMA uptake, with less intensity than FDG uptake. Although PSMA uptake is usually mild, several lymphoma subtypes might cause false-positive results in PSMA PET/CT performed to assess prostate cancer. ***References:*** [1] Kanthan GL, et al. Clin Nucl Med.2016;41(6):500-501. [2] Vamadevan S, et al. Clin Nucl Med.2016;41(12):980-981.

EPS-007

Artificial intelligence can warn for focal skeleton/bone marrow uptake in Hodgkin lymphoma patients staged with FDG-PET/CT

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Aim/Introduction: To develop an artificial intelligence (AI) method for the detection of focal skeleton/bone marrow uptake and quantification of diffuse bone marrow uptake (BMU) in patients with Hodgkin lymphoma undergoing staging with FDG-PET/CT. The results of the AI-method were compared to image interpretations of a group of physicians from different hospitals. ***Materials and Methods:*** Forty-eight non-treated patients who had undergone a staging FDG-PET/CT between 2017-2018, with biopsy proven Hodgkin lymphoma, were retrospectively included. The skeleton and bone marrow were segmented using a convolutional neural network [1] . To detect focal uptake, bone uptake significantly higher than the mean bone marrow uptake was marked as abnormal and an index, based on the total squared abnormal uptake, was computed. Patients with an index above a predefined threshold was interpreted as having focal uptake. Diffuse BMU was classified as high if the patient had a SUVmedian spine bone marrow uptake larger than the liver (>1,0). Ten physicians, with 2-12 years of PET/CT-experience, working in three different hospitals classified the cases regarding focal skeleton/bone marrow uptake and diffuse BMU. ***Results:*** AI agreed with the majority of the readers in 39 of the 48 cases (81%) regarding focal skeleton/bone marrow involvement. While for diffuse BMU AI agreed in 33 (69%) cases with the majority of the physicians, in 1 case half of the physicians agreed with AI and in 14 cases most physicians disagreed with AI. Inter-observer agreement between the physicians, both regarding focal and diffuse BMU was moderate, Kappa 0,53 (range 0,25-0,80) and Kappa 0,41 (range 0,03-0,68), respectively. ***Conclusion:*** An AI-method can be developed to highlight suspicious focal skeleton/bone marrow uptake in Hodgkin lymphoma patients staged with FDG-PET/CT. This AI-method can also objectively present high versus low BMU by calculating median SUV-values in the whole spine marrow and the liver. We have demonstrated that inter-observer agreement regarding both focal and diffuse BMU are moderate among nuclear medicine physicians. ***References:*** 1. Lindgren Belal S, Sadik M, Kaboteh R, Enqvist O, Ulén J, Poulsen MH, Simonsen J, Høilund-Carlsen PF, Edenbrandt L, Trägårdh E. Deep learning for segmentation of 49 selected bones in CT scans: First step in automated PET/CT-based 3D quantification of skeletal metastases. Eur J Radiol. 2019;113:89-95.

EPS-008

Bone Marrow 18F-FDG Uptake Patterns to Evaluate Infiltration in Mantle Cell Lymphoma

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Aim/Introduction: To determine the utility of establishing patterns of 18F-FDG uptake in the bone marrow to evaluate bone marrow infiltration (BMI) in mantle cell lymphoma (MCL). ***Materials and Methods:*** Retrospective review of PET/CT of 42 patients with MCL (3 women, average age 62.5 years), treatment-naïve and with bone marrow biopsy (BMB) as part of the diagnostic work-up study. PET/CT images were visually evaluated, defining five patterns of 18F-FDG uptake in the bone marrow: A-focal (uni or multifocal), B-diffuse homogeneous similar to liver activity, C-diffuse homogeneous above liver activity, D-heterogeneous, E-no uptake/below liver activity. All the patterns except the last one were considered as BMI. Results of image evaluation were compared with BMB. ***Results:*** PET/CT considered BMI in 30 cases (71.4%), most of them with pattern B (40.5%), while BMB revealed involvement in 35 patients (83.3%). There were 17 discordant results (40.5%), 11 of which were interpreted as no-BMI by PET/CT but BMB proved as infiltrated by lymphoma. At least 75% of the cases with uptake pattern C and 88.9% of those with pattern D showed disease at the BMB. No cases with pattern A were identified. ***Conclusion:*** Establishing patterns of FDG uptake in the bone marrow helps standardizing the visual evaluation of PET/CT to determine BMI in MCL, obtaining concordant results with the