ESUI Oral Presentations

Imaging

EO6
Preoperative lymph node staging of intermediate and high-risk prostate cancer using whole body integrated PET/MR with a 68Gallium-labelled ligand of prostate-specific membrane antigen

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Introduction & Objectives: Staging of primary intermediate and high-risk prostate cancer patients before curative treatment usually comprises bone scintigraphy and CT or MRI of the abdomen. Recently, Glu-NH-CO-NH-Lys-(Ahx)-[(68)Ga(HBED-CC)] as a novel 68Gallium-labelled ligand of the prostate-specific membrane antigen (68Ga-HBED-PSMA) has been developed. First reports state high sensitivity and specificity in the detection of prostate cancer lesions. Thus, the aim of this prospective analysis was to investigate 68Ga-HBED-PSMA PET/MR for staging in this patient cohort and correlate it with the results of postoperative histological findings.

Material & Methods: This analysis included 53 patients prior to planned radical prostatectomy with intermediate or high-risk prostate cancer according to d’Amico classification. After injection of 100–150 MBq 68Ga-HBED-PSMA a fully-diagnostic PET/MR including multiparametric prostate MRI was performed and images were reviewed by one nuclear medicine physician and one radiologist in consensus. Visualization of local tumor, evidence of lymph node or distant metastases was evaluated and compared to postoperative histological findings.

Results: Despite unremarkable conventional imaging 68Ga-HBED-PSMA PET/MR revealed metastasized disease in two patients who therefore did not undergo radical prostatectomy. Tumor involvement of the prostate could be visualized by 68Ga-HBED-PSMA PET in 88.3% of patients (45/51). In patients with PSMA-positive primary tumor 68Ga-HBED-PSMA PET detected 11 out of 13 patients with histological lymph node involvement (sensitivity: 84.6%) and correctly classified 31 out of 32 patients without histological evidence of lymph node metastases (specificity: 96.6%; accuracy 93.3%). Of note, the two patients with lymph node metastases that were missed by 68Ga-HBED-PSMA PET only showed micrometastasis in one lymph node. Conclusions: In this initial series, 68Ga-HBED-PSMA PET/MR showed a high detection rate of the primary tumor within the prostate and proved to be of high sensitivity, specificity and accuracy regarding lymph node staging. Therefore, 68Ga-HBED-PSMA PET/MR as single investigation might have the potential to stage intermediate and high-risk prostate cancer patients more accurately than standard imaging.

EO7
MRI use prior to prostate biopsy in a German tertiary care centre: A plea for standardization

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Introduction & Objectives: The number of prostate MRIs performed in patients with suspected prostate cancer prior biopsy steadily increases. Different attempts for standardization of prostate MRI reporting have been made. To assess the use of the PI-RADS reporting system and analyse its impact on detected tumour characteristics in patients scheduled for a prostate biopsies to a tertiary referral centre.

Material & Methods: Based on suspicious digital rectal examination or increasing PSA levels, 97 patients from all across Germany were sent for prostate biopsies between 10/2013 and 04/2014. All patients received MRIs, performed in different MRI-institutions. In 73 (79%) patients, at least one suspect MRI foci was diagnosed and fusion biopsies were performed by using the Koelis system. Additionally, a standardized random 10-core biopsy was performed.

Results: In all patients, prostate imaging was performed by using T2-weighted, diffusion-weighted and dynamic contrast-enhanced imaging (T2WI, DWI, DCE-MRI). A non-standardized reporting scheme 50/73 patients (group 1) was compared to patients diagnosed with the PI-RADS scoring system 23/73 (group 2). The overall detection rate for targeted vs. random biopsies was 38% vs. 50% in group 1 and 52% vs. 61% in group 2. A prostate cancer ≥3+4 diagnosis was made in 79% (15/19) vs. 60% (15/25) for targeted vs. random biopsies (group 1) and in 83% (10/12) vs. 57% (5/9) for targeted vs. random biopsies (group 2). High-risk tumour (defined as Gleason score ≥4+4) was detected in 32% (6/19 patients vs. 20% (5/25) in targeted vs. random biopsies in group 1 compared to 42% (5/12 patients) vs. 15% (2/14) when using the PI-RADS system. Moreover, the amount of tumour per core was increased when using targeted biopsies in patients diagnosed with the PI-RADS system: Mean 8.8% (SD ±15.9) vs. 3.1% (SD ±5.1) group 1 (targeted vs. random) and 10.2% (SD ±15.4) vs. 5.2% (SD ±9.4) in group 2 (targeted vs. random).

Conclusions: The use of MRI guided fusion biopsies increased the overall detection rate. Among patients diagnosed with cancer, the proportion of Gleason score ≥3+4 tumours was increased by simultaneously lowering the proportion of patients diagnosed with a Gleason score <3+3. This phenomenon was strongest detected in patients in whom cancer diagnoses was made by using a standardized reporting system. Therefore, the use of the PI-RADS systems for reporting findings in prostate MRIs should be strictly recommended. Moreover, the clinical and economic burden of non-standardized MRI reporting should be considered from a health care provider and national health authority’s point of view.

EO8
Initial experience with PSMA-radioguided surgery in prostate cancer patients

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Introduction & Objectives: With the advent of 68Ga-HBED-PSMA PET hybrid imaging techniques even small and atypically localized metastatic lesions of prostate cancer can be visualized. However, these lesions might not be easy to localize intraoperatively. Thus, the aim of this feasibility study was to evaluate intraoperative detection of metastatic lesions using a gamma probe after injection of radioactive-labelled PSMA-ligands in correlation with postoperative histological findings.

Material & Methods: Five prostate cancer patients with evidence of oligometastatic primary or recurrent disease on 68Ga-HBED-PSMA PET hybrid imaging were included in this feasibility study. 24 hours before surgery patients received an intravenous injection of an 111In-labelled PSMA-ligand (PSMA I&T). Intraoperatively, metastatic lesions were detected by gamma probe with acoustic and visual feed-
back. Using the freehand SPECT technique optical tracking of the gamma probe allowed augmenting the live video stream of the field of surgery with reconstructed 3D image showing the position of the hotspots. Results of radioactive rating (positive vs. negative) in resected tissue were compared to findings of postoperative histological analysis.

**Results:** Lesions declared radioactive-positive intraoperatively as well as positive measurements of resected tissue ex vivo by the gamma probe corresponded to metastatic prostate cancer lesions with a specificity of 100%. Detection of lesions as well as complete resection of even small metastatic lymph nodes was improved by the use of the gamma probe. Compared to preoperative $^{68}$Ga-HBED-PSMA PET hybrid imaging the intraoperative use of the gamma probe detected all positive lesions and might even be more accurate due to reduced lesion-to-detector distance.

**Conclusions:** In this feasibility study, PSMA-radioguided surgery proved to be of high value for intraoperative detection of even small metastatic lesions in prostate cancer patients. However, greater patient numbers including follow-up data are needed to determine its possible role in clinical routine.

**EO9**

**Contribution of the confocal microscopy in the exploration of the upper urinary tract tumors**

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**Introduction & Objectives:** CT scan Imaging of the upper urinary tract (UUT) could find a lesion under 3 mm with a sensitivity of 40%. Ureteroscopy is the gold standard to explore UUT but the diagnosis is confirmed on biopsy and cytology. We present the preliminary results of a prospective UROVISIO study based on the use of confocal laser endomicroscopy (CLE) to explore UUT. This technology could give histological aspects of urothelium during ureteroscopy.

**Material & Methods:** In this IRB approved prospective single-center study, the number of patients needed for enrollment is 30. All patients have indication of an exploration with ureteroscopy of the UUT for benign or malignant lesions. In all cases, urine samples were obtained for cytology; and a biopsy was performed in case of suspicious lesions. Before CLE, 10 cc of fluorescein 0.1% are instilled in UUT. A Cellvizio confocal miniprobe (UROFLEX B) was used in all cases. Video-clips of CLE sequences were reviewed for an inter-observational study in correlation with cytology and histological samples.

**Results:** From November 2013 to June 2014, 8 patients were included and 10 CLE were performed. Normal histological aspect of urothelium on CLE is found in all patients next to inflammatory or tumor lesion. The key criteria of normal urothelium include the presence of umbrella cells and normal capillary network on lamina propria layer (Fig. 1A). Inflammatory lesions show loosely arranged aggregations of smaller monomorphic cells and enlarged capillary network (Fig. 1B). Papillary tumor is characterized by a central fibrovascular core surrounded by well organized neoplastic urothelial cells (Fig. 1C). Two Low-grade papillary tumor was found on CLE and confirmed in final histological analysis. All inflammatory lesions on CLE had a negative cytology.

**Conclusions:** CLE could be used during reno-ureteroscopy and give an immediate histological imaging of the UUT urothelium. This new technology could add an extension to the diagnostic armamentarium of UUT carcinoma, and may change our guidelines as well.

**Figure 1**

**A**

**B**

**C**