

### FDG-PET INVESTIGATION IN PATIENTS WITH TUMORS OF THE EWING FAMILY

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**Aim:** The high grade Ewing Sarcoms (ES) and Primitive Neuro Ectodermal Tumors (PNET) consist of Tumors of Ewing family (ET). Our purpose was to evaluate the value of <sup>18</sup>F-FDG-PET investigation in patients with ETs in a retrospective study.

**Material and methods:** 24 patients (ages: 6-62, 17 males, 7 females) with suspicious ET were included in the study evaluating PET investigations of a five years period. The absorption corrected images of 33 whole body <sup>18</sup>F-FDG-PET investigations performed in the primary or secondary diagnostics were analysed visually and semiquantitatively with use of Standard Uptake Value (SUV). In cases of 14 investigations PET was compared to bone scintigraphy regarding bone lesions. The final diagnosis based on histology, imaging and follow up.

**Results:** Histologically the primary lesions were ES (n = 10), PNET (n = 13) and osteomyelitis (n = 1). The sensitivity and specificity for disease (ET, and/or its metastases) were 96 and 78 % respectively. Altogether 154 focal lesions were detected by PET and/or other imaging modalities. Sensitivity and specificity regarding focal lesions were 78 and 78%. This lower specificity is due to small lesions. In true positive cases the mean SUV was  $4.6 \pm 2.8$ , in false positive cases  $3.1 \pm 1.5$ . True and false positive cases could not be differentiated definitively based on SUV values because of overlap. In 4 cases PET depicted 70, while bone scintigraphy only 8 bone metastases.

**Conclusions:** <sup>18</sup>F-FDG-PET investigation is a valuable method in case of ETs. Concerning the detection of bone metastases of ETs PET is superior to bone scintigraphy, while for the depiction of small lesions mainly represented by pulmonary metastases PET is less sensitive than helical CT. The determination of the role of whole body <sup>18</sup>F-FDG-PET in diagnostic algorithm needs further investigations.

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### THE ROLE OF <sup>99m</sup>Tc-DEPREOTIDE SPECT IN DIFFERENTIAL DIAGNOSIS OF SOLITARY PULMONARY NODULES. PILOT STUDY

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**Objective:** <sup>18</sup>F-FDG PET is widely used to differentiate between benign and malignant solitary pulmonary nodules (SPN). However this method is relatively expensive and its availability is limited. Many neoplasms take up <sup>99m</sup>Tc-depreotide, allowing a simpler differentiation of SPNs. The drawback is that its uptake is increased in some granulomatous and inflammatory disorders. The aim of this study was to determine the uptake level of <sup>99m</sup>Tc-depreotide after performing SPECT and compare it with structural and histopathological findings.

**Material and methods:** Eleven individuals (mean age of 60) were included in this study. SPECT images were obtained 2 to 4 hours after injection with 600 MBq <sup>99m</sup>Tc-depreotide. Nine of this group had histopathological findings. In reconstructed transaxial slices ROIs were drawn using CT scan so as to direct the area of interrogation. Average and maximum values of uptake related to volume in cm<sup>3</sup> were calculated. These values were compared with histopathological findings. All interpretations preceded pathology reporting.

**Results:** Four patients demonstrated malignant processes (2 squamous cell, 1 adenocarcinoma, 1 malignant fibrous histiocytoma), the average and maximum uptake values were  $68.9 \cdot 10^{-6}/\text{cm}^3$  (SD = 26.6) and  $92.6 \cdot 10^{-6}/\text{cm}^3$  (SD = 34.6), respectively. Five patients showed benign processes (tuberculosis, sarcoidosis, interstitial and chronic pneumonia), with average and maximum uptake of  $48.8 \cdot 10^{-6}/\text{cm}^3$  (SD = 33) and  $62.4 \cdot 10^{-6}/\text{cm}^3$  (SD = 40.1), respectively. One patient suffering from chronic pneumonia had a high probability of inflammation according to the CT scan. Except for this one patient, the other four had average and maximum uptake of 34.7 (SD = 11.5) and 45.2 (SD = 16), respectively. The difference between the average and maximum values was significant (2 sample t-probe:  $P < 0.05$ ).

**Conclusions:** By using either average or maximum values the two patient groups could be separated. According to our results <sup>99m</sup>Tc-depreotide looks promising in characterising SPNs, but its further clinical role awaits confirmation in larger patient groups.

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### OUR EXPERIENCES WITH LYMPHOSCINTIGRAPHY AND SENTINEL LYMPH NODE DETECTION IN PATIENTS WITH UROLOGICAL MALIGNANCIES (PROSTATE-, URINARY BLADDER-, PENIS CANCER)

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The sentinel lymph node (SLN) detection of urological malignancies in our hospital has been used since 2000. During these three years we examined 17 patients (pts) with early stage of prostate cancer (PrC), 5 pts with urinary bladder cancer (UbC) and 2 pts with penis cancer (PeC), performing lymphoscintigraphs (LS) and SLN detections in every case.

**Material and method:** We performed the LS in the pts with PrC and UbC repeatedly (twice), controlling the reproducibility of the method. (In the case of PeC we performed only one LS.) We injected 2-3 ml Tc 99m SentiScint into 2-3 depots in PrC intratumorally, in UbC and PeC peritumorally. After 3 and 24 hours multiple plane LS (A-P, P-A, axial views) were made. The last pictures were performed just before the operation. During the operation the SLN(s) was (were) detected by gamma probe (NAVIGATOR).

Both the primary tumors and the SLN(s) were removed. We sent to the pathology for a special analysis the SLN(s) separately. We removed the inactive LNs as well from the „high risk” lymphatic region.

**Results:** LSs were successful in all of these cases, we could detect the SLN. These SLNs were sought out and removed in every case.

We detected the SLN outside the routinely dissected region in 2/17 PrC and among the removed SLN we found metastatic LN (by pathological analysis) in 2/17 PrC, and 2/5 UbC.

**Conclusions:** On the basis of our result of the SLN detection which seems to be very important method among the pts with urological malignancies. 1. We could find metastasis in LN (SLN) even in very early stage of PrC. 2. The SLN and - for this reason - the LN metastasis can be localised outside the routinely dissected LN basin. Maybe did the books of lymphatic anatomy become „old fashioned”? We have to continue collecting our experiences from the lymphatic mapping.

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### <sup>11</sup>C-METHIONINE PET SUPPORTS THE LOCALIZATION OF PRIMARY PROSTATIC CANCER

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**Purpose:** The incidence and mortality of prostate cancer is significantly increasing world-wide. The development of a PET based method is aimed facilitating better results in the identification of organ confined prostate cancers. We intend to help the urologist in aiming the biopsy by fusing the PET images obtained using <sup>11</sup>C-labeled methionine with the MR images.

**Material and methods:** 13 patients were included in the study all with suspected prostatic carcinoma because of elevated PSA levels (3.49-13.6 ng/ml), pathologic free/total PSA ratios (0.09-0.17) and negative results by conventional imaging methods. All patients went through at least one transrectal US-guided biopsy with negative results. PET investigations were performed using <sup>11</sup>C-methionine.

**Results:** PET investigations identified in 8 patients regions with tracer uptake higher than in the surrounding tissue of the prostate. Histology based on biopsies targeting these areas disclosed carcinoma in 4 patients and benign lesions (chronic prostatitis and benign hyperplasia) in the other 4 cases. Up till now, repeated biopsy was performed in two out of the 5 patients with negative PET imaging and resulted in negative findings.

The first biopsy is positive in only 20-40% of the cases with suspicion of prostate cancer. Accuracy of biopsies subsequent to the first unsuccessful attempt is 10-20%. Our result indicated that <sup>11</sup>C-methionine PET investigations are instrumental in maintaining biopsy protocols of more favourable hit probability saving the patients from the inconvenience of repeated interventions as well as the much unfavourable prognosis accompanying the late diagnosis.