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**ABSTRACTS**  
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## 11<sup>th</sup> Edition of The Balkan Congress of Nuclear Medicine

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## RADIONUCLIDE DIAGNOSIS AND THERAPY IN CHILDHOOD NEUROBLASTOMA WITH DIAGNOSTIC SINGLE CENTRE EXPERIENCE

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Neuroblastoma is the most frequent solid extra cranial childhood malignancy, usually affecting children under five. It arises from neural crest cells with neuroendocrine features and is characterized by the overproduction of catecholamines. The clinical presentation of neuroblastoma can vary from spontaneous regression to aggressive growth and death. The latest staging system utilized for neuroblastoma is the International Neuroblastoma Risk Group Staging System (INRGSS), which relies on preoperative imaging and image-defined risk factors.

Radiopharmaceuticals of interest in the evaluation of neuroblastoma are [<sup>123</sup>I/<sup>124</sup>I/<sup>131</sup>I] mIBG, [<sup>18</sup>F] FDOPA, [<sup>68</sup>Ga] DOTA peptides, [<sup>18</sup>F] FDG. The efficacy of each radiopharmaceutical is determined by distinct neuroendocrine cell uptake mechanisms. The cornerstone of neuroblastoma diagnosis is mIBG scintigraphy, which facilitates both PET imaging and therapy.

Neuroblastoma cells also overexpress somatostatin receptors, thus the peptide receptor theranostic concept may be employed in treatment. Scintigrams obtained through mIBG are semi-quantified by either the Curie or the International Society of Paediatric Oncology Europe Neuroblastoma (SIOPEN) scoring systems. As Serbia is a member of SIOPEN (SERPHO Serbian Society for Paediatric Hemato-Oncology), the SIOPEN semi-quantitative scoring system is used rather than Curie system for mIBG scintigram evaluation.

The Centre for Nuclear Medicine with PET of UCCS reintroduced mIBG scans in neuroblastoma patient evaluation in 2007. Since then, 190 children with neuroblastoma have been diagnosed, and over 350 scintigrams were semi-quantified by SIOPEN score, both soft tissue and bone score.

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BCNM-24/P01

**THE VALIDITY OF FDG PET/CT IN THE DETECTION AND FOLLOW UP OF SEMINOMA**

Petrovic J.<sup>1</sup>, Veljkovic M.<sup>1</sup>, Beatovic S.<sup>1</sup>, Odalovic S.<sup>1</sup>, Stojiljkovic M.<sup>1</sup>, Grozdic Milojevic I.<sup>1</sup>, Veljkovic M.<sup>1</sup>, Sobic Saranovic D.<sup>1</sup>, Artiko V.<sup>1</sup>

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Introduction: By reflecting glucose metabolism, FDG PET/CT has potential advantage over CT especially in post-therapy setting.

Aim: The aim of our investigation is determination of FDG PET/CT usefulness in detection of seminoma, therapy response evaluation and comparison to CT findings and tumor marker levels.

Material and methods: We investigated 82 men after orchidectomy and histopathological confirmation of seminoma, for the initial staging, restaging after chemo/radiotherapy with positive/uncertain CT, suspected recurrence on CT and elevated tumor markers. Clinical follow-up was of up to 8 years (mean 30.5 + 23.4 months) after first FDG PET/CT examination. Metabolic activity was analysed visually and semiquantitatively using SUVmax.

Results: FDG PET/CT was positive in 36 patients (43.9%) with average SUVmax of  $7.9 \pm 4.8$ . Recurrence was mostly found in retroperitoneal lymph nodes and distant metastases in lungs, bones, liver. Six findings were false positive and 3 false negative. Sensitivity, specificity, accuracy of FDG PET/CT were 92.3%, 86%, 89%, while CT had sensitivity 60.3%, specificity 66.6%. Pearson Chi-square test showed statistically significant difference between the results of FDG PET/CT and CT ( $p=0.016$ ). Significant correlation was found between positive FDG PET/CT findings and levels of LDH ( $p=0.043$ ), while it was not significant between FDG PET/CT findings and AFP and FDG PET/CT and  $\beta$ -hCG ( $p>0.05$ ).

Conclusion: FDG PET/CT was superior to CT in evaluation of therapy response, active disease in residual tissue and normal size lymph nodes, as well as when CT was negative and tumor markers were elevated. Elevated LDH contributes to positive FDG PET/CT findings.



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BCNM-24/P17

### HAS THE VALUE OF 18F-FDG PET/CT BEEN UNDERESTIMATED IN PROSTATE CANCER?

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Prostate cancer is an increasing burden on society. It is estimated that the incidence rate of prostate cancer in Europe alone was 330,000 in 2023. The most significant risk factor for developing prostate cancer is age, and since we are being faced with an aging population, it is crucial that firm protocols and guidelines for screening and follow up of these patients exist.

At the University Clinical Centre of Serbia, we recently introduced 99mTc-PSMA SPECT/CT examinations for prostate cancer patients. Patients were selected based on the following criteria: initial treatment (either radical prostatectomy or radiotherapy) and a biochemical recurrence. The average PSA level measured amongst them was 5.07.

Out of the 30 patients examined, despite having a positive (and growing) PSA level, 9 of them had metabolically negative findings on PSMA SPECT/CT. These patients were then referred for an additional 18F-FDG PET/CT examination. This method indeed showed positive FDG metabolic activity in the morphologically suspicious lesions with no PSMA metabolic activity.

From these results, we can conclude that although 99mTc-PSMA SPECT/CT is the method of choice for prostate cancer patients with a biochemical recurrence, there is still room for 18F-FDG PET/CT in their diagnostic work up. This is mostly relevant for patients that are negative on 99mTc-PSMA SPECT/CT with increasing PSA levels.

Ultimately, the results of any diagnostic imaging will determine the next steps in the patients' treatment. Patients with positive FDG examinations will not be candidates for radioligand therapy and other methods of treatment must be considered.



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BCNM-24/P26

**<sup>18</sup>F PET/CT IN THE DIAGNOSIS OF SECONDARY MALIGNANCIES IN PATIENTS WITH HODGKIN LYMPHOMA**

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Introduction: The risk of a second cancer among patients who have been treated for Hodgkin's lymphoma is higher than the incidence of cancer in the general population. <sup>18</sup>F PET/CT is used in the evaluation of a number of malignancies.

Case outline: A 62-year-old female patient was sent for an <sup>18</sup>F PET/CT examination at the Center for Nuclear Medicine with Positron Emission Tomography of the University Medical Center of Serbia for the initial staging of diffuse large B-cell lymphoma (DLBCL), diagnosed 19 years after the patient was being treated for Hodgkin lymphoma. PET/CT revealed an increased metabolism of glucose in a lesion in the right lower lobe of the lungs, which was previously seen on a standard-dose CT, and in the subcarinal lymph node. Bronchoscopy was performed, and a biopsy of the pulmonary lesion revealed squamous cell carcinoma. PET/CT examination also disclosed an increased accumulation of FDG in the right tonsil and right cervical lymph nodes, which showed an increased metabolism due to DLBCL, and a focal zone of an increased metabolism of glucose in the cervix, which still wasn't evaluated for malignancy at the time of this presentation.

Conclusion: PET/CT is a significant tool not only in the initial staging and follow-up of patients with lymphoma but also in a diagnostic evaluation of secondary malignancies, which these patients show an increased risk for.



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BCNM-24/P01

### THE VALIDITY OF FDG PET/CT IN THE DETECTION AND FOLLOW UP OF SEMINOMA

Petrovic J.<sup>1</sup>, Veljkovic M.<sup>1</sup>, Beatovic S.<sup>1</sup>, Odalovic S.<sup>1</sup>, Stojiljkovic M.<sup>1</sup>, Grozdic Milojevic I.<sup>1</sup>, Veljkovic M.<sup>1</sup>, Sobic Saranovic D.<sup>1</sup>, Artiko V.<sup>1</sup>

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Conclusion: FDG PET/CT was superior to CT in evaluation of therapy response, active disease in residual tissue and normal size lymph nodes, as well as when CT was negative and tumor markers were elevated. Elevated LDH contributes to positive FDG PET/CT findings.



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BCNM-24/P11

**SHOULD WE PERFORM BONE SCINTIGRAPHY ONLY IN HIGH-RISK PATIENTS' GROUP WITH NEWLY DIAGNOSED PROSTATE CANCER? A RETROSPECTIVE ANALYSIS BASED ON RISK-GROUP STRATIFICATION**

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For more than half a century, nuclear medicine has played a significant role in the early detection of metastatic disease in newly diagnosed prostate cancer patients. <sup>99m</sup>Tc-bone scintigraphy with labeled diphosphonate compounds is a widely available and highly sensitive (83%) imaging method that is still a part of most recent European Association of Urology guidelines for prostate cancer(1,2). EAU guidelines define three different risk groups based on TNM status, Gleason Score and PSA serum levels at the time of diagnosis (low, intermediate and high-risk), and recommend performing <sup>99m</sup>Tc-bone scintigraphy only in high-risk patients or symptomatic patients, regardless of risk group.

We retrospectively analyzed 294 bone scans of newly diagnosed prostate cancer patients that were referred for bone scintigraphy at the University Clinical Center of Serbia between January 2019 and January 2023, and stratified them into 3 different risk groups based on EAU criteria: 26 patients were in low-risk, 110 in intermediate-risk and 158 in high-risk group. In the low-risk group, none of the patients had bone metastatic disease; in the intermediate-risk group, 10/110 patients(9.1%) had metastatic bone lesions and in the high-risk group 54/158 patients(34%) had at least one metastatic lesion in the skeleton. Interestingly, in the intermediate-risk group, 7/10 patients were with Gleason Score 7(4+3).

Based on the data we gathered from analyzed bone scans of risk-group stratified patients, we can conclude that while bone-scintigraphy might not be needed in the low-risk patients, we can strongly suggest performing bone scintigraphy in intermediate risk-group of patients(in addition to high-risk group).

1. Luining WI, Meijer D, Dahele MR, et al. Nuclear imaging for bone metastases in prostate cancer: The emergence of modern techniques using novel radiotracers. *Diagnostics (Basel)*. 2021;11(1):117.
2. EAU Guidelines on Prostate Cancer - Uroweb [Internet]. Uroweb - European Association of Urology. Available from: <https://uroweb.org/guidelines/prostate-cancer> (2023, accessed 17<sup>th</sup> March, 2024).



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