

**Conclusions:** The vascular surfaces of AMI and VMI were significant different on the side with breast cancer compared to the contra lateral side. This difference was not observed in healthy controls. Future research should proof whether the vascular surface could be a supplementary parameter in the assessment of MRM.

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POSTER

# **Role of [18F]FDG-PET/CT Imaging in the Management of Muscle Invasive Transitional Cell Carcinoma: a Single-institutional Experience Report**

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**Background:** The management of muscle-invasive bladder cancer has evolved over the years with the introduction of perioperative chemotherapy; however, the appropriate selection of patients is still a limiting issue. Computed tomography (CT) or magnetic resonance imaging (MRI) have limited accuracy, particularly, in lymph node staging. In this setting, [18F]fluoro-2-deoxy-D-glucose ([18F] FDG) positron emission tomography (PET) has emerged as an useful alternative for adequate staging and decision making.

**Materials and Methods:** This study investigated the value of FDG-PET/CT imaging in the management of patients with advanced bladder cancer. Between January 2004 and May 2010, 26 patients with muscle-invasive bladder cancer underwent FDG-PET/CT after CT or MRI for staging purposes. The accuracy of FDG-PET/CT was assessed using both organ-based and patient-based analyses. FDG-PET/CT findings were validated by either biopsy or serial CT/MRI.

**Results:** Of the 26 patients available for analysis, PET/CT demonstrated different findings from CT or MRI in 38% of the cases, including evidence of lymph node involvement in 3 patients with originally uninvolved lymph nodes and distant metastases in one of these patients. Also, FDG-PET/CT findings were normal in two out of 15 patients with evidence of nodal involvement by CT or MRI. In both patients, there were no pathological evidences of metastatic involvement. However, FDG-PET/CT was associated with three false positive cases including renal tuberculosis, nodal chronic inflammatory process and chronic pancreatitis. Initial management modifications and changes in the treatment modality occurred in 34% and 23% of the patients, respectively, as a result of FDG-PET/CT re-staging.

**Conclusion:** FDG-PET/CT provides additional diagnostic information that enhances clinical management, when compared to CT or MRI alone. FDG-PET/CT scans may provide better accuracy in clinical information for directing treatment. However, the number of false positive findings are still a concern, particularly in areas such as South America, where the incidence and prevalence of some types of infectious and granulomatous diseases differ from the American and European populations.

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POSTER

# **Role of FDG-PET/CT in the Evaluation of Bone Marrow Involvement of Solid Tumours**

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**Background:** Bone scintigraphy, magnetic resonance imaging, and FDG-PET/CT are used in the evaluation of bone metastasis in solid tumours. There is paucity of imaging modalities that predict bone marrow metastasis in adult solid tumours. We aimed to investigate the predictive value of FDG-PET/CT in solid tumours in which bone marrow metastasis was proven by biopsy.

**Materials and Methods:** We retrospectively analysed patients with proven bone marrow metastasis histopathologically. FDG-PET/CT was ordered in 10 patients. We quantitatively evaluated FDG uptake in iliac wing, corpus sterni, and lumbar vertebra with respect to liver and spleen involvement. We used standard uptake value (SUVmax) and involvement rate to depict bone marrow metastasis.

**Results:** We found bone and bone marrow involvement in all 10 patients with FDG-PET/CT imaging. Five patients showed only bone metastasis whereas 5 patients both bone and bone marrow metastasis. In 5 patients, bone marrow involvement was suspected by FDG-PET/CT although complete blood count was within normal limits.

**Conclusion:** FDG-PET/CT was highly accurate in predicting bone marrow metastasis in solid tumours in adults.

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POSTER

# **Positive Predictive Value of PET- CT in Evaluating Post Therapy Residues of Hodgkin Lymphoma and Diffuse Large B Cell Lymphoma**

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**Background:** Patients with diffuse large B cell NHL (DLBCL) and Hodgkin lymphoma (HL) often exhibit a residual mass of which only 20% and still lesser numbers of NHL and HL respectively, have persistent disease at restaging laparotomy. Computerized tomography scan (CT scan) low specificity in response assessment following therapy [2,3]. So the necessity to identify cases with no viable disease in residues is increasing, but with lesser invasive techniques. Various studies have shown varying sensitivity and positive predictive value of Fluorine<sup>18</sup> fluoro deoxy glucose positron emission tomography (FDG PET) which leads to either unnecessary biopsy of PET positive residues. Indian data addressing this issue is scarce, where PET positive post treatment residues have a high chance of being non malignant, chronic inflammatory conditions or reactive, with paucity of studies using fusion of FDG and CT scan that can improve diagnostic accuracy. This study has been specifically designed to address this issue and find the positive predictive value (PPV) of fusion of PET CT, in evaluating post treatment residues in HL and DLBCL. Further a trend of the Standard Uptake value (SUV) in predicting viable disease has also been analyzed as a secondary outcome of the study.

**Materials and Methods:** Between June 2008 and October 2009, patients diagnosed to have HL and DLBCL at Cancer Institute (WIA) Chennai, treated with standard chemotherapy protocols with or without radiotherapy & who underwent end of therapy <sup>18</sup>FDG PET CT scan to assess post treatment residues, were included in the study. All cases with PET positive residues were biopsied wherever feasible. Correlation of the biopsy with PET positivity and its SUV was done. The PET negative residues were not biopsied and were kept under follow up. All the cases had a mean follow up of 11.69±4.45 months.

**Results:** Seventy eight patients were included in the study with a median age of 36 years (4–76 years), of which there were 55 males and 23 females with a male: female ratio of 2.3:1. Of 78 patients, there were 52 cases of HL and 26 cases of DLBCL. In DLBCL patients, PPV of PET CT was 75% (SUV max 2.03). The 4 PET CT positive cases (SUV max of 1.1) which could not be biopsied were disease free at a median follow up of 15.5 months (10–19 months). In the HL PPV of PET CT was 36.3%. The mean SUV of PET positive residue in DLBCL was 5.7±3.49 (SUV max 12.8), whereas the mean SUV of PET positive residue in HL was 10.8±3.63 (SUV max 15.06) (p value – 0.018).

**Conclusions:** The PPV of PET findings is somewhat limited, dictating necessity to biopsy any PET-positive node, before salvage treatment is contemplated. Even lower SUV values in DLBCL residues may reveal viable disease. On the other hand, larger the node, more were the chances of finding viable disease PET positive HL residues. Size of the node appeared to be predictive in HL. Radiotherapy did not seem to affect the false positive rates in either HL or DLBCL.

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POSTER

# **18F-FDG PET for Assessment of Therapy Response After Neoadjuvant Chemotherapy in Stage IIIa Non-small Cell Lung Cancer**

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**Background:** The aim of this study was to evaluate FDG-PET for assessment of therapy response and prediction of patient outcome after neo-adjuvant chemotherapy (NACT) of IIIa non-small cell lung cancer (NSCLC).

**Material and Methods:** Twelve patients (11 men and 1 women, mean age: 64.33 years old (range:19–81)) with newly diagnosed and histologically proven IIIa NSCLC (5 adenocarcinoma and 7 squamous cell carcinoma) were included in a prospective study between September 2008 and January 2010. All patients underwent CT and 18F-FDG-PET-CT (Siemens Biograph. 16<sup>®</sup>) before and after NACT (cisplatin-based chemotherapy). The images data were collected, analyzed and correlated with outcome data. Maximum SUV (SUVmax) value and the NACT response (EORTC criteria) were correlated with clinical outcome. We also compared the assessment of treatment response between CT scan (RECIST criteria) and PET-CT scan (EORTC criteria).

**Results:** The mean average FDG uptake of the primary tumours was 13.26 compared with 7.72 after NACT. According to RECIST criteria, one patient developed a complete response (CR), 7 had partial response (PR), 3 stable disease (SD) and one had progressive disease (PD). On PET-CT scan

images, according to EORCT criteria, 7 patients had PR, 1 SD and 4 had PD. NACT understaged 4 patients because PET-CT scan found new lesions in 2/4, PD for metabolic progression (>25% increase of SUV<sub>max</sub>) in lymph node disease in another one and PR instead of CR in the last one. In 2 cases in which CT scan showed SD, PET-CT scan showed PR. 33.3% of patients underwent surgical intervention after NACT. Progressive disease or stable disease according to PET-CT (new tumour manifestations or increasing SUV) was well correlated with an unfavourable outcome.

**Conclusions:** FDG-PET is suitable to assess response to NACT in patients with stage IIIA NSCLC accurately. <sup>18</sup>F-FDG-PET-CT may be helpful in improving restaging after NACT since it allows a reliable assessment of residual tumour viability and it can find new lesions.

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POSTER

#### Diagnostic Performance of Selective Positron Emission Tomography for Lung Cancer Computed Tomography Screening: a Meta-Analysis

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**Background:** The effective lung cancer screening modality has not been established yet. Positron Emission Tomography (PET) has proven to be helpful in lung cancer for staging and evaluation and might be potentially used as a successful screening modality. The objective of our study is to estimate the diagnostic performance of selective PET for lung cancer computed tomography screening via a meta-analysis of a subgroup analysis from a systematic review.

**Material and Methods:** A systematic review is performed by reviewing primary studies focusing on PET screening for lung cancer using the following keywords "(lung cancer) AND (positron emission tomography) AND ((screen) OR (screening))" in Pubmed® on Nov 30th, 2010. The preliminary results will be partly presented in ISPOR 16th annual international meeting. Studies reported evidence of lung cancer computed tomography (CT) screening programs with selective PET were further identified as a subgroup analysis and were separately reported in the present study. Methodological quality was assessed using the modified criteria recommended by the Cochrane Methods Working Group on Systematic Review of Screening and Diagnostic Tests used in a previous study. A random effect model was used to calculate the pooled diagnostic performance of selective PET screening.

**Results:** Among the identified studies (n=2733), three studies were included in this meta-analysis. In total, 207 participants received PET in the prevalent screening, accounting for 2.5–3% of individual trial participants. The quality assessment was viewed as acceptable (>=75% of maximal score in each trial). The estimated pooled sensitivity and specificity with 95% confidence interval was 86% (76–93%) and 92% (85–96%) respectively in the prevalent screen.

**Conclusions:** PET can be used as a selective modality in combination with CT for screening lung cancer in high risk population, with a high diagnostic performance.

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POSTER

#### Combination of 99mTc-MIBI Scintigraphy, Fine Needle Aspiration and Ultrasound in the Preoperative Assessment of Patients With Hypofunctioning Solitary Thyroid Nodules (HSTN)

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**Purpose:** To evaluate diagnostic accuracy of 99mTc-MIBI scintigraphy in multimodality evaluation of patients with hypofunctioning solitary thyroid nodules.

**Materials and Methods:** 73 patients 19–65 y.o. with HSTN on the 99mTc-pertechnetate scan were included in this retrospective analysis. Planar thyroid imaging in anterior, semi-lateral and lateral projections was performed 15–30 and 120 min after intravenous injection of 370–540 MBq

99mTc-sestaMIBI. All acquisitions were done on rectangular dual-head gamma camera equipped with low-energy, high-resolution, parallel-hole collimators. Images with focal and scattered patchy uptake of 99mTc-MIBI were scored as abnormal and suspicious for thyroid malignancy. Obligatory examinations included ultrasound thyroid examination (US) and US guided percutaneous aspiration biopsy (PAB) from nodules. All 73 patients were operated and have histological verification of disease.

**Results:** Scintigraphy revealed abnormal accumulation of 99mTc-MIBI in "cold" thyroid nodules in 61 of 73 evaluated patients. According to histological verification after surgery 55 cases were true positive, 8 – true negative, 4 – false negative and 6 – false positive. It must be mentioned that 4 of 6 patients with false positive results had follicular adenoma which must be also operated. Sensitivity (Sen), Specificity (Sp) and Accuracy (Ac) of scintigraphy with 99mTc-MIBI was as follows 93%, 57% and 80%.

PAB was non-diagnostic in 5 cases. All 5 patients had abnormality on 99mTc-MIBI scintigraphy and cancer on histology. PAB was false positive in another 2 cases. Finally, Sen, Sp and Ac of PAB was 91%, 85% and 90%. US examinations were true positive in 55, true negative – in 9, false negative – in 4 and false positive – in 5 cases with Sen (93%), Sp (64%), Ac (88%).

Combination of 99mTc-MIBI scintigraphy and PAB was significantly more accurate (Sen 97%, Sp 96% and Ac 93%) than PAB and US separately or in combination.

**Conclusion:** In patients with HSTN scintigraphy with 99mTc-MIBI characterized by high sensitivity but its combination with PAB offers the best diagnostic accuracy.

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POSTER

#### Combination of Functional and Anatomic Imaging in Diagnosis of Axillary Lymph Node Metastases (LNMs) in Patients With Breast Cancer (BC)

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**Purpose:** To evaluate different imaging strategies for diagnosis of axillary LNMs in patients with primary BC.

**Material and Methods:** Ninety nine consecutive patients with primary BC were examined during period from 13.10.2008 to 27.04.2010. Functional imaging by scintigraphy (AxSc) with 99mTc-MIBI was performed in static and tomography modes 15 min after i/v injection. Focal areas of tracer accumulation in axial region were considered as signs of LNMs. Ultrasound (US) examination of axillary region was performed on 7.5 kHz scanner. Nodes with diameter more than 1 cm were considered abnormal. All patients were operated with axillary LN dissection and subsequent histological evaluation.

**Results:** Scintigraphic signs of LNMs revealed in 40 patients: 23 – true positive, 17 – false positive. Among 58 women with normal AxSc results 8 had LNMs and 40 – uninvolved nodes. Sensitivity (Sen), Specificity (Sp) and Accuracy (Ac) of AxSc were as follows: 74%, 75% and 74%.

Sonography diagnosed LNMs in 44 women: 30 were metastatic on histology while other 14 – uninvolved. On the contrary, 8 of 47 US normal sized nodes were metastatic on histology. US had following values when used for diagnosis of axillary LNMs: Sen – 79%, Sp – 77%, Ac – 77%. When LNMs were diagnosed as the combination of concordantly abnormal US and AxSc examinations Sp reached 96%, Sen dropped down to 52% and Ac – 79%. Another model was based on the assumption that LNMs must be diagnosed in all patients with abnormal US or AxSc examinations. According to this strategy Sen reached 87%, Sp – 68% and Ac – 78%.

**Conclusions:** 1. We found comparative accuracy of US and AxSc in diagnosis of axillary LNMs in patients with primary BC. 2. Combination of both modalities can significantly improve sensitivity (87%) or specificity (96%) of final conclusion which is determined by established diagnostic strategy and criteria's that are used for BC diagnosis.

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POSTER

#### Human Adipose Tissue Derived Mesenchymal Stem Cells as Vehicles for Cell-based Glioma Therapy; a Model Based on Non-invasive Bioluminescence Imaging

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**Background:** Lately adipose tissue mesenchymal stem cells (hAMSCs) have emerged as cellular vehicles for therapy of solid tumours, due