Bioconductance Compared to 18FDG-PET in Evaluating CT-Detected Lung Lesions

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Background: Lung cancer (LC) is the leading cause of cancer mortality. Computed tomographic (CT) screening detects LC at earlier stages but also results in finding many more smaller, benign nodules. Positron-Emission-Tomography (PET) is commonly used to evaluate suspicious lesions prior to invasive biopsies. However, PET accuracy is confounded by various factors including size, inflammation and tumor metabolic activity. Another potential biomarker of cancerous tissue is a non-invasive measure of transcutaneous bioconductance. This study compares Electro Pulmonary Nodule (EPN), a tissue bioconductance scan, to 18FDG-PET in evaluating CT detected suspicious lung lesions.

Methods: Cohort- 27 patients with suspicious nodules evaluated with both PET and EPN scanning (IRB approved protocol) prior to biopsy or long-term radiologic follow-up. An EPN Scan measuring bioconductance was performed on bilateral anatomic skin sites and results were scored as either positive or negative dependent on a defined cut-off point. The PET results were interpreted as positive, negative or indeterminate.

Results: There were 18 LCs (16 non-small cell LC, 2 small cell LC) and 9 benign lesions. PET results yielded 7 indeterminate readings. Excluding these 7, PET had 100% sensitivity (14/14 true positives) and 67% specificity (4/6 true negatives). EPN Scan evaluation of these 20 determinate PET cases had 86% sensitivity (12/14 true positives) with 83% specificity (5/6 true negatives). When evaluating the entire cohort of 27, the EPN results improved sensitivity and specificity to 89% (16/18 true positives) and 89% (8/9 true negatives), respectively. Table 1 describes the 7 lesions 18FDG-PET indeterminate lesions compared to EPN Scanning.
In these 7 cases, the EPN Scan correctly classified all cases for 100% accuracy. Of note, 2 of the 4 cancers classified by PET as “indeterminate” were < 1 cm and were correctly categorized by the EPN Scan.

**Conclusion:** While 18FDG-PET is often used as a clinical adjunct in the evaluation of suspicious CT detected pulmonary lesions, it has recognized limitations. In this feasibility study of measuring transcutaneous bioconductance as a pre-biopsy assessment, EPN Scan performed favorably versus PET, especially in evaluating smaller or PET-indeterminate lesions.

**Keywords:** Lung, Cancer, Bioconductance, PET