

Lung Cancer

SESSION TITLE: Lung Cancer: Procedures, Outcomes, and Palliative Care

SESSION TYPE: Rapid Fire Original Inv

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COLE RELAXATION FREQUENCY: A PARAMETER TO ASSESS LYMPH NODE STATUS IN PATIENTS WITH LUNG CANCER

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PURPOSE: Lung cancer is the world's leading cause of cancer deaths, and early, accurate diagnosis remains challenging. The severity of lung cancer increases radically when tumor cells metastasize to lymph nodes or distant organs [1]. Thoracic CT is the gold standard in lung cancer diagnosis, however enlarged lymph nodes on CT demand a diagnostic procedure via endobronchial ultrasound or mediastinoscopy to properly assess the severity and plan an adequate treatment [1,2]. The Cole Relaxation Frequency (CRF), a derived electrical bioimpedance signature, has been proved to detect cancer in breast, skin, and lung tissues [3,4,5]. The aim of this pilot study was to determine if NoduleScan, a CRF based technology previously proposed by NovaScan to detect cancer in the lungs, can be used for lymph node assessment [5].

METHOD: Human ex-vivo testing was conducted with NoduleScan in freshly resected lung tissue and lymph nodes from five volunteer patients undergoing resection for non-small cell lung cancer. NoduleScan was used to perform CRF measurements of the lung tumor, the distant normal lung tissue, and the lymph nodes in order to assess cancer presence in these samples. NoduleScan outcomes were compared to histopathology results for each of these samples to establish a potential method for point-of-care lung cancer lymph nodes assessment.

RESULTS: Lymph node assessment resulted in 100% sensitivity, 70.6% specificity, 44.4% PPV, 100% NPV, based on n=21 lymph node samples collected from five patients. Lung tumor assessment from the five patients yielded 83.3% sensitivity, 100% specificity, 100% PPV and 80% NPV.

CONCLUSIONS: NoduleScan demonstrated promising results in assessing lymph node status. Further studies on a larger sample size will work on improving the accuracy of this technology. The outcome of this study suggests a possible future implementation of NoduleScan technology within an endoscopic endobronchial and transoesophageal device to accurately assess lymph node status and to guide diagnostic and treatment options.

CLINICAL IMPLICATIONS: A possible future implementation of NoduleScan technology within an endoscopic, endobronchial, and transoesophageal device would allow for a low-cost and user-friendly method to accurately assess lymph node status in-vivo and to guide the diagnostic and treatment decision making process. The benefit of NoduleScan during mediastinoscopy procedure would allow for real-time nodal assessment that augments the pathological assessment process with a precise periprocedural intralesional assessment mechanism for confirmation of the location of cancerous cells.

REFERENCES: 1. Bouget et al. 2019; 2. Verhoeven et al. 2019; 3. Gregory et al. 2012; 4. Svoboda et al. 2018; 5. Bogdanowicz et al. 2021.

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