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Proceduralist-Directed Rapid On-Site Pathologic Evaluation (ROPE) using Dynamic Cell Imaging- a Pilot Study of Peripheral Pulmonary Lesion sampling via Robotic Bronchoscopy

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Authors: Matus, Ismael*; Akhtar, Sameer**
Thoracic and Interventional Pulmonology Service
Helen F. Graham Cancer Center and Research Institute
Department of Medicine, Christiana Care

Rationale: The diagnostic evaluation of peripheral pulmonary lesions (PPLs) relies on complementary technologies. Rapid onsite evaluation (ROSE) of cytopathology's role is established for mediastinal lymph nodes, though less studied for the evaluation of PPLs. VanGogh™, a novel Dynamic Cell Imaging (DCI) technology for on-site histopatholoigic analysis (formerly CelTivity™, used in the study) may offer intraprocedural confirmation of representative diagnostic tissue during the evaluation of PPLs.

Methods: Single-center prospective study evaluated DCI of PPL samples obtained via robotic bronchoscopy (Monarch), J&J) using 21G fine needle aspiration, cryobiopsy, and forceps biopsy. Each sample was interpreted at point of care by the proceduralist using DCI, classifying it as either lesional or non-lesional , and subsequently evaluated by a pathologist to determine whether diagnostic or nondiagnostic. The concordance between the proceduralist's and the pathologist's assessments was calculated at the patient and biopsy level, and stratified by tissue acquisition technique.

Results: 50 patients with 146 samples were included. Overall concordance between proceduralist's interpretation of the sample using DCI and pathologist's diagnosis was 88% (95% CI: not defined) at the patient level. Across all 146 biopsies, overall concordance was 84% (95% CI: 77% - 90%). Stratified by tissue acquisition technique, concordance was highest for cryobiopsy (88% [95% CI: not defined]) and forceps biopsy (86% [95% CI: 74-94]).

Conclusions: ROPE using cryoprobe and forceps biopsy of PPLs demonstrated high concordance with final pathology, enhancing intraprocedural confidence in obtaining representative diagnostic specimens. Further investigation is warranted to assess the potential of this novel technology to improve diagnostic yield and confirm target localization in support of future bronchoscopic ablative therapies.