CHEST Online Supplement

Comparing Pulmonary Nodule Location During Electromagnetic Bronchoscopy With Predicted Location on the Basis of Two Virtual Airway Maps at Different Phases of Respiration

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e-Appendix 1.

Procedure Details and PointCloud Collection

Each procedure was performed using a 4.3 mm outer diameter (OD) and 2.0 mm working channel bronchoscope (BF-MP160F, Olympus, Tokyo, Japan) with an electromagnetic locatable instrument (1.8mm OD 12.5mm L always-on tip tracked brush; 1.8 mm OD serrated cup forceps; 1.2mm length, 21ga cytology needle, Veran Medical Technologies, Inc., St. Louis, MO) or the View Peripheral Catheter (735mm length, 3.2mm OD, 2.0mm working channel, Veran Medical Technologies, Inc.) with standard biopsy instruments was used for each procedure. The View Peripheral Catheter is a "bronchoscope" with always-on tip tracked navigation to allow the bronchoscopist to maintain electromagnetic guidance while obtaining biopsies. It was used at the bronchoscopist discretion with the majority of the case done with the Olympus BF-MP160F. Lumen registration with the SPiN® Thoracic Navigation system is automatic using the EXP map, but confirmed by a main carina touch with a tip tracked instrument, followed by collection of the PointCloud. The system gathers a PointCloud by tracking the tip-tracked instrument's 3-D position in the tracheobronchial tree during the initial systematic airway inspection to the 3rd to 4th generation bronchi. These points are collected at a rate of 5 per second, which are reconstructed to form the lumen registration airway map. Once collected, electromagnetic navigation to the PN was performed based on the EXP airway map. When the system indicated that the tip-tracked instrument had reached the PN, a 3-D point was recorded, called target lock, representing PN location on EXP airway map. The instrument was removed and the distance to the PN was assessed by the catheter length from the distal tip to its insertion point through the bronchoscope's working channel. The PN location was validated by visualization with a 20-MHz radial endobronchial ultrasound probe (R-EBUS; UM-S20-17S, Olympus). Using the same method to assess catheter length to the PN, R-EBUS length was assessed and the difference between the two lengths was recorded. Instrument(s) were re-inserted and biopsies obtained using a combination of brush, forceps, and needle aspiration, where applicable. Fluoroscopy was not used in this study.