

Procedures

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Human Ex Vivo Lung Evaluation of the Next Generation Convex Probe Endobronchial Ultrasound Bronchoscope

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PURPOSE: Endobronchial ultrasound-transbronchial needle aspiration (EBUS-TBNA) is a minimally invasive modality for mediastinal lymph node staging of lung cancer. The aim of this study was to evaluate feasibility and improvement of the next generation convex probe endobronchial ultrasound (CP-EBUS) bronchoscope against the current CP-EBUS in ex-vivo human lungs. The prototype next generation CP-EBUS aims to make it easier to operate, to select bronchial tree, to puncture target LNs and to approach hilar LNs.

METHODS: The prototype next generation CP-EBUS (BF-Y0063; Olympus, Tokyo, Japan), with a decreased forward oblique view (20 degrees), greater upward angulation range (160 degrees), and smaller distal rigid diameter (6.6 mm), was compared with the current CP-EBUS (35 degrees, 120 degrees, and 6.9 mm, respectively) in 8 ex-vivo human lungs. The operability, insertion ability, puncture ability, endoscopic and ultrasound images were assessed.

RESULTS: A total of 8 ex-vivo human lungs were evaluated by 6 thoracic surgeons. The operability and bronchial selectivity were greater than CP-EBUS because of the decreased direction of view and increased angulation range. Although the maximum reach was not significantly different, increased angulation range enabled us to insert the CP-EBUS into the upper bronchial tree with ease. The average time for the detection of the majority of LNs with next generation CP-EBUS from the upper part of trachea set as a start point was significantly shorter (#4L; 11.3 sec. vs. 9.9, $P < 0.05$, #7; 12.3 vs. 9.9, $P < 0.01$, #10R; 18.6 vs. 13.5, $P < 0.01$, and #11L; 25.8 vs. 19.2, $P < 0.01$). As the puncture angle became sharper, lymph node puncture ability improved, especially accessibility to #4L and #10R was easier with the next generation CP-EBUS. Next generation CP-EBUS was equal or greater in all respects, and was considered as acceptable for clinical use.

CONCLUSIONS: Next generation CP-EBUS has improved operability, selectivity of bronchial tree, access and detection of mediastinal/hilar lymph nodes.

CLINICAL IMPLICATIONS: The next generation CP-EBUS will allow better access and improved operability for assessment of mediastinal and hilar lymph nodes.

DISCLOSURE: The following authors have nothing to disclose: Kosuke Fujino, Hideki Ujiie, Hitoshi Igai, Tomonari Kinoshita, Changyoung Lee, Salma Hindy, Andrew Effat, Kazuhiro Yasufuku

We evaluated the prototype of new EBUS-scope.

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