

Abstracts

22nd European Conference on General Thoracic Surgery June 15-18, 2014, Copenhagen, Denmark

Session IX: Mixed Thoracic II TUESDAY, 17 JUNE 2014 11:00 - 12:30

F-061

A COMPARATIVE STUDY AMONG MINIATURIZED ULTRASOUND PROBES FOR PULMONARY NODULES DETECTION IN AN *EX VIVO* LUNG PERFUSION MODEL

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Objectives: Intraoperative localization of small pulmonary nodules with minimally invasive procedures is becoming very important in thoracic surgery. We compare performances of four ultrasound (US) probes, three currently used for thoracic endoscopic diagnostic procedures, in detecting lung nodules in an *ex vivo* lung setting.

Methods: Two porcine right and left lungs were en bloc procured with heart and trachea in a certified slaughterhouse, 10 minutes after the animal was

suppressed. One block was preserved at 4°C for 6 h (Control Group A). One block was perfused on site with a Perfadex solution enriched with tissue plasminogen activator, stored for 6 h at 4°C and subsequently perfused with the Steen solution and ventilated according to the *ex vivo* lung perfusion (EVL) protocol (Group B). Four lungs were randomly seeded with four types of targets: waterball; gel; muscle; fat [diameter, number of implants, depth in table]. Four US probes were tested in an open setting after lung collapse: Olympus radial UM-BS20R-3 (20 MHz) [PROBE 1], Olympus radial UM-2R (12 MHz) [PROBE 2], Hitachi convex endobronchial ultrasound (EBUS) EB1970UK 2.0 (5-10 MHz) [PROBE 3], Hitachi convex EUP-OL531 (5-10 MHz) [PROBE 4]. US probes were compared in terms of: a) number of nodules localized/not localized; b) US imaging quality based upon the nodule profile and its echogenicity graded according to semiquantitative scales from 0 (poor) to 4 (excellent). Student's *t*-test and analysis of variance with *post hoc* multiple comparisons were utilized with a statistical significance of $P < 0.05$.

Results: EVLP enhanced US localization of nodules in Group B versus Group A. Differences between US probes were detected for the number of localized nodules ($P = 0.006$) and US diameter ($P = 0.000$).

Conclusions: EVLP enhanced US exploration of lung parenchyma in the *ex vivo* model. Linear probes performed better than radial ones; in the whole, EBUS scope (PROBE3) achieved the best performance and its use for retrieving pulmonary nodules could be studied in a clinical setting.

Disclosure: No significant relationships.