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Title: CT-guided transthoracic biopsies of lung lesions: Diagnostic accuracy and safety of a novel frontal core biopsy device

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Body: Introduction. The purpose of this study was to compare the diagnostic accuracy and safety of CT-guided transthoracic core-needle biopsies (CNB) of lung lesions using a novel frontal core biopsy device (Spirotome), and fine-needle aspiration biopsies (FNAB) using a screw needle (Rotex). Methods. FNAB was consecutively performed under CT guidance in 70 and CNB in 68 patients. The needle size was 22 gauge for FNAB and 14 gauge for CNB. Medical charts were retrospectively reviewed to statistically evaluate results and complications. Results. The diagnostic rate was higher with CNB than FNAB (93% vs 81%; $P=0.05$) and with lesions ≥ 1.5 cm ($P<0.001$). CNB allowed a better characterization of benign lesions and cancer histological subtypes. Molecular biology analyses of cancerous tissues were possible in 72% and biobanking in 30% cases of CNB, while the cytological material obtained by FNAB was insufficient for these purposes. CNB caused a significantly higher rate of pneumothorax than FNAB (33% vs 9%; $P=0.001$) but most of them were partial and chest tube insertion rate was similar with both procedures (10% vs 9%; $P=0.43$). In multivariable analysis, incidence of chest tube insertion was higher in presence of emphysema ($P=0.009$), lesions deeper than 3 cm ($P=0.08$), and supine position on CT table ($P=0.003$), independently of the needle used. Conclusions. In the evaluation of lung lesions, CT-guided transthoracic CNB with a novel core biopsy device (Spirotome) has a better diagnostic accuracy than FNAB, while the rate of chest tube insertion for pneumothorax is similar. This new CNB device should further be compared to other CNB needles.