CT-guided transthoracic lung biopsy: Predictive factors of pneumothorax

Biópsia pulmonar transtorácica guiada por TC: factores preditivos de pneumotórax

Dear Editor,

Computed tomography (CT) guided transthoracic lung biopsy (TTLB) is a well established method in the diagnosis of intrathoracic lesions with good diagnostic yield.\(^1\) Pneumothorax is the most frequent complication with an incidence varying between 8% and 64%.\(^2\)

The objective of this study was to evaluate potential risk factors associated with the occurrence of pneumothorax in CT-guided TTLB. We performed a retrospective study of patients undergoing CT-guided TTLB between 2007 and 2012 in Braga Hospital. Clinical data and radiologic images of patients were reviewed.

A total of 269 TTB were performed (201 fine needle aspiration biopsies and 68 core biopsies), in 209 patients with a mean age of 64.2 years, 75.8% male, 60% with smoking habits. Pneumothorax rate was 20.8%. Treatment of pneumothorax with chest drainage was necessary in 10/269 biopsies (3.7%). An initial univariate analysis identified the following risk factors: larger needle size (\(p = 0.033\)), smaller size of the lesion (\(p = 0.001\)) and absence of pleural contact (\(p = 0.001\)) – Table 1. A multiple logistic regression analysis has identified absence of pleural contact (\(p < 0.001; R^2 = 0.107\)) and size of the lesion (\(p = 0.030; R^2 = 0.120\)) as significant independent risk factors for the occurrence of pneumothorax. Pneumothorax occurred in 41/111 (36.9%) biopsies in lesions without pleural contact vs 15/158 (9.5%) with pleural contact. Pneumothorax rate for lesions \(< 2\) cm was 31% compared with 15.4% for lesions \(> 4\) cm. Age, gender, smoking habits, presence of emphysema, needle size, presence of caviation, contours, location and depth of lesion were not significantly associated with increased risk of pneumothorax.

In our study, the absence of pleural contact was the most significant risk factor associated with the occurrence of post-TTLB pneumothorax. These data were corroborated by another retrospective study of Khan et al.\(^3\) in which lesions in the lung parenchyma had a higher pneumothorax rate than lesions located in the pleura or thoracic wall. Another significant risk factor identified was lesion size. There seems to be a gradual increase in the risk of pneumothorax to progressively smaller lesions. In a retrospective analysis of 660 biopsies, Yeow et al.\(^4\) showed that the risk of pneumothorax was about 11 times higher in lesions \(\leq 2\) cm than in lesions \(> 4\) cm.

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In our study, the absence of pleural contact was the most significant risk factor associated with the occurrence of post-TTB pneumothorax. These data were corroborated by another retrospective study of Khan et al.\(^3\) in which lesions in the lung parenchyma had a higher pneumothorax rate than lesions located in the pleura or thoracic wall. Another significant risk factor identified was lesion size. There seems to be a gradual increase in the risk of pneumothorax to progressively smaller lesions. In a retrospective analysis of 660 biopsies, Yeow et al.\(^4\) showed that the risk of pneumothorax was about 11 times higher in lesions \(\leq 2\) cm than in lesions \(> 4\) cm.

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In conclusion, this study supports the performance of CT-guided TTLB in the study of undetermined lung lesions as a safe method. Although the overall incidence of pneumothorax was 20.8%, the clinically significant pneumothorax rate requiring treatment with chest tube drainage was low (3.7%).

**Authorship**

João Filipe Cruz conceived this study, collected the data and carried out the statistical analysis. Rui Rolo collected the data, collaborated in the inception of the study and supervised all aspects of its implementation. Lourdes Iglésias and João Cunha contributed to the critical revision of the manuscript. All the authors contributed to the interpretation of the results and the proof reading of the manuscript.

**Conflicts of interest**

The authors have no conflicts of interest to declare.

**References**


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