Effectiveness of CT-guided percutaneous lung biopsy by low-experienced residents

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In this presentation, we reported a retrospective study on our experience in CT-guided percutaneous lung biopsy performed by residents having a low or limited previous experience. We compared our results with those obtained by experienced operators and published in large studies of the literature in terms of accuracy and side effects. The study included 229 patients (male: 131 - female: 98 - average age: 65 y) that underwent percutaneous lung biopsy (lesion diameter range: 6.9 to 163 mm - average: 32.3 mm) under CT control from 1 September, 2009, to 11 April, 2011. All biopsies were performed by two residents during their second/third year of residency. A first resident learned from an experienced radiologist in interventional radiology and, after a few weeks, he began to perform biopsies by himself. The ten first biopsies were performed in close supervision of the experienced radiologist. After some months of experience the first resident taught and trained the second resident. Usual indications and contraindications for lung biopsy were applied. Usual technique was used with both 18G fine needle aspiration and 20G co-axial tru-cut needle combined technique under CT fluoroscopic control. In 2 cases of the 229 biopsies, a sample was not obtained due to an immediate pneumothorax. Lesions reported as suspicious of malignancy at pathology, including atypical adenomatous/alveolar hyperplasia, were considered as a false negative biopsy (n = 7) for analysis. Malignant, benign and false negative samples were obtained in 78%, 18% and 4%, respectively. This represents a global accuracy of 94.7%, which is closely similar to other studies (Table I).

In terms of side effects, the rate of pneumothorax was 39%, 37% of them were treated by insertion of a pleural catheter. We experienced also a single case of air embolism with complete recovery (0.4% and similar rate as reported by Hiraki et al in 2007). Complication rate is also in the range of the percentages reported in other studies. Of interest is the high insertion of pleural catheter in our series, though being in the range reported in literature. This may be due to the low experience of the residents that prefer to treat most pneumothoraces immediately in order to prevent any further complication, rather than simply observe patients with limited pneumothorax.

Finally, the analysis of the results of one of the residents across time showed that there is a rapid learning to perform lung biopsies with results as accurate as reported in the literature and without significant difference in terms of accuracy ($Z^2 = 1.038 < 3.84$) or side-effects in the learning curve.

In conclusion, percutaneous lung biopsies performed under CT control can be performed by low-experienced radiologists who obtain almost immediately the same accuracy as reported in series published in the literature and without higher rate of adverse effects.

Bibliography