



How to Time the Patient's Breathing during Pleural Puncture in CT-Guided Percutaneous Lung Biopsy?

CT 유도하 경피 폐생검에서 흉막 천자 시 환자의 호흡 시기는 어떻게 할 것인가?

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In CT-guided percutaneous lung biopsy, maintaining the patient in an expiratory state during pleural puncture is crucial to minimize procedure-related complications (1). If the patient ceases breathing after expiration, the lung volume decreases, facilitating easier access to the lung nodules or masses by a needle. Additionally, lung damage may be reduced upon needle penetration. Thus, delaying breathing after expiration, rather than inspiration, may further reduce the risk of complications.

However, during CT-guided percutaneous lung biopsy, determining the patient's breathing phase (inhalation, mid-tidal, or expiration) depends on the location or size of the lung nodules (1, 2). Access to lung nodules varies among patients based on their breathing patterns. For instance, accessing the lung nodule in the lower lung in an expiratory state may be challenging because of the narrow rib gaps in the expiratory state and may lead to abdominal organ damage. In this case, a lung biopsy had better perform after the patient ceased breathing in an inspiratory state. Hence, in conducting CT-guided percutaneous lung biopsy, the patient's respiratory condition should be assessed considering the successful acquisition of a lung nodule specimen and risk of procedure-related complications.

The authors compared the complication rates among the three respiratory phases (inhalation, mid-tidal, or expiration). They observed a significantly lower pneumothorax rate during the expiratory phase (17.6%, 40/227; $p = 0.035$). However, there

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were no significant differences in the rates of hemoptysis, chest tube placement, immediate air aspiration, and technical failure among the respiratory phases. Notably, the expiratory phase exhibited a significantly higher rate of pleural punctures (16.7%, 38/227; $p = 0.025$) (3). If a patient ceases breathing in an expiratory state during CT-guided percutaneous lung biopsy, the incidence of pneumothorax may decrease, albeit at the cost of an extended procedure time because patients typically hold their breath for a longer duration during the inspiratory phase. However, if breath is held in the exhaled phase, the position of the pulmonary nodule may shift perioperatively because of the shorter breath-holding time compared with the inspiratory phase, potentially leading to an increased number of pleural punctures (4).

Overall, to reduce complications during CT-guided percutaneous lung biopsy, it is generally preferable to proceed if the patient ceases breathing in an expiratory state. However, insisting on an expiratory state is not necessary, because complications from CT-guided percutaneous lung biopsy are not solely determined by the patient's breathing patterns. Determining the appropriate respiratory condition before needle insertion into the lung to obtain a suitable specimen and minimize complications is crucial.

Conflicts of Interest

The author has no potential conflicts of interest to disclose.

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