

CT

1

가 CT (CT fluoroscopy)

: CT 18 288

22 , 가 CT 18

가 2 가 CT 가

1 , 가 2

1) , 2) , 3)

, 4)

: 22 19 86.3%

12 (63.2%) , 7 (36.8%) 1 12

(54.5%), 2 10 (45.5%)

가 1 cm 11 9 (81.8%)가 1 , 2 (18.2%)가 2 ,

가 1 cm 11 3 (30%)가 1 , 8 (70%)가 2

가 (p = 0.03)

가 (p > 0.05).

: , CT

가

(Transthoracic needle biopsy, TNB)

가 , 가

tomography, CT) (computed 가 (2, 3). Katada (2) CT

CT (computed tomography fluoroscopy system)

TNB . CT

가 ,

(1). CT TNB (guiding

modality) 20 가 , CT

(3-6). CT TNB

가

가 (3).

가가
 , CT
 (Fig. 1).
 1.4)
 1-3 (CT
 2 24
 PCNB CT
 가 2
 가 1
 가 가 2
 PCNB (Fig. 2).
 가 1 cm
 1 cm
 가 1 2
 2 cm 2
 PCNB
 Fischer's exact test
 PCNB 22
 가 19 86.3%
 12 63.2% , (adenocarcinoma)
 6 가 , (squamous cell carcinoma) 3 , (bronchioloalveolar carcinoma) 1 , (nonsmall cell carcinoma) 1 , (small cell carcinoma) 1
 7 36.8% , 4 가 ,
 2 , 1
 3 가 가 2
 가 1
 CT
 3.3
 가 1 22 12 (54.5%)
 가 가 2 10 (45.5%) 0.78 cm (0.2 cm - 2.2 cm) 가 CT
 1.49 cm (0.3 cm - 7.0 cm)
 22 20 , 2
 1 18
 , 1 CT
 가 1 cm 11
 9 (81.8%)가 1 , 2 (18.2%)가 2 ,
 가 1 cm 11 3 (30%)
 가 1 , 8 (70%)가 2 가
 가 (p = 0.03).
 11 5

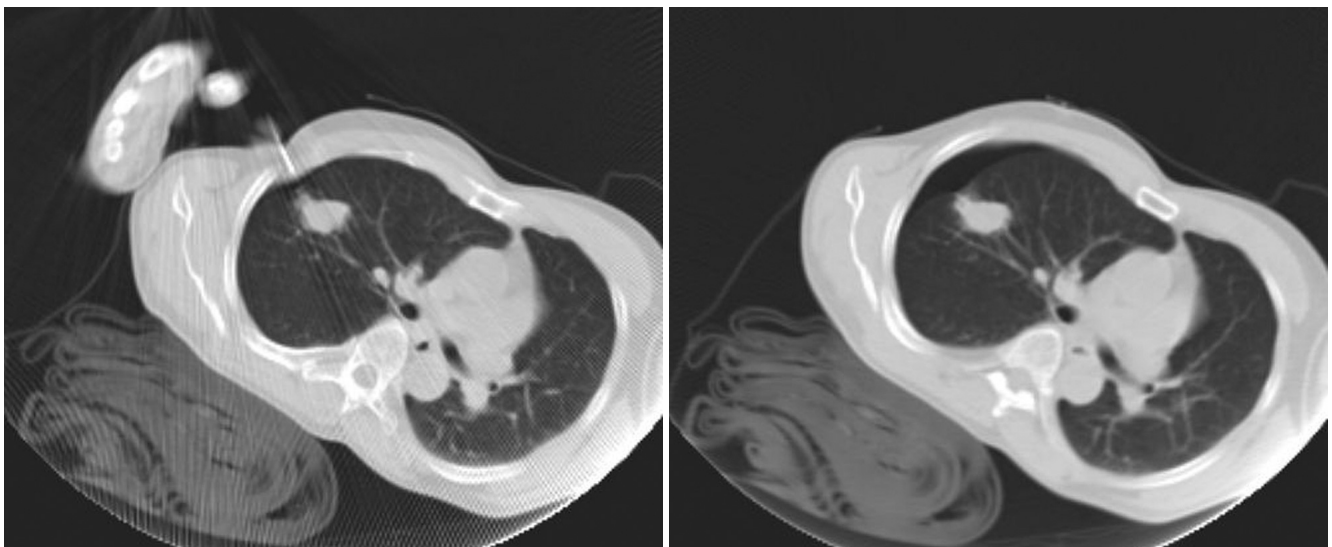


Fig. 2. Tuberculosis in a 69-year-old man.

A. Small amount of right pneumothorax was noted after lung biopsy. Maximum diameter in pneumothorax was 10.5 mm.

B. There is increase in the size of pneumothorax after biopsy. Maximum diameter in pneumothorax was 20.1 mm (group 2).

(45.4%)가 1 , 6 (64.6%)가 2 ,
 11 7 (63.6%)가 1 , 4 (36.4%)가 2
 ($p > 0.05$).
 1 , 3
 2 1 1 2
 (15)
 21 8 CT 18 -
 62.5% 5
 PCNB 22
 , 19 (86.3%)
 PCNB
 2 cm 9 2 (22.2%)가 1 , 7 (77.8%)가 2
 2 cm 13 5 (38.5%)가 1 , 8
 (61.5%)가 2 가 ($p >$
 0.05.).
 PCNB
 ,
 가 .
 Change (14) 13 5 (38.5%)
 CT 가 가 (1)
 TNB 가 CT 17.9 -
 54.3%, CT 15 - 42%
 (4 - 7).
 15.7% (49/317) , CT
 , 가 가
 , 8% , 가
 가 (8). TNB
 , ,
 (1, 4, 9 - 12)
 TNB 가
 , 가
 , 가
 (16) CT 가 2 cm
 Topal (10)
 0 cm 4.7%, 0.5 - 3 cm 27%, 3 cm
 50% 가
 가
 가
 가 1 cm
 (3). TNB 가 , 11 9 (81.8%)가 1 ,
 146

가 1 cm 10 3 (30%) 1
가 ($p = 0.03$). 가
가

PCNB

가 가

CT

(2, 3, 5-7).

가 22

PCNB

가 가

PCNB

CT

가

가 1cm PCNB

1. Vanssonenberg E, Casola G, Ho M, Neff CC, Varney RR, Wittich GR, et al. Difficult thoracic lesions: CT-guided biopsy experience in 150 cases. *Radiology* 1988;167:457-461
2. Katada K, Kato R, Anno H, Ogura Y, Koga S, Ida Y, et al. Guidance with real-time Ct fluoroscopy: early clinical experience. *Radiology* 1996;200:851-856
3. Froelich JJ, Ishaque N, Regn J, Saar B, Walthers EM, Klose KJ.

Guidance of percutaneous pulmonary biopsies with real-time CT fluoroscopy. *Eur J Radiol* 2002;42:74-79

4. , , , , , . CT

1999;41:699-704

5. Yamagami T, Iida S, Kato T, Tanaka O, Toda S, Kato D, et al. Usefulness of new automated cutting needle for tissue-core biopsy of lung nodules under CT fluoroscopic guidance. *Chest* 2003;124: 147-154
6. Muehlstaedt M, Bruening R, Diebold J, Mueller A, Helmberger T, Reiser M. CT/fluoroscopy-guided transthoracic needle biopsy: sensitivity and complication rate in 98 procedures. *J Comput Assist Tomogr* 2002;26:191-196
7. Hirose T, Mori K, Machida S, Tominaga K, Yokoi K, Adachi M. Computed tomographic fluoroscopy guided transthoracic needle biopsy for diagnosis of pulmonary nodules. *Jpn J Clin Oncol* 2000;30:259-262
8. Baumann MH, Noppen M. Pneumothorax. *Respirology* 2004;9:157-164
9. Klein JS, Salomon G, Stewart EA. Transthoracic needle biopsy with a coaxially placed 20-gauge automated cutting needle: results in 122 patients. *Radiology* 1996;198:715-720
10. Topal U, Ediz B. Transthoracic needle biopsy: factors effecting risk of pneumothorax. *Eur J Radiol* 2003;48:263-267
11. Cox JE, Chiles C, McManus CM, Aquino SL, Choplin RH. Transthoracic needle aspiration biopsy: variables that affect risk of pneumothorax. *Radiology* 1999;212:165-168
12. Berquist TH, Bailey PB, Cortese DA, Miller WE. Transthoracic needle biopsy: accuracy and complication in relation to location and type pf lesion. *Mayo Clin Proc* 1980;55:475-481
13. Jens J, Natascha I, Judith R, Bettina S, Eduard M, Klaus J. Guidance of percutaneous pulmonary biopsies with real-time CT fluoroscopy. *Eur J Radiol* 2002;42:74-79
14. Chang YC, Wang HC, Yang PC. Usefulness of computed tomography-guided transthoracic small-bore coaxial core biopsy in the presence of a pneumothorax. *J Thorac Imaging* 2003;18:21-26
15. Liessei G, Avventi P, Dell 'Antonio C, Pavanello M. The biopsy of pulmonary masses guided by computed tomography after iatrogenic pneumothorax. *Radio Med* 1997;94:315-318
16. Laurent F, Michel P, Latrabe V, Tunon de Lara M, Mithran R. Pneumothoraces and chest tube placement after CT-guided transthoracic lung biopsy using a coaxial technique : incidence and risk factors. *AJR Am J Roentgenol* 1999;172:1049-1053

Usefulness of CT Fluoroscopy-guided Percutaneous Needle Biopsy in the Presence of Pneumothorax During Biopsy¹

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Purpose: When pneumothorax occurs during a percutaneous needle biopsy, the radiologist usually stops the biopsy. We evaluated the usefulness of computed tomographic (CT) fluoroscopy-guided percutaneous needle biopsy in the presence of pneumothorax during biopsy.

Materials and Methods: We performed 288 CT fluoroscopy guided percutaneous needle biopsies to diagnose the pulmonary nodules. Twenty two of these patients had pneumothorax that occurred during the biopsy without obtaining an adequate specimen. After pneumothorax occurred, we performed immediate CT fluoroscopy guided percutaneous needle biopsies using an 18-gauge cutting needle. We evaluated the success rate of the biopsies and also whether or not the pneumothorax progressed. We classified these patients into two groups according to whether the pneumothorax progressed (Group 2) or not (Group 1) by measuring the longest distance between the parietal pleura and the visceral pleura both in the early and late pneumothorax. Additionally, we analyzed the relationship between the progression of pneumothorax after biopsy and 1) the depth of the pulmonary nodule; 2) the number of biopsies; 3) the presence or absence of emphysema at the biopsy site; and 4) the size of the pulmonary nodule.

Results: Biopsy was successful in 19 of 22 nodules (86.3%). Of the 19 nodules, 12 (63.2%) were malignant and 7 (36.8%) were benign. Twelve patients (54.5%) were classified as group 1 and 10 patients (45.4%) as group 2. The distance between the lung lesion and pleura showed a statistically significant difference between these two groups: 1 cm in distance for group 1 (81.8%) and group 2 (18.2%), and > 1 cm in distance for group 1 (30%) and group 2 (70%), $p < 0.03$. Yet the number of biopsies, the presence or absence of emphysema at the biopsy site and the size of the pulmonary nodules were not related to the progression of pneumothorax ($p > 0.05$).

Conclusion: When early pneumothorax occurs during a biopsy, CT fluoroscopy guided percutaneous needle biopsy is an effective and safe procedure. Aggravation of pneumothorax after biopsy is affected by the depth of the pulmonary nodule.

Index words : Biopsies, technology

Lung, CT

Lung, biopsy

Pneumothorax

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