

CT

: 18

1

.

:

18

CT

:

94

18

1-3

1 cm, 1.1-2 cm, 2.1-3 cm,

CT

>3cm 4

: 94

가

78

82.98%

0.7-6(

4.8)cm

93.85%

(P=0.002).

2.1-3cm

> 3cm

0-5.5(1.4)cm

가

(P>0.05).

12

1.1-2 cm

29

8

(27.59%)

2.1-3cm

>3cm

14

8

(57.14%)

2cm

(P=0.041),

2

cm (P=0.006)

8

(P>0.05),

(P=0.021).

>2 cm

14

4

(28.57%)

: CT

18

가

,

, CT

18

CT

가

가

(successful

(1-5). CT

biopsy rate)

(2-6).

가

, 18

(7).

1996 3

1998 6

94

18

(Auto-

matic Cutting Needle, Manan Medical Products Inc.,
Northbrook, Illinois, U.S.A.)

(PRO-

MAC Biopsy System, Manan Medical Products Inc., Northbrook, Illinois, U.S.A.)

1-3
CT(TCT-300S, Toshiba, Tokyo, Japan)

CT 10mm
CT 5
CT 1
CT
가
CT
1 cm
CT
CT
가
2 %
Lidocaine
CT 1
가
가
가
CT
가
가
10 %
1-2
가
CT
(Fig. 2, 3).



Fig. 1. CT scan obtained with prone position shows a 18-gauge automated cutting needle (arrow) with its tip located at the edge of pulmonary nodule in the left lower lobe. This nodule was confirmed as adenocarcinoma.

CT
가
가
가
1 cm, 1.1-2 cm, 2.1-3 cm, 3
cm 4
가
가
가
CT
CT
CT



Fig. 2. Post-biopsy CT scan obtained with prone position shows ground-glass attenuation (arrowheads) suggesting hemorrhage adjacent to the nodule in the left lower lobe. This nodule was confirmed as adenocarcinoma.



Fig. 3. CT scan with the patient right anterior oblique position shows pneumothorax (open arrows) developed during biopsy with 18 gauge automated cutting needle of pulmonary nodule in right middle lobe. This nodule was confirmed as squamous cell carcinoma.

CT (Wegener's granulomatosis) 1 가 .

가 10 . 18

가 16

가 12 ,

가 2 , 가 2

1 CT 3 CT

X-

Chi-square

test

1 cm, 1.1-2 cm, 2.1-3 cm, 3 cm

4

0.7-6(4.8) cm , 2 cm

2 cm (P=0.002).

가 2 cm 65 가 61

(93.85 %) , 2 cm 29 가

17 (58.62 %) 0-

5.5(1.4) cm 4

(P=0.069) (Table 1, 2).

5.12 ± 2.9 cm , 2.13 ± 1.3

cm 가

(P=0.001),

가 0.86 ± 1.4 cm 1.29 ± 1.2 cm

(P=0.087) (Table 3).

Table 1. Successful Biopsy Rate and Pneumothorax & Hemorrhage Rate according to Size of Pulmonary Lesions

Size (cm)	Successful biopsy rate(%)	Complications	
		Pneumothorax(%)	Hemorrhage(%)
> 3	53/56(95)	3/56(5)	5/56(9)
2.1-3	8/9(89)	1/9(11)	1/9(11)
1.1-2	10/16(63)	4/16(25)	2/16(13)
1	7/13(54)	4/13(31)	0/13(0)

Table 2. Successful Biopsy Rate and Pneumothorax & Hemorrhage Rate according to Distance of Pulmonary Lesions from Pleura

Distance (cm)	Successful biopsy rate(%)	Complications	
		Pneumothorax(%)	Hemorrhage(%)
> 3	8/10(80)	6/10(60)	3/10(30)
2.1-3	4/4(100)	2/4(50)	1/4(25)
1.1-2	11/17(65)	2/17(12)	2/17(12)
1	55/63(87)	2/63(3)	2/63(3)

Table 3. Statistical Analysis of Successful Biopsy Related to Size & Distance of Pulmonary Lesions from Pleura

	Successful biopsy	No successful biopsy	P-value*
Size(cm)	5.12 ± 2.9	2.13 ± 1.3	0.001
Distance(cm)	0.86 ± 1.4	1.29 ± 1.2	0.087

*:chi-square test

CT 1-2 CT

1-2

CT 94

12 , 8

12 CT

가

1 cm, 1.1-2 cm, 2.1-3 cm, 3 cm 4

2.1-3

cm >3 cm 1.1-2 cm 1 cm 가

, 2.1-3 cm >3 cm 65 4 (6.15 %)

1.1-2 cm 1 cm 29 8 (27.59 %)

(P=0.041). 가 2 cm

4 2.1-3 cm >3 cm 1.1-2

cm 1 cm (P=0.006). 2.1-3 cm >3

cm 14 8 (57.14 %)

, 1.1-2 cm 1 cm 80 4 (5.00 %)

가 2 cm

가 (Table 1,

2). 1.84 ± 1.1 cm

Table 4. Statistical Analysis of Size & Distance of Pulmonary Lesion from Pleura Leading to Pneumothorax and Hemorrhage

	Pneumothorax			Hemorrhage		
	+	-	P-value*	+	-	P-value#
Size(cm)	1.84 ± 1.1	3.21 ± 1.2	0.012	3.12 ± 1.5	3.61 ± 2.5	0.785
Distance(cm)	3.25 ± 1.8	1.20 ± 2.7	0.006	3.21 ± 1.8	1.12 ± 2.3	0.007

*,# : chi-square test

+ : existence of pneumothorax or hemorrhage

- : absence of pneumothorax or hemorrhage

3.21 ± 1.2 cm 가 18

가

가 (P=0.012) (Table 4).

3.25 ± 1.8 Berquist (8) 가 80

1.20 ± 2.7 cm (4).

가 가 5.12 ± 2.9 가 2.13 ± 1.3 cm

가 (P=0.006) (Table 4).

가 가 (Table 3),

8 가 가

4 가 CT

1 cm, 1.1-2 cm, 2.1-3 cm, >3 cm 4 가 CT

4 (P=0.556), 가

2.1-3 cm >3 cm 14 가

4 (28.57 %) 1 cm 1.1-2

cm 80 5 (6.25 %) , 가 2 cm

가

(P=0.021) (Table 1, 2).

3.12 ± 1.5 cm 3.61 (8,12,13, 20-23). 12

± 2.5 cm 12.77 %

(P=0.785),

3.21 ± 1.8 cm , , 가 가 ,

1.12 ± 2.3 cm , 가 가 (12,22).

가 가 (P=0.007) (Table 4).

가 , Lalli (24) 가 가 (7) 18

가

12 % 가 (24,25).

18 가

64-97 % (2-9), 1980 Lindgren 가

72-98 %

(1,2,5,10,11).

가 가

가 가 (26),

가

가

가 18 20

21 22

(7,8,12-19). 0-10 % (6,27),

- in 122 patients. *Radiology* 1996;198:715-720
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: CT
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CT-Guided Automated Needle Biopsy of Pulmonary Lesions : Analysis of Successful Biopsy Rate and Frequency of Pneumothorax and Hemorrhage using an 18-Gauge Cutting Needle¹

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Purpose : To determine the rate of successful biopsy and frequency of post-biopsy pneumothorax and hemorrhage using an 18-gauge cutting needle in CT-guided automated needle biopsies according to lesion size, and the distance between lesion and pleura.

Materials and Methods : Ninety-four patients with focal lung lesion who had undergone CT-guided automated needle biopsies using an 18-gauge cutting needle were retrospectively reviewed. We evaluated the relationship between successful biopsy rate and pneumothorax and hemorrhage according to lesion size and distance between lesion and pleura. For the purposes of this study, size and distance were grouped as follows : 1 cm; 1.1-2 cm; 2.1-3 cm ; > 3 cm.

Results : Biopsy was successful in 78 of 94 patients(83%). When lesions were larger than 2cm in size the diagnostic rate increased ($P=0.002$), but the distance between lung lesion and pleura was not statistically related to successful biopsy ($P>0.005$). Where there were post-biopsy complications, the pneumothorax rate was higher in lesions less than 2 cm in size ($P=0.041$) and in those separated by more than 2 cm from the pleura ($P=0.006$). Where separation was of this order, the hemorrhage rate was higher ($P=0.021$), but statistically, this was not affected by lesion size ($P>0.05$).

Conclusion : When 18-gauge cutting needle is used in CT-guided automated needle biopsies of pulmonary lesions, the rate of successful biopsy is affected by lesion size ; the pneumothorax rate is also affected by lesion size, as well as by the distance between lesion and pleura; the hemorrhage rate is influenced only by the distance between lesion and pleura.

Index words : Biopsies, complications

Lung, CT

Lung, biopsy

Lung, hemorrhage

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