

331

5 가 ,
 1 8
 6.69 mmol/L
 5.6 MBq/kg (0.15 mCi/kg) 18F - fluoro - deoxy - glucose (18F - FDG) 60
 500 mL (700 mL)
 PET/CT Allegro PET 16 CT
 (gemini scanner, Philips, U.S.A.) CT
 120 kVp, 130 mAs, 0.9 sec , 5 mm , 0.5 sec
 PET (3 min/bed)
 (Ordered subset expectation maximization algorithm: 4 iteration, 8 subunits)

Table.1. PET/CT Findings of Patients with Pulmonary Lymphangitic Metastasis

Patients	CT component	Location	Interlobular septal thickening (No./section)	Thickening of peribronchovascular interstitium	Fissural thickening	PET component	Location	Pattern	Grade
1. F/39		unilateral Left	<5	absence	thick				absence
2. M/54		bilateral, BLL	5 - 10	absence	thick				absence
3. M/58		bilateral, BLL	5 - 10	presence	absence		bilateral, BLL	multinodular	Gr 1
4. F/50		bilateral, BLL	<5	presence	thick		unilateral, RLL	multinodular	Gr 1
5. F/51		bilateral, all lobe	>10	presence	thick		bilateral, RUL, lingular	multinodular	Gr 2
6. M/71		unilateral RLL	<5	presence	absence				absence
7. F/53		bilateral, BLL	5 - 10	presence	thick				absence

*Grade 0, no activity; grade 1, activity less than or equal to mediastinal background activity; grade 2, activity higher than mediastinal background activity.

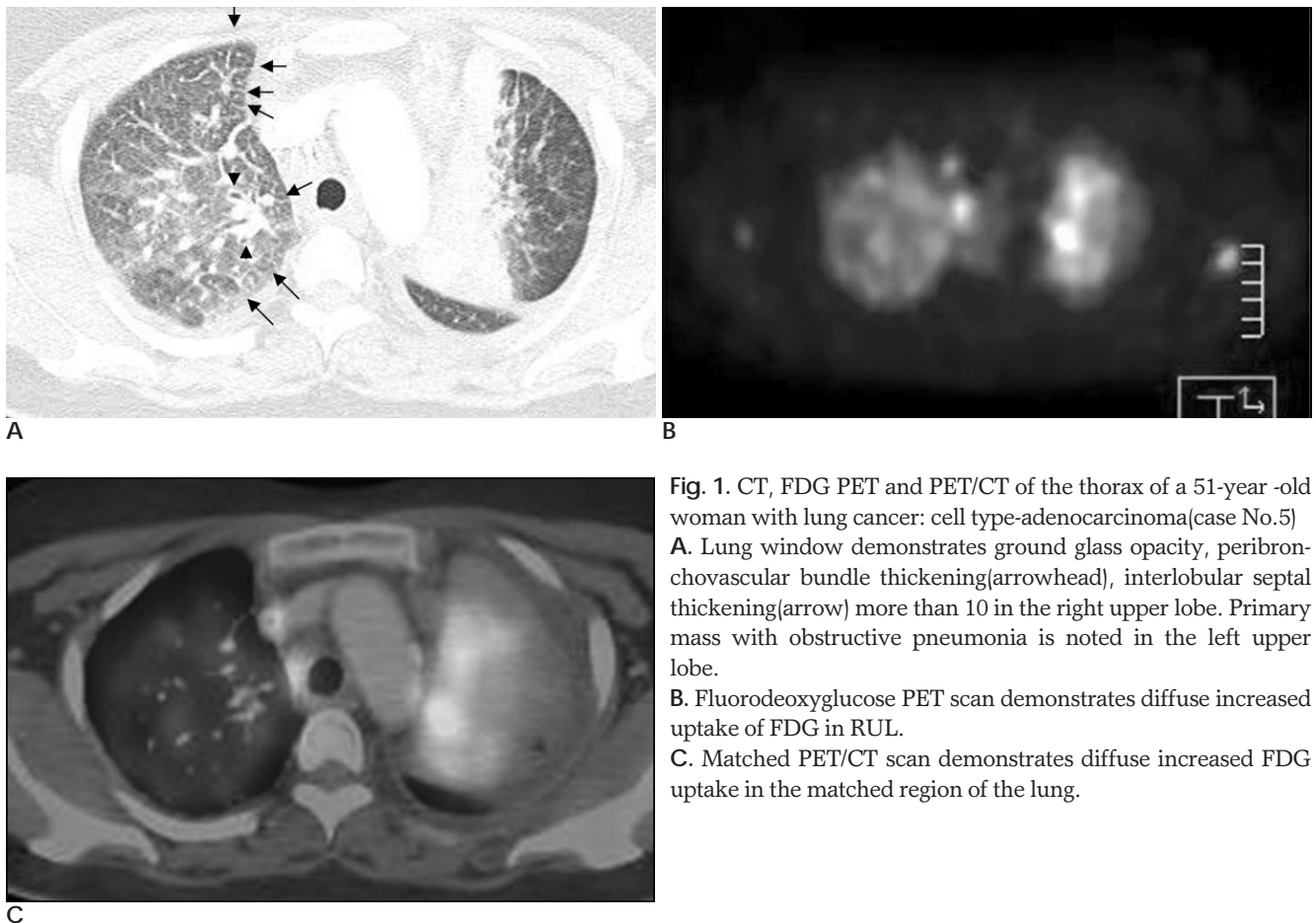


Fig. 1. CT, FDG PET and PET/CT of the thorax of a 51-year-old woman with lung cancer: cell type-adenocarcinoma(case No.5)
A. Lung window demonstrates ground glass opacity, peribronchovascular bundle thickening(arrowhead), interlobular septal thickening(arrow) more than 10 in the right upper lobe. Primary mass with obstructive pneumonia is noted in the left upper lobe.
B. Fluorodeoxyglucose PET scan demonstrates diffuse increased uptake of FDG in RUL.
C. Matched PET/CT scan demonstrates diffuse increased FDG uptake in the matched region of the lung.

가 0 .

CT . CT

PET

PET/CT

CT PET 2 가

FDG 가 가 CT PET 가

CT , FDG 가 가

CT 가

가 FDG 가 . CT

PET FDG

. PET 1, 2

7 PET CT

FDG 가 3 가

, FDG 가 4 2 가

. CT

3 CT

FDG 가 (Table 1).

가 3 가

가 10 1 , 5 10

가 1 , 5 가 1 . 3

가 10

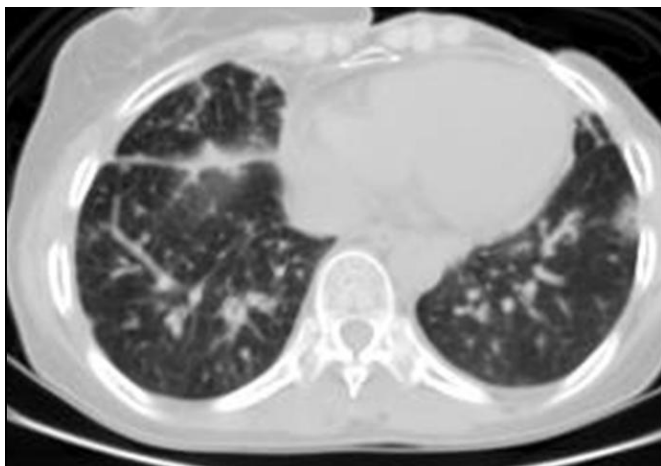
가 1

FDG 2 , 가

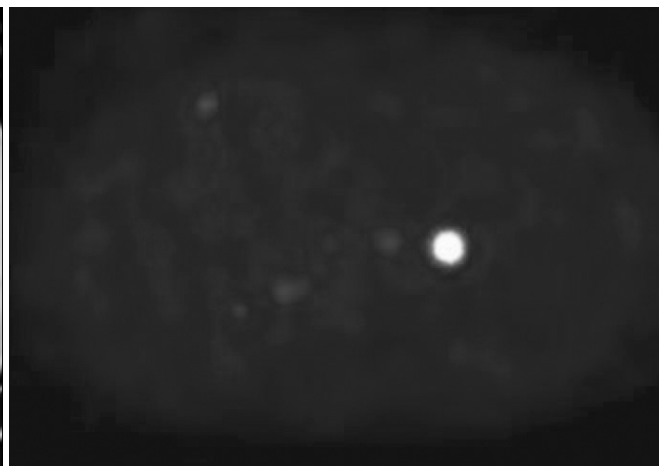
(SUV (standardized uptake value)) 2.5

(Fig. 1). SUV FDG 가 가

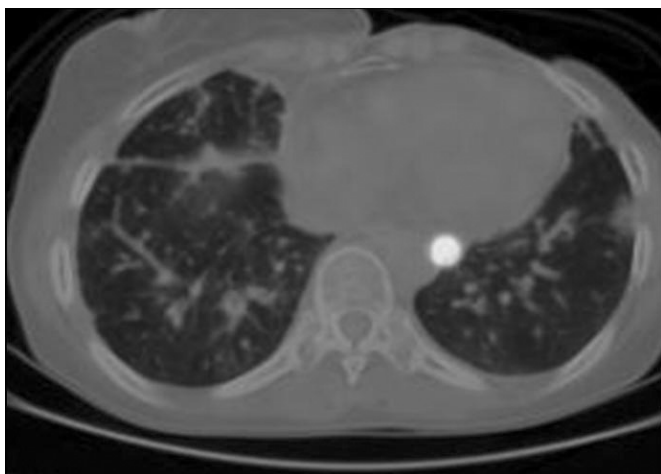
SUV



A



B



C

Fig. 2. CT, FDG PET and PET/CT of the thorax of a 50-year-old woman with breast cancer : cell type-intraductal carcinoma (case No.4)

A. Computed tomography demonstrates less than 5 interlobular septal thickening.

B. FDG PET scan demonstrates diffuse mild increased uptake (less than mediastinal blood pool) of FDG.

C. Matched PET/CT scan demonstrates diffuse mild increased uptake of FDG in the corresponding area.

가 : PET CT

가 SUV

가 1 가 5 FDG CT가 가 (8, 9). CT

1 (Fig. 2). 4 CT 가

FDG 가

가 10 가 2 , 5 가 2 ,

5 10 2 (Fig. 3). (10, 11). CT 가

, FDG 가 3 2 가

, FDG 가 4 3 가

가 , FDG 가

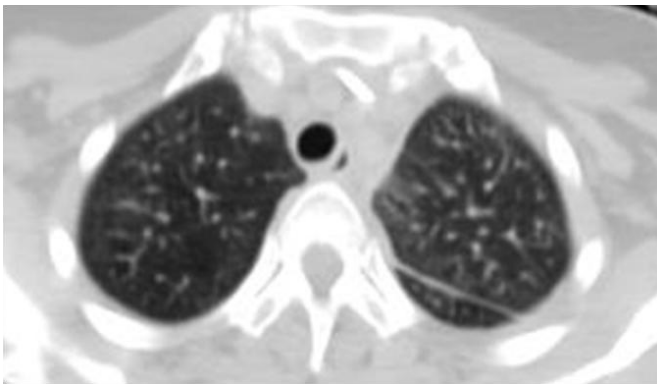
PET PET/CT가 가

PET PET/CT

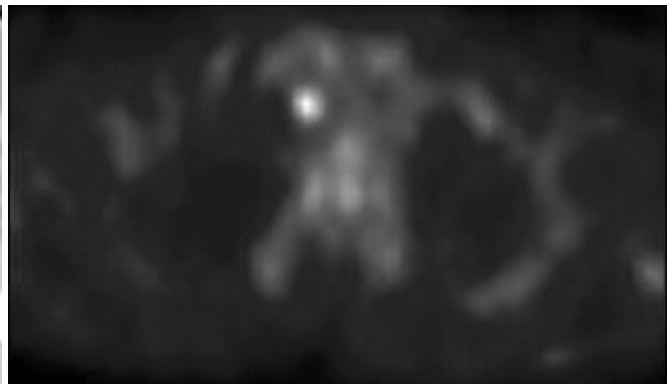
가

2004 . FDG

CT (13 - 15).



A



B



C

Fig. 3. CT, FDG PET and PET/CT of the thorax of a 39-year-old woman with lung cancer: cell type-adenocarcinoma(case No.1: pulmonary lymphangitic metastasis was pathologically confirmed by wedge resection)
A. Lung window demonstrates interlobular septal thickening less than 5 and no peribronchovascular bundle thickening in left upper lobe.
B. Fluorodeoxyglucose PET scan demonstrates no abnormal parenchyma uptake.
C. Matched PET/CT scan shows interlobular septal thickening without FDG uptake in matched area.

PET/CT CT PET/CT
 64
 CT가 가 (16,
 가 17). 가 PET FDG
 가 (6, 7). 가 PET FDG
 가 PET 1
 FDG
 (6, 7). 가 , 가
 가 , 가 Acikgoz G (6)
 FDG
 CT 가
 가 가
 가 가
 가 .
 가 PET CT CT
 가 , 가 FDG
 가 , FDG 3
 가 ,
 가 PET FDG
 CT 가
 PET/CT PET
 , PET
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 가

1. 2002;279-280
2. Heitzman ER. *The lung: radiologic pathologic correlation* 2nd ed. St. Louis: Mosby, 1984;413-421
3. Bergin C, Roggli V, Coblentz C, Chiles C. The secondary pul-

monary lobule: normal and abnormal CT appearance. *AJR Am J Roentgenol* 1988;151:21-25

4. Grenier P, Valeyre D, Cluzel P, Brauner MW, Lenoir S, Chastang C. Chronic diffuse interstitial lung disease: diagnostic value of chest radiography and high-resolution CT. *Radiology* 1991;179:123-132.
5. Naidich PD, Webb WR, Muller NL, Krinski GA, Zerhouni EA, Siegelman SS. *Computed tomography and magnetic resonance of the thorax*, 3rd ed. Philadelphia: Lippincott-Raven, 1999;418-420
6. Acikgoz G, Kim SM, Houseni M, Cermik TF, Intenzo CM, Alavi A. Pulmonary Lymphatic Carcinomatosis(PLC): Spectrum of FDG-PET Findings. *Clinical Nuclear Medicine* 2006;31:673-678
7. Digumarthy SR, Fischman AJ, Kwek BH, Aquino SL. Fluorodeoxyglucose positron emission tomography pattern of pulmonary lymphatic carcinomatosis. *J Comput Assist Tomogra* 2005;29:346-349
8. Castaner E, Gallardo X, Pallardo Y, Branera J, Cabezuelo MA, Mata JM. Disease affecting the peribronchovascular interstitium: CT findings and pathologic correlation. *Curr Probl Diag Radiol* 2005;34:63-75
9. Johkoh T, Ikezoe J, Tomiyama N, Nagareda T, Kohno N, Takeuchi N, et al. CT findings in lymphangitic carcinomatosis of the lung: correlation with histologic findings and pulmonary function tests. *AJR Am J Roentgenol* 1992;158:1217-1222
10. Stein MG, Mayo J, Muller N, Aberle DR, Webb WR, Gamsu G. Pulmonary lymphangitic spread of carcinoma: appearance of CT scans. *Radiology* 1987;162:371-375
11. Munk PL, Muller NL, Miller RR, Ostrow DN. Pulmonary lymphangitic carcinomatosis: CT and pathologic findings. *Radiology* 1988;166:705-709
12. Honda O, Johkoh T, Ichikado K, Yoshida S, Mihara N, Higashi M, et al. Comparison of high resolution CT findings of sarcoidosis, lymphoma, and lymphangitic carcinomatosis: is there any difference of involved interstitium? *J Comput Assist Tomogr* 1999;23:374-379
13. Aquino SL, Asmuth JC, Alper NM, Halpern EF, Fischman AJ. Improved radiologic staging of lung cancer with 2-[18F]fluoro-2-deoxy-D-glucose-positron emission tomography and computed tomography registration. *J Comput Assist Tomogr* 2003;27:479-484
14. Yi CA, Lee KS, Kim BT, Shim SS, Chung MJ, Sung YM, et al. Efficacy of helical dynamic CT versus integrated PET/CT for detection of mediastinal nodal metastasis in non-small cell lung cancer. *AJR Am J Roentgenol* 2007;188:318-325
15. Bruzzi JF, Murden RF. PET/CT imaging of lung cancer. *J Thorac Imaging* 2006;21:123-136
16. Antoch GA, Stattaus J, Nermat AT, Marnitz S, Beyer T, Kuehl H, et al. Non-small cell lung cancer: dual modality PET/CT in preoperative staging. *Radiology* 2003;229:526-533
17. Shim SS, Lee KS, Kim BT, Chung MJ, Lee EJ, Han J, et al. Non-small cell lung cancer: prospective comparison of integrated FDG PET/CT and CT alone for preoperative staging. *Radiology* 2005;236:1011-1019

Comparison between PET and CT Findings for 7 Patients with a Pulmonary Lymphangitic Metastasis¹

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Purpose: This study was conducted to compare the PET and CT findings for patients with a pulmonary lymphangitic metastasis.

Materials and Methods: We retrospectively reviewed the PET and CT findings of seven patients diagnosed with a pulmonary lymphangitic metastasis between May 2005 and May 2007.

Results: All patients had interstitial thickening, as seen on a CT scan, while the PET scans showed abnormal findings in only three patients. In these three patients, one patient had interlobular septal thickening of more than 10, another patient had interlobular septal thickening of more than 5 but less than 10, and another patient had interlobular septal thickening of less than 5. All of the patients had bronchovascular bundle thickening. However, among the four patients that had normal FDG uptake, no patient had interlobular septal thickening of more than 10, two of the patients had interlobular septal thickening of more than 5 but less than 10, and the remaining patients had interlobular septal thickening of less than 5. Only two of the patients had bronchovascular bundle thickening.

Conclusion: All patients with pulmonary lymphangitic metastasis have typical CT findings, but some of the patients had FDG uptake, as seen in the PET scans. Thus, CT is a more useful modality for diagnosis for pulmonary lymphangitic metastases.

Index words : Lung neoplasms
Lymphatic metastasis
Tomography, X-ray computed
Positron-emission tomography

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