

() PET

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= Abstract =

Assessment of Gynecologic Malignancy (Recurrent Ovarian Carcinoma) by Positron Emission Tomography

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Background: Recurrence of ovarian carcinoma is difficult to diagnose by current diagnostic modalities. Positron emission tomography(PET) might be useful for detecting recurrence of ovarian carcinoma by producing images which reflect biochemical change of tissues rather than their physical characteristics using a positron emitting glucose analog, 2-[18F]-fluoro-2-deoxy-D-glucose(FDG), because glycolysis is increased in malignant tissue.

Objective: To determine if PET is sensitive for the detection and demonstration of recurrence of ovarian carcinoma and to compare detectability of PET to that of serum CA-125 and CT/MRI.

Materials & Methods: Whole body PET scan was performed in thirty patients with epithelial ovarian carcinoma from March, 1996 to March, 1998 in Seoul National University Hospital. All patients received cytoreductive surgery and combination chemotherapy. The recurrence of ovarian carcinoma was declared by surgico-pathologic evidence or abnormal elevation of serum CA-125 level. CTI/Siemens scanner was used for PET. Ten mCi(370 MBq) of FDG was injected intravenously before whole body scan was obtained from the head to the lower leg. Regional transmission and emission scan was also obtained for areas of tumor. Serum CA-125 levels and CT/MRI findings by the time of PET were matched with PET results. Correlation analysis was performed between each diagnostic modalities and the recurrence of ovarian carcinoma.

Results: Ovarian carcinomas were recurred in twelve out of thirty patients. FDG PET detected the recurrence of ovarian carcinoma in ten patients(sensitivity = 66.7%; specificity = 86.7%; contingency coefficient, CC = 0.48; p = 0.003), and better than CA-125(sensitivity = 75.0%; specificity = 75.0%; CC = 0.28; p > 0.05) and CT/MRI(sensitivity = 38.5%; specificity = 57.1%; CC = 0.01; p > 0.05).

Conclusion: FDG PET accurately predicted the recurrence of ovarian carcinoma and is a useful adjunctive diagnostic method. A prospective case-control study with more patients might be needed in the future.

Key words ; PET, Recurrence, Ovarian Carcinoma

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. , 60% 5 30% 가 . 1 . (CT), , (MRI), 1. CA-125, 가 , (cytoreductive surgery) cisplatin 50% 1996 3 1998 3 30 12 (40.0%) (), 18 (60.0%) (). 47.4 ± 12.0 . 16 (53.3%), 4 (13.3%), 6 (20.0%), 2 (6.7%), 1 (3.3%) . 1 가 9 (30%), 2 가 3 (10%), 3 가 18 (60%) . , 가 , CA-125가 . CA-125 35 U/ml . CT 2-[18F]-Fluoro-2-deoxy-D-g- MRI 27 . glucose(FDG) . 가 2. F-18-FDG (positron emitting radio-nuclide) 18F , 가 110 . 18F 0.64 MeV , FWHM(full width at half maximum) 0.22 mm . PET PET , , . PET ECAT 921 (Emission computerized axial tomography; CTI / Siemens Co, USA) . 18F TRI3 (EBCO Co, Canada) F-18-Fluorine

Table 1. Comparison of predicting power between diagnostic modalities

	Group	* Group	Contingency coefficient	p-value
n	12	18		
Age	53.7 ± 7.4	43.3 ± 12.8		ns
FIGO stage			0.40	ns
I	2	7		
II	3			
III	7	11		
Histologic type			0.41	ns
Serous	9	7		
Mucinous	2	2		
Endometrioid	1	5		
Metastatic		2		
Clear cell		1		
EST		1		
CA-125 elevation**	6(50.0%)	4(22.2%)	0.28	ns
CT/MRI	5(45.5%)	8(50.0%)	0.01	ns
PET	10(83.3%)	5(27.8%)	0.48	0.003

* Group = Recurred at the time of PET;

Group = Not recurred at the time of PET.

** CA-125 > 35 U/ml.

hanning, cutoff 0.4

/ / .

Fig. 1. (A) The procedure of whole body PET scan
(B) Adding regional PET scan

2) 가

(standardized uptake value, SUV), differential uptake ratio(DUR) 가 ,

, .

1)

6

:

가

20

9) 가

20 Mø

10 mCi F-18 FDG(FDA , IND No. 30,300)

20 Mø

30

30

20-30

150 cm

step

7

(Fig.

5

,

1

2.).

3.

5 ,

6 ,

7

가 가

SPSS 7.5가

Mann-Whitney U test

CA-125, CT/MRI,

가

(Fig. 1.). ECAT 6.5B

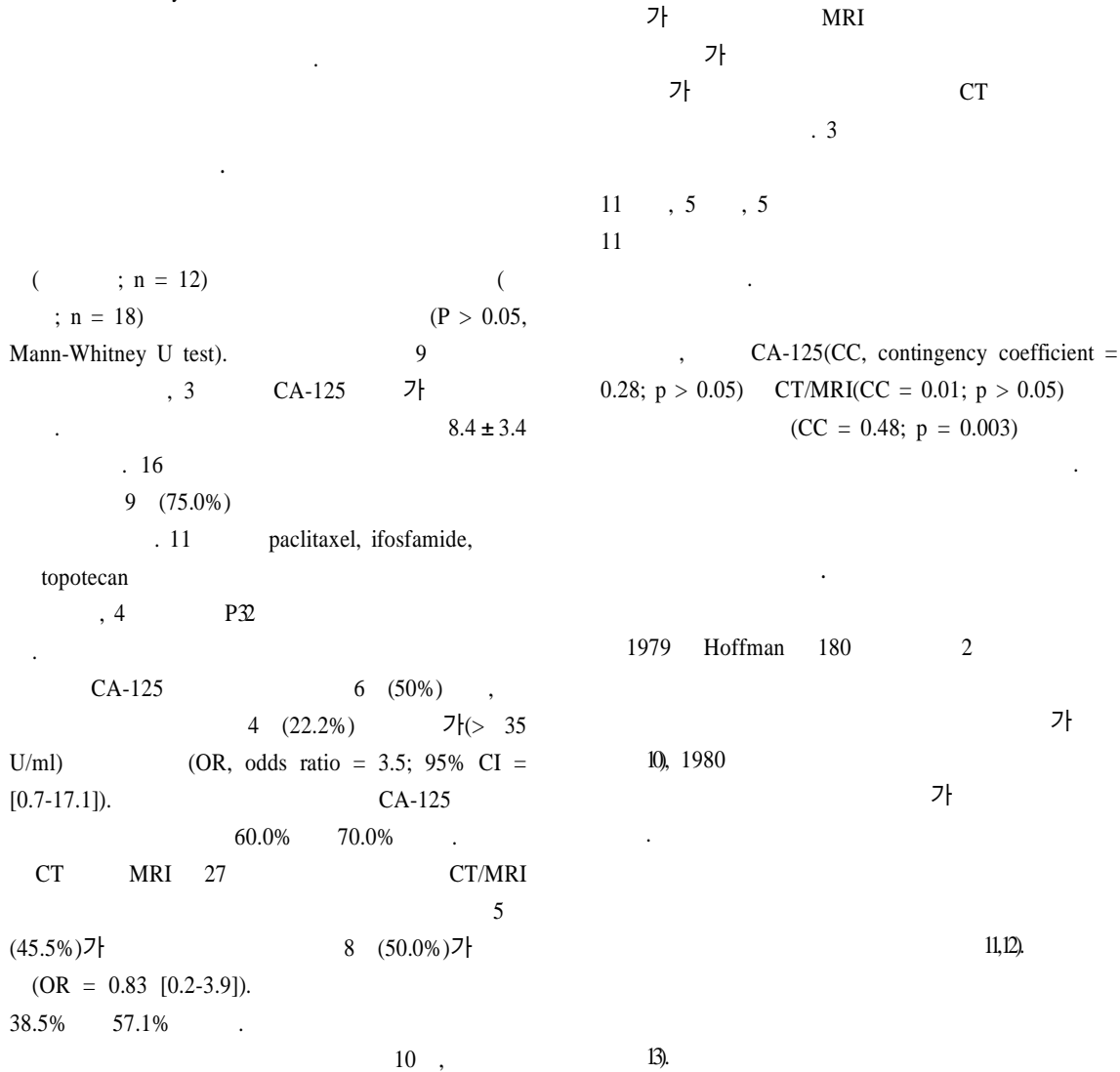
contingency

coefficient

. p value

0.05

Fig. 2. A case of liver metastasis of ovarian carcinoma detected by FDG PET



PET (14), Phelps (1979) 가

15). FDG-PET 가

. PET 11C, 13N, 15O, 18F 가 16,17). FDG-PET가

(photon) 18), 가

19). FDG-PET

, 20,21). FDG-PET

가 2-[18F]- (time activity curve, TAC)

Fluoro-2-deoxy-D-glucose(FDG) . FDG hexokinase (re-

(phosphorylation) . Glu- gions of interest, ROIs)

cose 6-phosphate FDG , (standar-

dized uptake value, SUV) PET

FDG

PET

$$SUV = \frac{\text{regions radioactivity concentration [Bq/ml]}}{\text{injected dose [Bq] / patient weight [g]}}$$

가 가 PET가

FDG-PET FDG-PET lean body mass 가

가 , , , , Hubner (1993)

(DNA flow cyto-

metry) (proliferation

index) 22),

(monoclonal

antibody), (receptor ligands),

FDG FDG-PET 가 23,24).

FDG-PET

PET

Sokoloff (1977) 가 (auto-

radiography) [14C]deoxyglucose 가

FDG (comparten- FDG-PET

PET
 가
 CT, MRI
 6, 16, 28
 FDG-PET, 12, 3).
 FDG-PET CT/MRI가 6
 , 8, 7
 FDG-PET
 4
 2 가
 Bruce, 2, 1
 (1995) 15
 FDG-PET 66.7%
 (= 86.7%; = 83.3%;
 = 72.2%). CA-125
 CT/MRI 60.0% 38.5%
 Bassa 가 FDG-
 (1996) 16 PET 가
 FDG
 가 28).
 Rege (1993) FDG-PET가
 FDG-PET
 29). FDG-PET 가
 FDG-PET
 FDG-PET
 가
 가
 가
 가
 가
 Dahlbom (1992)
 30). 1994
 가 2
 가
 Bender (1997) 75

1996 3 1998 3 0.83 [0.2-3.9]) (CC = 0.01; p > 0.05).

3. (cytoreductive surgery) cisplatin 30 가 (= 66.7%; = 86.7%; OR = 13.0 [2.1-81.5]; CC = 0.48; p = 0.003).

12 ,
CA-125가
35 U/ml . CT MRI 27
CA-125, CT/MRI,

1. CA-125 75.0% 75.0% (OR = 3.5 [0.7-17.1]) (CC, contingency coefficient = 0.28; p > 0.05).
2. CT MRI 가 38.5% 57.1% (OR =

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