

## 급성 심근경색증과 유사한 증세를 보이는 스트레스성 심근병증의 임상적 특징과 경과 : 전향적 연구

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### Clinical Manifestation of Novel Stress-induced Cardiomyopathy Mimicking Acute Myocardial Infarction : Single Center Prospective Registry

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#### ABSTRACT

**Background and Objectives :** The so-called 'stress-induced cardiomyopathy' or takotsubo cardiomyopathy, mimicking acute myocardial infarction (AMI), has recently been reported, particularly in Japan. We prospectively studied the clinical characteristics of, for the first time with a Korean series, this novel syndrome. **Subjects and Methods :** Eighteen patients, fore filling the inclusion criteria, were entered onto the study. The criteria for inclusion were : 1) no previous history of cardiac disease, 2) acute onset, 3) a regional wall motion abnormality in the left ventriculogram, typically in the apical segment, and 4) no significant stenosis in the coronary angiogram. **Results :** The events preceding the condition included : emotional stress (N = 7), acute illness (N = 5), non-cardiac surgery or medical procedure (N = 4) and accident (N = 2). Chest pain, dyspnea, or nausea/vomiting were initially noted in 12 cases (66%). Pulmonary edema was demonstrated in 10 (56%), and cardiogenic shock in 4 (23%) of the patients. The peak creatinine kinase MB fraction was  $69 \pm 136$  IU/L. A T wave inversion was noted in all patients, whereas, a Q wave was noted transiently in only 1. The average left ventricular ejection fraction (LVEF) was  $38 \pm 8\%$  on the initial echocardiograms. On the left ventriculograms, 15 patients showed akinetic wall motion, or aneurysmal dilatation in the apical wall, however, notably in 3 patients in the mid-ventricular wall. The coronary vasospasm provocation tests were negative in all 10 patients tested. An intravascular ultrasonography showed no infarct-related plaques in the 4 patients examined. On a follow-up echocardiogram, the average LVEF was improved to  $51 \pm 8\%$ , and regional wall motion was normalized after  $30 \pm 29$  days following onset. **Conclusion :** We report, for the first time in a series of Korean patients, on a novel stress-induced cardiomyopathy with transient regional wall motion abnormality, mimicking AMI. The precise etiology remains to be elucidated in further studies. (**Korean Circulation J 2002;32(12):1054-1063**)

**KEY WORDS :** Stress ; Cardiomyopathy, congestive ; Myocardial infarction ; Myocardial stunning.

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## 서론

가

6%

## 연구 방법

가

가

가

X-  
4

가

12

X-

24

1

1

1

가

가

<sup>2)</sup>

(10 ug

20

ug )

takotsubo(た

こつほ :  
ooning

) cardiomyopathy

apical ball-

가

## 대상 및 방법

대상 환자

1998 1 2001 10

1)

2)

3)

4)

50%

1

(intra - coronary haziness)

## 통계분석

±

ST

Student - t test

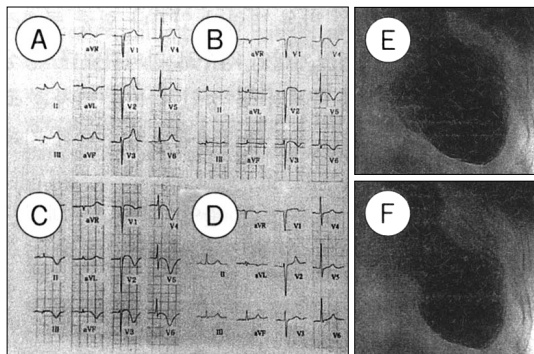
p - value가 0.05

## 결 과

### 증례 1 :

60 , 가  
2  
196  
mg/dL II, III, aVF,  
V1 - V3 ST I, aVL T  
가 (Fig. 1). Q  
ST 2  
T 7  
M - mode  
30%  
X -  
6

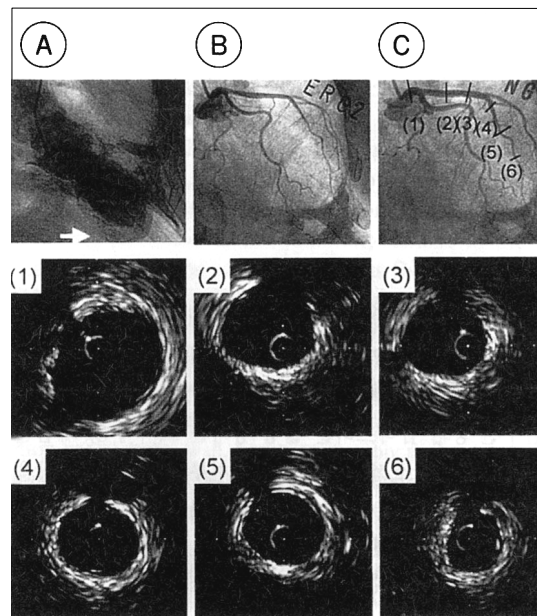
(apical ballooning)  
crea-  
tine kinase(CK) 293 IU/L CK -  
MB 40 IU/L . 3  
45%, 1 64%



**Fig. 1.** Electrocardiogram (ECG) and left ventriculogram of case 1. A : 2 hours after the onset of chest pain, ECG showed ST segment elevation in lead II, III, aVF. B : 7 hours after the onset, T wave inversion in lead I, II, III, aVF, V1-6, C : 7 days after the onset, more prominent T wave inversion (D) 3 months after onset, normalized ECG. E-F : 6 hours after the onset, left ventriculogram showed apical ballooning-type aneurysmal dilatation during systole.

### 증례 2 :

69 ,  
2  
ST aVR  
T 가  
X -  
CK 376 IU/L CK - MB  
12.8 ng/mL 가  
32% 2  
가  
(Fig. 2).  
3 cm



**Fig. 2.** Left ventriculogram and coronary angiogram of case 2. A : left ventriculogram showed apical aneurysm and apical thrombus (arrow). Note the pleural calcification due to previous pleural tuberculosis. B : intracoronary ergonovine spasm provocation test was normal, C : coronary angiogram after intracoronary nitroglycerin injection. Note the intravascular ultrasonography in corresponding segment. (1)-(6) : virtually no definite atherosclerotic plaque was found in this patient.

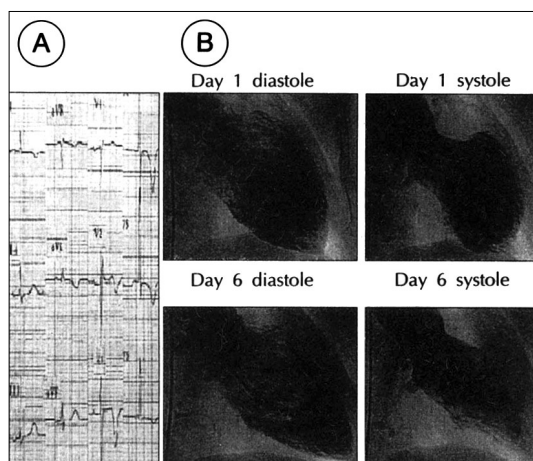
16%  
가 240 mg/dL  
가

45% 6  
T

증례 3:  
84 1~2  
V1-V3 ST  
2  
(mid-ventricular wall)  
(Fig. 3). 2  
T 가  
. 6

#### 임상적 특징

18 가 가 3 ,  
가 15 가 5  
63±18 (42~84 )  
, 38%, 16%,



**Fig. 3.** Electrocardiogram and left ventriculogram of case 3 (Mid-ventricular type). A : electrocardiogram showed T wave inversion in lead I, aVL, V2-6. B : left ventriculogram showed mid-ventricular akinetic wall motion at day 1, which was normalized after 6 days.

#### 발병 선행인자

가 (Table 1).  
가 7 가 ( 3 ,  
1 ), 2  
( 1 , 1 )  
5 , 2  
, 1  
, 1  
1  
가 4  
(gall bladder empyema)  
(percutaneous transhepatic  
biliary drainage) 1 , 1 ,  
1 , 1

**Table 1.** Stressful conditions preceding the onset

	Number of patients (%)
Total patient number	18 (100%)
Emotional stress	7 ( 39%)
Anger state	2
Fighting	1
Mother's death	1
Nightmare	1
Severe anxiety	2
Accident	2 ( 11%)
Fall-down	1
Near-drowning	1
Acute illness	5 ( 28%)
Sepsis	2
Paralytic ileus	1
Thyrotoxicosis	1
Post-chemotherapy	1
Post-procedure or surgery	4 ( 22%)
Tongue cancer surgery	1
Ulcer perforation surgery	1
Post-PTBD	1
Hysterectomy	1

PTBD : percutaneous transhepatic biliary drainage

## 임상양상 및 검사조건

(12, 66%), (12, 66%), (12, 66%), (6, 33%), 11 (56%)  
X- 4 (22%), 2 (11%)  
Creatinine kinase MB fraction(CK-MB) 18 13  
peak CK-MB  $69 \pm 135$  IU/L, peak troponin-I  $6.9 \pm 10.6$  ng/mL  
CK-MB가 116  
7 (39%) ST

ST

. Q 1

T

70%

. T

가

$60 \pm 50$  (6~120)

(Fig. 4).

$39 \pm 9\%$

, 7

528%

( $p < 0.001$ , Fig. 4).

가

$30 \pm 29$

ST

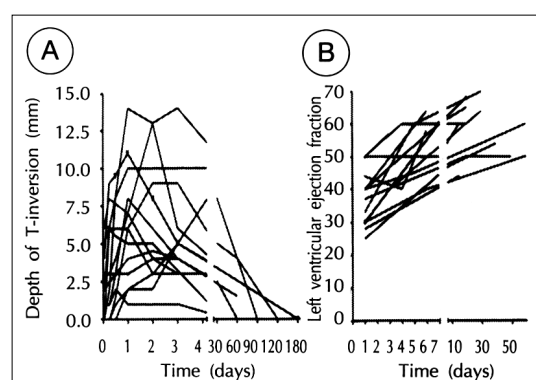
ST

CK-MB

$148 \pm 192$  IU/L,  $21 \pm 17$  IU/L

troponin-I

$15.5 \pm 14.6$  ng/dL,  $3.4 \pm$



**Fig. 4.** A : temporal change of T wave inversion, and B : left ventricular ejection fraction. T wave inversion was normalized in  $60 \pm 50$  days. Left ventricular ejection fraction was  $39 \pm 9\%$  initially, and rapidly improved to  $52 \pm 8\%$  after 7 days.

2.5 ng/dL ST

( $p < 0.05$ ).

## 관동맥 및 좌심실 조영술 소견

18

15

(left ventricular apical ballooning)

가

, 3

가

(mid-ventricle)

(Fig. 3).

$15 \pm 7$  mmHg

11

6

20 mmHg

. 10

4

(positive vessel remodeling)

soft

plaque

2

( 2 ).

4

(coronary flow reserve),

$1.6 \pm 0.6$ ,

$2.2 \pm 0.3$

## 임상 경과

2

,

1

.

11

(56%)

4 (22%)

.

1

, 17

,

1

## 고찰

T

가 . 가 . 60 .

1 가 1 가 .

1 .

가 가 3)

4)5)

가 5~10%

takotsubo cardiomyo - 1)

pathy ampullar cardiomyopathy . 1) ,

Tsuchihashi (83%)

tran- 가 . 16%

sient left ventricular apical ballooning .

2) 88 , 2)

12 : 76 67 . ,

20% CK - MB 69 ± 135 IU/L

가 67%, 가 13% 11 ± 6 . 3)

ST T 가

97% 가 T , Q 1

ST 39% . T

90% , Q 가 27%

가 . 4)

22%, 15%, 가

9% . 1

가

2

. 55% . 5) 가

21% . 4

6)

Tsuchihashi 2)

(re- 가 10

trospective registry)

87%

7)

8

30 , T

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diomyopathy [131I]metaiodobenzyl - guani-  
dine(MIBG)

가 .

가 .

“ Takotsubo - shaped cardiomyopathy ”  
ampullar cardiomyopathy 가 .

## 요 약

### 배경 및 목적 :

“ human stress cardiomyopathy ”  
Tsuchihashi

apical ballooning transient left ventricular omyopathy) 가  
2) 가 .

(midventricular)

가 3  
cardiomyopathy

takotsubo

### 방 법 :

1)

2)

3)

가

4)

cardiomyopathy

가 가

stress

18

가

(acute

### 결 과 :

regional cardiomyopathy)

7 ,

5 ,

4 ,

2

, ,

가 12

가 .

56%,

23%

18

13

, creatinine kinase MB

fraction

69 ± 136 IU/L

116

T

가

Q

1

38 ±

가

.

.

8%

, 15

3

10

4



51 ± 8%

30 ± 29

. 17

1

결 론 :

가

중심 단어 : ; ; ;

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