

# 폐경후 Syndrome X 환자에서 에스트로젠 치료의 유용성

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## Beneficial Effects of Estrogen in Syndrome X of Postmenopausal Women

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### ABSTRACT

**Background :** There are many reports about the correlation between cardiovascular disorders and estrogen deficiency in postmenopausal women. The purpose of current study is to know that postmenopausal estrogen therapy may affect the lipid metabolism and endogenous fibrinolytic system and exercise tolerance. **Method :** We investigated the relation of estrogen treatment (srogen 0.625 mg/day) to serum lipid levels, angiotensin converting enzyme activity, plasminogen activator inhibitor-1 and parameters of treadmill test in 22 postmenopausal women of normal coronary artery with abnormal exercise test complained with chest pain accompanied by postmenopausal symptoms. **Results :** Estrogen treatment significantly elevated the serum HDL-cholesterol level (42.8 to 50.1 mg/dl,  $p < 0.05$ ) and reduced the PAI-1 level (16.2 to 10.4 ng/dl,  $p < 0.01$ ) without considerable side effects. During the exercise test, the positivity appearance time and total exercise duration is significantly increased after estrogen treatment. **Conclusion :** The postmenopausal use of estrogen favorably changed the lipid level, fibrinolytic system and might improve the microcirculation which may protect against the ischemic heart disease risk without significant side effects. (Korean Circulation J 1999;29(3):298-305)

**KEY WORDS :** Estrogen · Postmenopause.

### 서 론

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가

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: 1999 3 22

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146 - 92

factor, EDRF)

(endothelium - dependent relaxing

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ACE

14 washout phase

가 , (

ACE) , , 22 conjugated estrogen(srogen  
0.625 mg/ ) 21 7  
289.7 .

대상 및 방법

( ), (clotting method of Clause),  
(ACE activity, ELISA ),  
plasminogen activator inhibitor 1(PAI - 1, ELISA  
) .

대 상 1996 6 8 11  
8 9

22 ( 54 ) 5ml .

6.4 , , -

15 , 7 , Lp(a) Immuno Immunozyne  
Kit (LDL  
cholesterol) Fredwald formula . ACE  
synthetic substrate FAPGG(Sigma  
Corp., USA) PAI - 1  
TintElize Kit(Biopool, Sweden)

(Table 1).

방 법

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(follicle stimulating hormone, FSH) 가 통계분석  
40 IU/L package program SPSS for windows(ver -  
(CASE 12, Marquette Electronic Comp., USA) sion 7.5) student's T - test  
6 12 ± , p 0.05

Bruce  
J - point 0.08  
1 mm ST

(seconds) (METs)  
Seldinger

Tagarno 35 CX projector 2  
가

**Table 1.** Clinical characteristics of patients

N = 22	
Age (yr)	54.0 ± 7.0
Obesity ( , > 120% of IBW)	9
Alcohol Hx ( , > 2 times/week)	3
Smoking Hx ( )	0
Cause of menopause ( )	
(Spontaneous : Hysterectomy)	15 : 7
Menopausal duration (yr)	6.4 ± 4.7
Estrogen Tx. duration (days)	289.7 ± 55.3

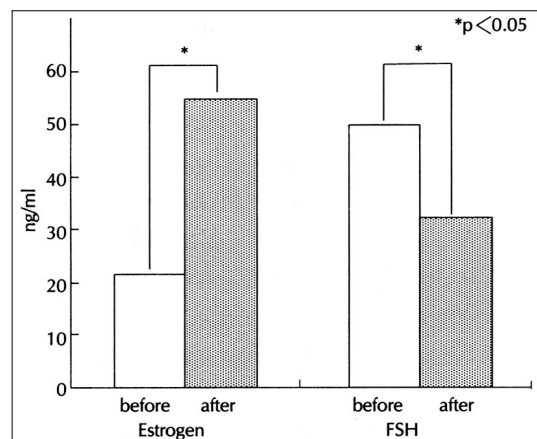
## 결 과

### 임상 양상 및 결과

**Table 2.** Serum levels of estrogen, lipid profiles, ACE activity, PAI-1 levels

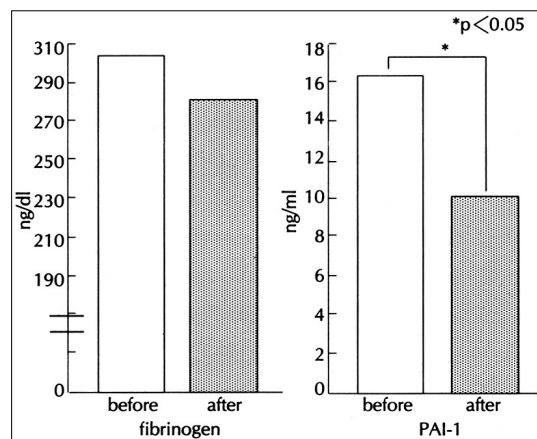
Estrogen Treatment	Before	After
FSH (ng/ml)	52.1 ± 5.6	33.7 ± 4.5*
Estrogen (ng/ml)	22.6 ± 2.9	56.7 ± 5.8*
Total cholesterol (mg/dl)	210.2 ± 30.7	206.5 ± 28.0
Triglyceride (mg/dl)	165.8 ± 68.9	169.5 ± 76.0
HDL-cholesterol (mg/dl)	42.8 ± 2.5	50.1 ± 12.9*
LDL-cholesterol (mg/dl)	134.7 ± 36.1	125.9 ± 31.4
LP (α) (mg/dl)	30.2 ± 24.0	31.9 ± 25.5
Fibrinogen (mg/dl)	307.0 ± 66.4	279.4 ± 76.8
PAI-1 (ng/dl)	16.2 ± 8.3	10.4 ± 6.0*
ACE activity (U/L)	20.3 ± 5.6	33.8 ± 3.4

\*p<0.05

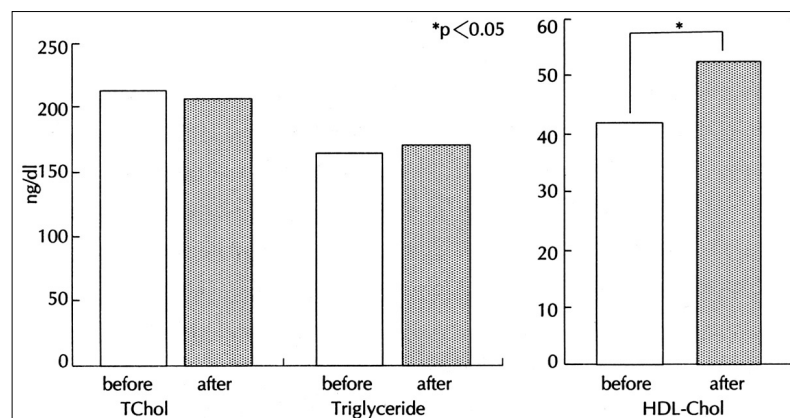


**Fig. 1.** Changes of estrogen and FSH concentration after TX.

6.4  
15 ,  
7 289.7 (Table 1).  
22 20  
2 , 2  
가 1  
22.6 ± 2.9 ng/ml  
56.7 ± 5.8 ng/ml, 52.1 ± 5.6 ng/ml 33.7 ± 4.5  
ng/ml 가 (Table 2  
and Fig.1).  
42.8 ± 2.5 mg/dl 50.1 ± 12.9 mg/dl  
가 (Table 2 and Fig. 2, p<0.05)



**Fig. 2.** Changes of serum lipid levels after estrogen treatment.

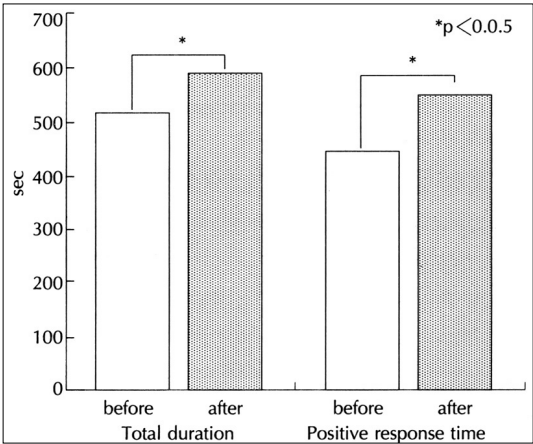


**Fig. 3.** Changes of fibrinogen & PAI-1 levels after estrogen TX.

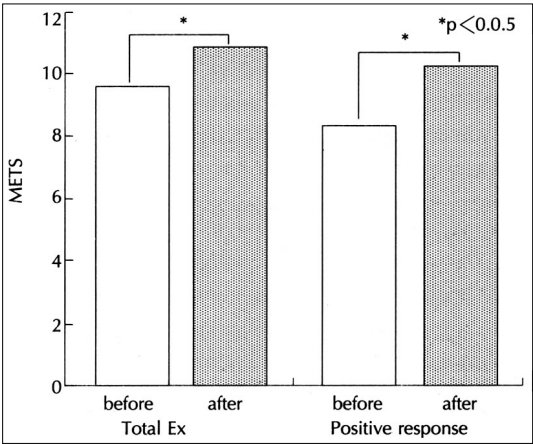
**Table 3.** Time duration & METs of positive response, total exercise (Bruce protocol)

Estrogen Treatment	Before	After
Time appearance of positive response (sec)	463.0 ± 133.6	571.3 ± 128.7*
Total exercise duration (sec)	527.1 ± 99.5	601.3 ± 116.3*
METs of positive response	8.3 ± 2.3	10.4 ± 2.4*
METs of total exercise	9.7 ± 1.6	11.1 ± 1.9*

\* p<0.01



**Fig. 4.** Parameter changes of TMT (Bruce protocol).



**Fig. 5.** Total Ex. & positive response on TMT (METs).

, Lp(a)  
 , PAI - 1  
 16.2 ± 8.3 ng/ml 10.4 ± 6.0 ng/ml  
 (Table 2 and Fig.3, p<0.01).

(17 - estradiol)  
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 7 - 9)

가<sup>2)21)</sup>

가<sup>21)</sup>

(HDL cho -

lesterol),<sup>2)</sup> A - 1 가

가 lipoprotein(a),

<sup>10)</sup> srogen(0.625 mg/ )

1

가 3 5

가

tissue

가, plasminogen activator( t - PA) rapid

가, , prostacyclin inhibitor plasminogen activator inhibitor - 1(

가, nitric oxide synthase gene PAI - 1)

가<sup>11)</sup>

t - PA

<sup>12)</sup> collagen

Lp(a)

가 complementary DNA 1

Lp(a) apolipoprotein(a)<sup>22 - 24)44)</sup> PAI - 1

protease sequence

<sup>13 - 15)</sup> Lp(a), apo(a)가 t - PA PAI - 1 t - PA

가<sup>25)</sup>

Ezratty<sup>16)</sup> Lp(a)가

<sup>26)</sup>

Lp(a)가

가 proto -

oncogene C - myc

가<sup>28)</sup> 가

<sup>17)18)</sup> 가 PAI - 1

<sup>19)20)27)</sup>

Lp(a)

가 nitric oxide 가가<sup>30 - 32)</sup>

ACE  
 probucol E  
 가 29)  
 estradiol nitric oxide  
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 41)  
 가  
 syndrome  
 X Doppler  
 33) PEPI(postme -  
 nopausal estrogen/progestrin interventions) trial  
 가  
 34)35)  
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 (ACE)  
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 (bradykinin)  
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 ACE가 ACE  
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 (bradykinin) vessel tone  
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 of women' health initiative, WHI) 45)  
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 가  
 22  
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가 가

가

요 약

연구배경 : 가 , ACE

방 법 : 22 , PAI - 1 , ACE

결 과 : 22 20 가 , Lp(a) PAI - 1 가 , ACE

결 론 : 가

가

중심 단어 : . . .

감사문 1996 1997

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