

심장재활

홍 경 표 · 추 진 아

Cardiac Rehabilitation

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서 론

2. 운동요법의 효과

가

가

가

Redwood ⁴⁾ Hartung ⁵⁾

(VO₂max) 10~

30% 가

(Fig. 1).

⁶⁾

8

²⁾,

가 (18.3% - 0.8%,

p<0.01)(Table 1).

가 ,

³⁾.

가 가 ,

본 론

1. 심장재활팀의 구성

(rate pressure product : RPP)

(),

(Table 2)(Fig. 2).

가,

가 Hamala -

3. 운동요법의 적응증 및 금기증

inen 9)

10

(Fig. 3).

HDL -

, LDL -

10 - 12)

13)

14)(Table 3).

4. 운동요법의 위험도 평가

(heart rate variability)

가

가

가

(Table 4).

(Table 5),

(Table 6).

가

(1~3)

가

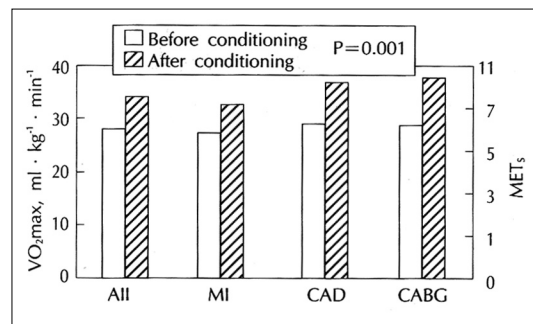


Fig. 1. 심근경색증, 관동맥우회로술, 관상동맥조영술로 관상동맥질환이 확인된 환자에서 운동요법으로 최대 산소섭취량(VO2max)이 의미있게 향상하였다⁵⁾.

8METs

2

가

Table 1. 심근경색증 환자에서 재활요법 전후 최대부하시 변수의 변화

					p
(ml/kg/min)	29.6 ± 6.1	35.2 ± 8.4	31.8 ± 7.9	31.4 ± 7.7	p = 0.0062
	8.6 ± 1.7	10.0 ± 2.2	9.0 ± 2.3	8.9 ± 2.2	p = 0.0063
(L/min)	1.3 ± 0.5	1.5 ± 0.6	1.3 ± 0.5	1.2 ± 0.4	p = 0.0274
(ml/bpm)	15.3 ± 3.6	17.0 ± 4.3	14.8 ± 3.4	16.1 ± 3.3	p = 0.5403, NS
()	825.0 ± 98.6	964.6 ± 176.1	875.7 ± 116.8	860.2 ± 133.4	p = 0.002
(maximal oxygen uptake, VO2max = cardiac output × arteriovenous oxygen difference)					
(metabolic equivalent, MET ; 1 MET = 3.5ml/kg/min)					
(anaerobic threshold)					
(maximal O2 pulse = VO2/heart rate)					

Table 2. 심근경색증 환자에서 재활요법 전후 최대하부하시 변수의 변화⁶⁾

					p
(mmHg · bpm)	160.8 ± 32.5	132.8 ± 27.0	145.2 ± 45.4	136.4 ± 35.2	p = 0.0305
(L/min)	33.9 ± 10.0	28.4 ± 6.7	31.2 ± 5.0	31.5 ± 4.7	p = 0.037
()	12.1 ± 1.2	9.6 ± 1.5	11.9 ± 1.1	12.5 ± 1.6	p = 0.0007
(rate-pressure product, RPP = heart rate × systolic blood pressure/100)					
(minute ventilation, VE)					
(rate of perceived exertion ; 6 - 20 scale)					

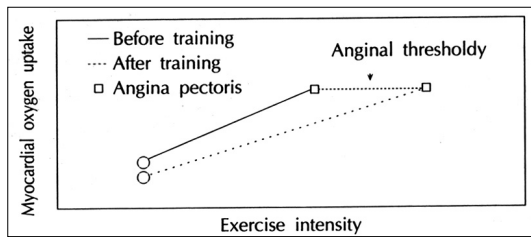


Fig. 2. 노력성 협심증에서 운동요법의 효과⁸⁾.

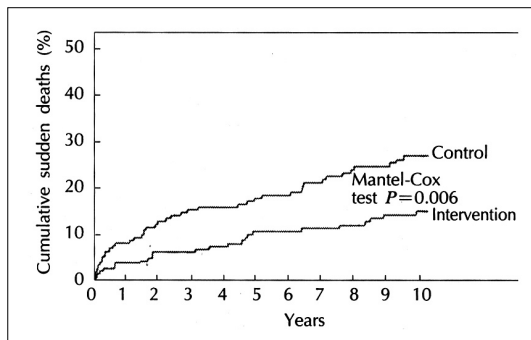


Fig. 3. 심장재활군과 대조군을 10년간 추적 관찰하였을 때 심장 돌연사의 빈도.

Table 3. 관상동맥질환에서 운동요법의 절대적 금기증

<div>>200/110mmHg</div> <div>(>20mmHg)</div> <div>(>120 /)</div> <div>(>38)</div> <div><0.75cm²)</div> <div>(>50mmHg,</div> <div>(>400mg%)</div>	<div>Table 5. 운동중 심장사의 위험이 높은 환자</div> <div>3</div> <div>ST >2mm / 가</div>
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가 . 가가 가

(Table 7).

가

1 : 80000 - 160000人.

5. 운동처방

1) 운동처방의 원리

, 1)

가

(heart rate :

HR) 20 /

, 2)

5~10

, 3)

(rate of perceived

exertion : RPE)

, 4)

40~60%

가

5

/週

Table 5. 운동중 심장사의 위험이 높은 환자

($<40\%$)

3

($<4\text{METs}$)

가 120 /

ST $>2\text{mm}$

/

가

1) , 2) ,
3) 240/110mmHg ,
4) ST 1mm ,
5) , 가
6) 가 , 7) 가 가 가
(2 , ,

가
É 7METs
50%

ST
가 É 2mm
Thallium
35% <50%

, 가 35%
<35%
, 10mmHg 가

24

ST 5METs
1mm ,

135/ ST 2mm

가 가 .
2 .
. .
. .
. .
/
. / , , / ,
,
,
,
가 .

(frequency), (intensity), (duration), (mode), (progression) 5 .

3~5 /週 Karvonen's HR reserve 40~85%

Borg RPE 12~14 .

$$= [(HR_{max} - HR_{rest}) \times 0.40 \sim 0.85] + HR_{rest}$$

가가 RPE
20~60 / 가 ,
30~40 .
, 가 1
,
2 . ,
(), , , , ,
, weight, wall pulleys ,
80~100% 가
가 . ,
, 가 .

1
1.5METs
5METs
RPE, RPE<13, HR<120/ (HRrest+

Table 8. 운동요법의 각 단계

Length of stay	Setting	Phase	GXT
5 - 14days	CCU/ward	(inpatient)	Low intensity
1 - 3mons	Hospital/clinic	(outpatient)	SL maximum
6 - 12mons	Local community center	(supervised, medical)	SL maximum
Indefinitely	Local community center/home	(unsupervised, maintenance)	SL maximum

CCU = cardiac care unit, GXT = graded exercise test, SL = symptom limited

20/) , 3 - 5 . 40%, 2METs,
1~2 1 RPE 8~9 5~10 , ,
20 , 3~4 / , 가 weight ,
가 2 / . 가
가 가
. 2 5METs

2) 2단계(Phase II)

1 , , , , ,
2~3 6~12 , , ,
, , ,
. 2
, 7~15 .
40~50% , HRrest() + 10~12 3
/ 20 / , 가
. (stretch) (Phase III)/가 가
, , ,

3) 3단계(Phase III)

50~70%, HRrest(2 3~6 ,
)+20~30 / (10~12 가 90 / , 가 4METs
/), RPE 11~15 15~20 / , 5METs 가
2~3 가 . 30~45 ,
, treadmill, , 50~85%가 , 8METs
airdyne, weight . 5METs ,
1) 40~60% , , weight, .
, 2~3METs 5~10 3 , ,
20~30 가 , 2) , 1) 8METs , 2)
3~5METs, HRrest + 10~20 / , RPE 11~13 ,
, 3) 5METs , 3)
. ST 1mm , 4)
5METs 1) 10~15 , 5) 가
30~60 가 , 2) , 6)
0.5MET/ 가 , 3) 가 ,

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