

## 협심증 환자에서 경피적 Nitroglycerin(앤지덤 패취®)의 임상효과

조장현<sup>1</sup> · 정명호<sup>1,2</sup> · 주신배<sup>1</sup> · 김남호<sup>1</sup> · 김건형<sup>1</sup> · 이승욱<sup>1</sup> · 이상현<sup>1</sup>  
 강경태<sup>1</sup> · 박형욱<sup>1</sup> · 안영근<sup>1</sup> · 정성택<sup>2</sup> · 조정관<sup>1,2</sup> · 박종춘<sup>1,2</sup> · 강정채<sup>1,2</sup>

### The Clinical Effects of Transdermal Nitrate (Angiderm Patch ) in Patients with Angina

Jang Hyun Cho, MD<sup>1</sup>, Myung Ho Jeong, MD<sup>1,2</sup>, Shin Bae Joo, MD<sup>1</sup>, Nam Ho Kim, MD<sup>1</sup>,  
 Kun Hyung Kim, MD<sup>1</sup>, Seung Uk Lee, MD<sup>1</sup>, Sang Hyun Lee, MD<sup>1</sup>, Kyung Tae Kang, MD<sup>1</sup>,  
 Hyung Wook Park, MD<sup>1</sup>, Young Keun Ahn, MD<sup>1</sup>, Sung Taek Jung, MD<sup>2</sup>,  
 Jeong Gwan Cho, MD<sup>1,2</sup>, Jong Chun Park, MD<sup>1,2</sup> and Jung Chae Kang, MD<sup>1,2</sup>

<sup>1</sup>The Heart Center, Chonnam University Hospital, <sup>2</sup>The Research Institute of Medical Sciences,  
 Chonnam National University, Kwangju, Korea

#### ABSTRACT

**Background and Objectives** : The clinical efficacy of transdermal nitroglycerin patch in patients with angina has not known exactly. After the application of transdermal nitroglycerin, the influences of transdermal nitrate on exercise capacity and clinical symptom in patients with angina were compared with the clinical effects of oral nitroglycerin. **Materials and Method** : Long acting oral nitrate was administered in 20 patients (9 male, 11 female, age : 56.3 ±4.6) and transdermal nitrate (Angiderm Patch ) applied in 20 patients (8 male, 12 female, age : 53.9 ±9.8), who suffered from angina more than 4 attacks per week. All patients were evaluated at 4-week interval : after 2 weeks' run-in period, after 4 weeks of randomized non-titrated treatment (first visit), after 8 and 12 weeks of titrated treatment (second and third visits). The frequency of angina, side effects of headache and skin irritation, blood pressure, echocardiographic ejection fraction and exercise treadmill score were compared between the two groups. **Results** : The frequency of angina attack was 14.4 ± 6.0 in oral nitrate and 14.0 ±4.9 in transdermal nitrate per two weeks during run-in period. After nitrates, the frequency of angina reduced to 8.1 ±4.5, 5.4 ±2.2 on the first, to 3.0 ±3.5 and 1.7 ±1.4 on the second, and to 1.2 ±1.7 and 0.3 ±0.4 on the third visit in oral and transdermal nitrate groups respectively. Blood pressure and ejection fraction were unchanged in both groups. Exercise treadmill score was 10.4 ±4.3 in oral and 10.6 ±2.3 in transdermal nitrate group during run-in period, which was increased to 12.6 ±4.0, 13.7 ±2.5 on the first, to 13.6 ±3.0, 15.1 ±2.2 on the second, and to 15.3 ±2.7, 15.6 ±1.9 on the third visit after oral and transdermal nitrates respectively. However, changes in the frequency of anginal episodes and exercise treadmill score were not different between two groups. Side effects of headache were observed in 7 of oral and 4 of transdermal nitrate group and skin irritation in 2 of transdermal group. **Conclusion** : Transdermal nitroglycerin is equally effective as oral nitroglycerin in the reduction of the frequency of angina attack and the improvement of exercise tolerance without significant side effects in patients with angina. (**Korean Circulation J 2000;30(1):66-71**)

**KEY WORDS** : Transdermal nitroglycerin · Angina · Headache.

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: , 501 - 757 1 8

: (062) 220 - 6243 · : (062) 228 - 7174

E - mail : myungho@chollian.net

서 론

가 가  
 가 ,<sup>1-3)</sup> ) 1 2 1  
 4-6) , 4 10 mg/12  
 , ,<sup>4)</sup> 4  
 nitrate ,  
<sup>4)7-9)</sup> Ni -  
 trate nitrate , ,  
 , , Nitrglycerin  
 24 nitroglycerin M Teichholz  
 first - pass metabolism<sup>10)</sup> ,<sup>26)</sup> ) - (5 × ST ) - (4 ×<sup>27)</sup>  
<sup>11-15)</sup> )  
<sup>16-18)</sup> 가 , ,  
 가<sup>19-24)</sup> ,  
 nitroglycerin 가 .  
 통 계

대상 및 방법

paired t - test  
 p value가 0.05  
 대 상  
 , Canadian Cardiovascular Society  
<sup>25)</sup> II III , 4  
 대상환자의 임상적 특징  
 12 가  
 20 , 가 9 11  
 56.3±4.6 , 20  
 가 8 , 12 53.9±9.8  
 ,  
 11 (55%),  
 방 법 12 (60%), 5 (25%),  
 2 (wash - 4 (20%)  
 out period) ,

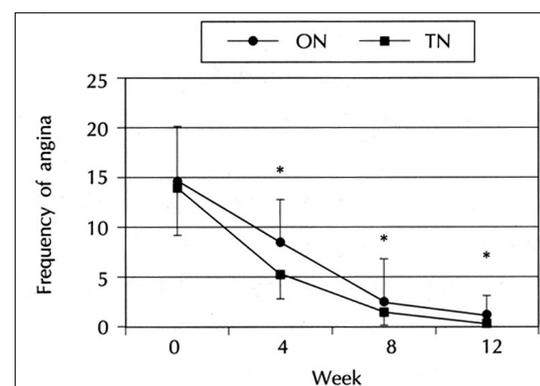
(Table 1).  
 ate  
 nitrate  
 통증의 횟수  
 2  
 4.5,  
 1.7  
 20  
 14.0 ± 4.9  
 5.4 ± 2.2,  
 0.3 ± 0.4  
 5 (25%)  
 mg  
 혈압 및 구혈율 변화

128.5 ± 8.8/81.5 ± 4.5 mmHg,  
 126.5 ± 5.2/79.5 ± 2.8 mmHg,  
 126 ± 7.4/79.5 ± 2.9 mmHg,  
 121 ± 4.5/78.2 ± 4.9 mmHg  
 126.0  
 ± 8.0/80 ± 8.0 mmHg,  
 123.5  
 ± 6.8/80 ± 2.0 mmHg,  
 125.0 ± 7.5/82.0  
 ± 4.6 mmHg,  
 126.0 ± 6.4/79.7 ± 1.9  
 mmHg  
 8.1 ±  
 1.2 ±  
 ( p<0.05).  
 63.8 ± 3.2%,  
 65.4 ± 2.7%,  
 66.4  
 ± 3.6%,  
 63.9 ± 2.3%  
 61.3 ± 9.3%,  
 63.6 ± 3.8%,  
 64.2 ± 3.8 %,  
 63.2 ± 4.1%  
 운동부하능력 변화  
 10.4 ±  
 4.3,  
 13.6 ± 3.0,  
 12.6 ± 4.0,  
 15.3 ± 2.7

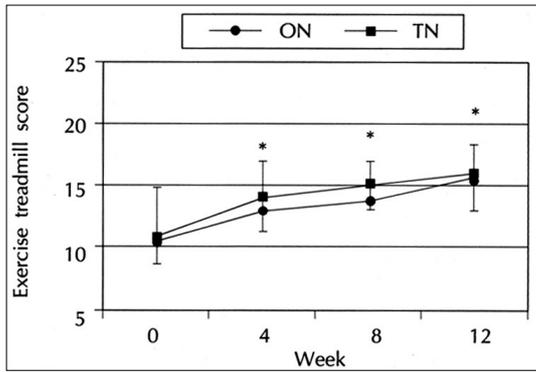
**Table 1.** Clinical characteristics of the patients

	Long acting oral nitrate (n = 20)	Transdermal Nitrate (n = 20)
Age (year)	56.3 ± 4.67	53.9 ± 9.80
Male (%)	45	40
Risk factors		
Hypertension (%)	45	45
Smoking (%)	15	10
Hyperlipidemia (%)	35	25
Diabetes (%)	10	20
Type of angina		
Effort (%)	50	45
Variant (%)	15	30
Mixed (%)	35	25
Concomitant angina drug		
Calcium antagonist (%)	55	60
Beta-antagonist (%)	25	20
Frequency of angina per two weeks	14.5 ± 6.0	13.6 ± 5.3

10.6 ± 2.3,  
 15.1 ± 2.2,  
 13.7 ± 2.5,  
 15.6 ± 1.91



**Fig. 1.** Frequency of angina decreased on oral nitrate (ON) and transdermal nitrate (TN) compared with baseline at 4, 8 and 12 weeks compared with baseline (\*p<0.05). However, there was no significant difference in the frequency of angina between ON and TN group.



**Fig. 2.** Exercise treadmill score increased on oral nitrate (ON) and transdermal nitrate (TN) compared with baseline at 4, 8 and 12 weeks compared with baseline (\* $p < 0.05$ ). However, there was no significant difference in the exercise treadmill score between ON and TN group.

(Fig. 2,  $p = 0.10$ ).

**부작용**

가 2 (5.9%)  
 가 2 (6%),  
 가 1 (3%)  
 가 4,  
 가 3,  
 가 7,  
 가 3,  
 가 1  
 (p=0.20).

**고 안**

Nitrate 가  
 Nitrate<sup>3)7)</sup>  
 가<sup>3)4)7-9)</sup>

nitrate 가 가  
 가 , nitrate  
 가 ,  
 Nitrate<sup>3)</sup> 가 가  
 prostacyclin  
 가  
 nitroglycerin 가  
 nitroglycerin<sup>10)17)18)</sup>, nitroglycerin  
 nitroglycerin<sup>1)8)12)</sup>  
 nitroglycerin  
 nitroglycerin  
 가<sup>8)12)</sup>  
 Sabino<sup>12)</sup> nitroglycerin 24  
 rin 20 mg 24  
 4 10  
 nitroglycerin 24  
 4  
 가  
 10  
 nitroglycerin  
 Stephen<sup>3)</sup>  
<sup>12)16)28)</sup>

nitrate 가 ,

, 2 14 .

대상 및 방법 :

diltiazem . 4 4

가 가 20 ( : 9, : 11 ; 56.3±4.6 )

20 ( : 8, : 12 ; 53.9±9.8 ) ,

nitroglycerin 2

가 가 ,<sup>12)29)30)</sup> 4 ,

nitroglycerin , ,

가 ,

nitroglycerin .

결 과 :

가 2 14.4±6.0

2 8.1±4.5,

가 3.0±3.5, 1.2±1.7

nitrate 가 2

14.0±4.9 2

nitrate 가 가 5.4±2.2,

1.7±1.4, 0.3±0.4

nitrates 50 mg, (p=0.07).

5 mg .

10.45±

35%, 20% 4.31, 12.63±4.03,

13.63±3.00, 15.36±2.76

nitrate 10.68±2.36, 13.77±

nitrate 2.55, 15.16±2.28,

가 15.68±1.91 .

3 가 가

nitroglycerin (p=0.10).

7 ,

4 , 2

요 약 ,

(p=0.20).

연구목적 : Nitroglycerin nitrate

nitroglycerin

가

가

중심 단어 :

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