

Leukotriene B₄ Thromboxane B₂가

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Effect of Leukotriene B₄ and Thromboxane B₂ on Lumbar Nerve Roots in Rat

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– Abstract –

Study Design : The motor impairment and sensory dysfunction were evaluated in twenty-eight rats after dropping of leukotriene B₄ and thromboxane B₂ on lumbar nerve roots.

Objectives : To evaluate the effects of inflammatory products on lumbar nerve roots of the rats without mechanical compression.

Materials and Methods : Twenty-eight Sprague-Dawley rats were evenly divided into four groups (7 rats in each group) according to the substances applied: In group I (sham operation), even dropping of normal saline on left 4th, 5th and 6th lumbar nerve roots: In group II, leukotriene B₄; In group III, thromboxane B₂; In group IV, leukotriene B₄ and thromboxane B₂. All rats were tested at 1st, 3rd, 5th, 7th, 10th and 14th postoperative day for motor impairment and sensory dysfunction to the heat.

Results : Hypersensitivity to the heat started to appear at 1st postoperative day in group IV and at 3rd day in groups II and III and was maximum at 5th day in group III and 7th day in groups II and IV compared with the control group. The histological study also showed moderate to marked necrosis of ganglion cells and infiltration of the inflammatory cells compared to the control group.

Conclusion : These results suggest that leukotriene B₄ and thromboxane B₂ produce inflammatory reactions in or around the nerve roots and lead to thermal hyperalgesia in rats without mechanical compression, therefore these results may apply to human lumbar nerve roots.

Key Words : Lumbar spine, Radiculopathy, Hyperalgesia, Leukotriene B₄ and Thromboxane B₂

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* 1998 가

B₄(0.1 μg) thromboxane B₂(10.0 μg)
 . Nygaard¹⁰⁾ ,
 leukotriene B₄ thromboxane B₂
 ,
 ,
 ,
 2.
 ,
 1, 3, 5, 7, 10, 14
 10-12,16,17)
 ,
 ,
 (1)
 16,17)
 4 (arbitrary rating
 scale)
 6).
 가.
 . 가
 가
 .
 .
 lipoxygenase leukotriene B₄
 cyclooxygenase thromboxane B₂
 (2)
 , 5 mm (plex-
 thermal iglass) 가 9 cm, 19 cm, 30 cm
 withdrawal latency(TWL)⁹⁾ ,
 TWL
 가 , 가 10
 , 4 cm 60 W 가
 15 mm 가
 . 0.1 3
 1.
 ,
 4
 300~450 g Sprague-
 3 2
 Dawley , 7 4⁶⁾ ,
 . TWL (Li - Lc)/Lc × 100
 1 kg Ketamine 10.0 mg, Rompun 0.15 ml ,
 (Li > Lc) (hypoalgesia) ,
 (Li < Lc) (hyperalgesia)
 Friedman-Pearson microrongeur (Li: TWL of ipsilateral side, Lc: TWL of
 contralateral side).
 4, 5, 6 , I
 4, 5, 6 5 μl 3.
 . II leukotriene B₄ 5 μl(0.1 μg) , III TWL 가 II IV
 thromboxane B₂ 5 μl(10.0 μg) , IV leukotriene 7 , III 5 , I 7

10%
hematoxylin & eosin
400

가
가

TWL
leukotriene B₄ thromboxane B₂
(Table 1).

II
가

III

4.

SAS(statistical analysis system)
repeated measure ANOVA
5%

3.

I (Fig. 1A)

가
, II (Fig. 1B)

가
. III (Fig. 1C)

가
, IV (Fig. 1D)

1.

I, II, III, IV

1, 3, 5, 7, 10, 14

leukotriene B₄ thromboxane B₂

4.

P I II 0.0003, I III
0.0144, I IV 0.0003, II
III 0.0003, II IV 0.0036, III IV
0.0003 0.05
가 . leukotriene B₄, thromboxane B₂
, leukotriene B₄ throboxane B₂

2.

I TWL 5.6, 1, 3, 5, 7, 10, 14
- 6.9, - 7.5, - 8.7, - 7.1, - 8.6, - 7.5
, II - 6.7, 1, 3, 5, 7, 10, 14
- 8.5, - 16.0, - 29.0, - 47.8, - 36.5, - 27.5,
III 4.5, 1, 3, 5, 7, 10, 14
- 7.6, - 13.5, - 21.6, - 14.1, - 12.0, - 11.0,
IV 3.2, 1, 3, 5, 7, 10, 14
- 15.8, - 23.5, - 32.5, - 68.9, - 43.0, - 31.7
. I
leukotriene B₄ II 3 7
, thromboxane B₂ III 3
5 , leukotriene B₄ thromboxane
B₂ IV 1 7

가
가

16). Ca-
vanaugh²⁾

Table 1. Thermal withdrawal latency(TWL)

| | Preop. | Postoperative days | | | | | |
|-----------|--------|--------------------|--------|--------|--------|---------|---------|
| | | 1 day | 3 days | 5 days | 7 days | 10 days | 14 days |
| Group I | 5.6 | -6.9 | -7.5 | -8.7 | -7.1 | -8.6 | -7.5 |
| Group II | -6.7 | -8.5 | -16.0* | -29.0* | -47.8* | -36.5* | -27.5* |
| Group III | 4.5 | -7.6 | -13.5* | -21.6* | -14.1* | -12.0 | -11.0 |
| Group IV | 3.2 | -15.8* | -23.5* | -32.5* | -68.9* | -43.0* | -31.7* |

*P<0.05, compared with the control group(repeated measure ANOVA)

¹³⁾. leukotriene leukotriene C₄,
 leukotriene D₄, leukotriene E₄
 leukotriene B₄
¹³⁾. leukotriene B₄
 가
 , thromboxane B₂
⁹⁾ leukotriene nociceptor
 .
 phospholipase A₂
 leukotriene , cyclooxygenase
 inhibitor indomethacin leukotriene B₄
 triene
¹⁰⁾ leukotriene B₄ thromboxane B₂가
 .
 leukotriene B₄ thromboxane B₂
 ,
 ,
^{10,14,15)}. Kim Chung⁷⁾
 ,
 Kawakami ⁶⁾ chronic gut
 가
 leukotriene B₄ thromboxane
 B₂
 , thermal withdrawal latency
 가
 leukotriene B₄ II I
 3 7 , leukotriene B₄ thromboxane B₂
 thromboxane B₂ III 3
 5 , leukotriene B₄ thromboxane B₂

IV 1 7
 (Table 1), leukotriene B₄ thromboxane B₂가
 (Fig. 1) . , IV
 II III
 ,
¹³⁾. Levine leukotriene B₄ thromboxane B₂
 , leukotriene
 B₄ thromboxane B₂
 3 III II
 leukotriene B₄가 thromboxane B₂
 .
 가
 , II IV III
 (Fig. 1)
 . leukotriene lipoxigenase
 hydroperoxyeicosatetraenoic acid(HPETE)가 leukotriene A₄
 leukotriene B₄ leukotriene C₄
 , leukotriene D₄ leukotriene E₄가¹³⁾.
 leukotriene C₄, D₄,
 E₄ , leukotriene B₄
 , 3
 7
 thromboxane B₂ . cyclooxyge-
 nase thromboxane B₂
 가 leukotriene B₄
¹²⁾. leukotriene B₄
 thromboxane B₂
 가
 leukotriene B₄
 7 .
 leukotriene B₄ thromboxane B₂
 ,
 (P<0.05, repeated measure
 ANOVA).

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: leukotriene B₄ thromboxane B₂가
 가
 :
 , leukotriene B₄ thromboxane B₂
 : Sprague-Dawley 28 7 4 4, 5, 6
 I , II leukotriene B₄ , III thromboxane B₂ , IV leukotriene B₄
 thromboxane B₂
 1, 3, 5, 7, 10, 14
 : IV 1 , II, III 3 III 5
 , II, IV 7
 , IV 가 가
 : ,

: , , , Leukotriene B₄ Thromboxane B₂

:

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가

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