

다발성 요추간반 탈출증에서의 컴퓨터 적외선 전신 체열 촬영의 진단적 가치*

조용은 · 김영수 · 장호열

= Abstract =

Clinical Efficacy of Digital Infrared Thermographic Imaging in Multiple Lumbar Disc Herniations

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Localization of the specific symptomatic level in multiple lumbar disc herniations is very important in the decision of surgical levels and operative method and is also one of the rate limiting factor for the successful postoperative results. Until now pain provocation test with discography is known as the unique functional and physiological method to localize the symptomatic level of disc herniation. But it is an invasive study and there is still an ongoing argument about discography for their diagnostic accuracy and specificity. Digital infrared thermographic imaging technique is a non-invasive technique to detect the discogenic pain with high accuracy. Authors evaluated the diagnostic efficacy of digital infrared thermographic imaging in 202 cases of multiple lumbar disc herniations by analysis of symptom correlation and the accuracy with operative findings. And also the correlation of digital infrared thermographic imaging technique with discography was analyzed.

The digital infrared thermographic imaging technique showed high sensitivity(86.4%) to the clinical symptom and good correlation with the operative findings. It also revealed high correlation rate(81.4%) with discography. As a conclusion, digital infrared thermographic imaging technique is a highly effective diagnostic tool in the localization of the symptomatic level in multiple disc herniations.

KEY WORDS : Multiple disc herniation · Discography · Digital infrared thermographic imaging.

서 론

가 가

가

가 가

가 ,

가 가 .

Table 1. Age and sex distribution

Age	Male	Female
10 - 19	4	0
20 - 29	13	4
30 - 39	24	17
40 - 49	22	31
50 - 59	21	40
60 - 69	7	13
70 - 79	1	1

Table 2. Radiologic disease classification

Diseases	No. of cases	%
Multiple disc herniation	139	68.8
Recurrent disc herniation with other discopathy	20	9.9
FBSS with other discopathy	18	8.9
Degenerative spondylolisthesis with other discopathy	14	6.9
Spondylolysis with other discopathy	11	5.4
Total	202	100.0

(DITI)

DITI 가

대상 및 방법

1. 환자군

1996 1 1997 3

2

202

92 ,

110

1 : 1.2

, 18

73

51.2

(Table 1).

3. 추간반 조영술

139 (68.8%) 가 ,

가 20 (9.9%), 1

Failed Back Surgery Syndrome

18 (8.9%),

14 (6.9%),

가 11 (5.4%)

(Table 2).

DITI

2. DITI 촬영

DITI

21

가

가 19

(Dorex Inc. U.S.A.)

1

, 202 557

2.8

L4/5가 195 가

, L5/S1 171 , L3/4 143 , L2/3 41 , L1/2 7

. Fluoroscopy

가

4

(Table 3). 1

, 2

가

3

, 4

Table 3. Grouping of discographic pain

Group	Discographic pain
	No pain or mild localized pain on injection site
	Different diffuse pain, poorly localized
	Similar pain without radicular pain
	Same pain with same radicular pain

결 과

1. DITI 검사 의 양상별 분류

9) (radicular type) DITI (Uni-lateral single radiculopathy) 가 155 (76.7%) 가 , 2 (Unilateral multiple radiculopathy) 5 (2.5%), (Bilateral lower lumbar radiculopathy) 19 (9.4%) , DITI 가 23 11.4% (Table 4). 155 3 (13.0%), 4 (17.4%) 5 86 (55.5%) 가 , 1 (39 , 25.2%) , 4 (21 , 13.5%), 3 (5 , 3.2%), 2 (4 , 2.6%) .

2. DITI와 임상 소견과의 관계

202 DITI (hyper-thermia) (hypothermia) 179 88.6% (sensitivity) . DITI 155 69.7% 108 , 134 96.4% 5 13 (7.3%) . 5 5 4 , 4 , 1 , 19 16 (84.2%), 3 (15.8%) 16 (84.2%) 23 19 (82.6%) 가 ,

Table 4. Patterns of digital infrared thermographic imaging

Patterns	No. of cases	%
Unilateral single radiculopathy	155	76.7
Unilateral multiple radiculopathy	5	2.5
Bilateral lower lumbar radiculopathy	19	9.4
Nonspecific	23	11.4
Total	202	100.0

Table 5. DITI^{†††} patterns and disease classification in operated 177 cases

	USR*	UMR**	BLLR***	Nonspecific
Multiple HLD [†]	121	1	2	0
Recurrent HLD [†]	12	1	2	5
FBSS ^{††}	3	0	5	8
Deg. spondylolisthesis	1	1	6	6
Deg. stenosis	2	1	0	0
Total	139	4	15	19

* : Unilateral Single Radiculopathy
 ** : Unilateral Multiple Radiculopathy
 *** : Bilateral Lower Lumbar Radiculopathy
 † : Herniated Lumbar Disc
 †† : Failed Back Surgery Syndrome
 ††† : Digital Infrared Thermographic Imaging

3. DITI와 수술 소견과의 관계

202 177 DITI (Table 5). 155 139 , 121 , 12 , Failed Back Surgery Syndrome 3 , 가 1 , 2 . DITI 가 134 96.4% 5 5 4 , 1 , Failed Back Surgery Syndrome 1 , 1 . 19 15

2 , Failed Back Surgery Syndrome 5 , 6 .
 . DITI
 23 19
 5 , Failed Back Surgery Syndrome 8 , 6 .
 177 153
 DITI
 86.4% .

4. 추간반 조영술과 임상 소견과의 관계

202 557
 ,
 가 237 가 , 131
 . 96 , 93
 .
 202
 139
 105
 IV 75.5%
 177
 135 (76.3%)
 .
 124 103 (83.1%),
 20 18 (90%)
 Failed Back Surgery Syndrome, ,
 62.5%, 21.4% 33.3%
 (Table 6).

5. DITI와 추간반 조영술과의 관계

177 DITI
 , DITI
 가 132 (74.6%) DITI
 가 26 (14.7%) . DITI
 , 가 7
 (3.9%), 가 12 (6.8%) .
 . 1948

Table 6. Pain provocation rate by discography in operated 177 cases

Disease	Total	Provoked case	Provocation rate
Multiple HLD*	124	103	83.1%
Recurrent HLD*	20	18	90.0%
FBSS**	16	10	62.5%
Deg. spondylolisthesis	14	3	21.4%
Deg. stenosis	3	1	33.3%
Total	177	135	76.3%

* : Herniated Lumbar Disc

** : Failed Back Surgery Syndrome

Table 7. Correlation of DITI* with discography in operated patients

	DITI	
	Specific pattern	Nonspecific pattern
Pain provocation in discography	132	7
No pain provocation in discography	26	12

* : Digital Infrared Thermographic Imaging

DITI 81.4%
 (Table 7).

고 찰

가

가
 X - , ,

가

가 가

가

가

Lindblom¹²⁾ sensor

가 . 가

Holt 23%

(false positive) 37%⁴⁾ 가 . 가

가 . 가

가 DITI

(antidromic stimulation)

(recurrent meningeal nerve, sin-
uvertebral nerve)⁷⁾⁸⁾⁹⁾¹⁴⁾

135 (76.2%) Holt . Pochaz -
evsky Wexler

177³⁾ .¹⁴⁾ Mills¹³⁾ Uem -
atsu¹⁵⁾ 가 가

16)¹⁶⁾ . 1987

가 가 가 50

가 가 가 가

7)8)⁷⁾⁸⁾ (Thermatome)

1956 , DITI , 89.5%,

Lawson¹⁰⁾ 78.8%

가

가 가⁹⁾ .

DITI

0.1 가 , 4가 .

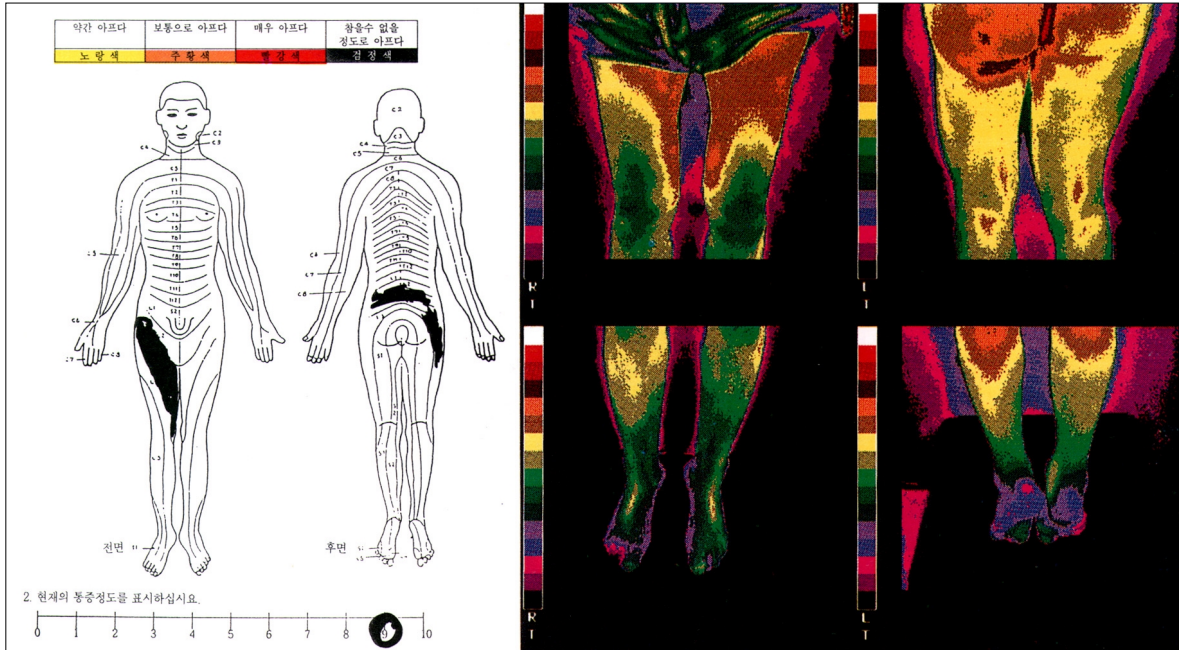


Fig. 2. Preoperative pain drawing and DITI. Pain was located on right anterior thigh on patient's drawing(Left). DITI revealed severe hypothermic on right anterior thigh same as pain drawing(right).

DITI		Failed Back Surgery Syndrome	
DITI (hypothermic area)	177	가 가	177
	81.4%		
19			
DITI	DITI		
86.4%	가		
결 론			
DITI	DITI	DITI	DITI
177	135	1)	(DITI)
76.3%	가 가		88.6%
90%			86.4%
		2)	
		76.3%	
	83.1%	가 가	

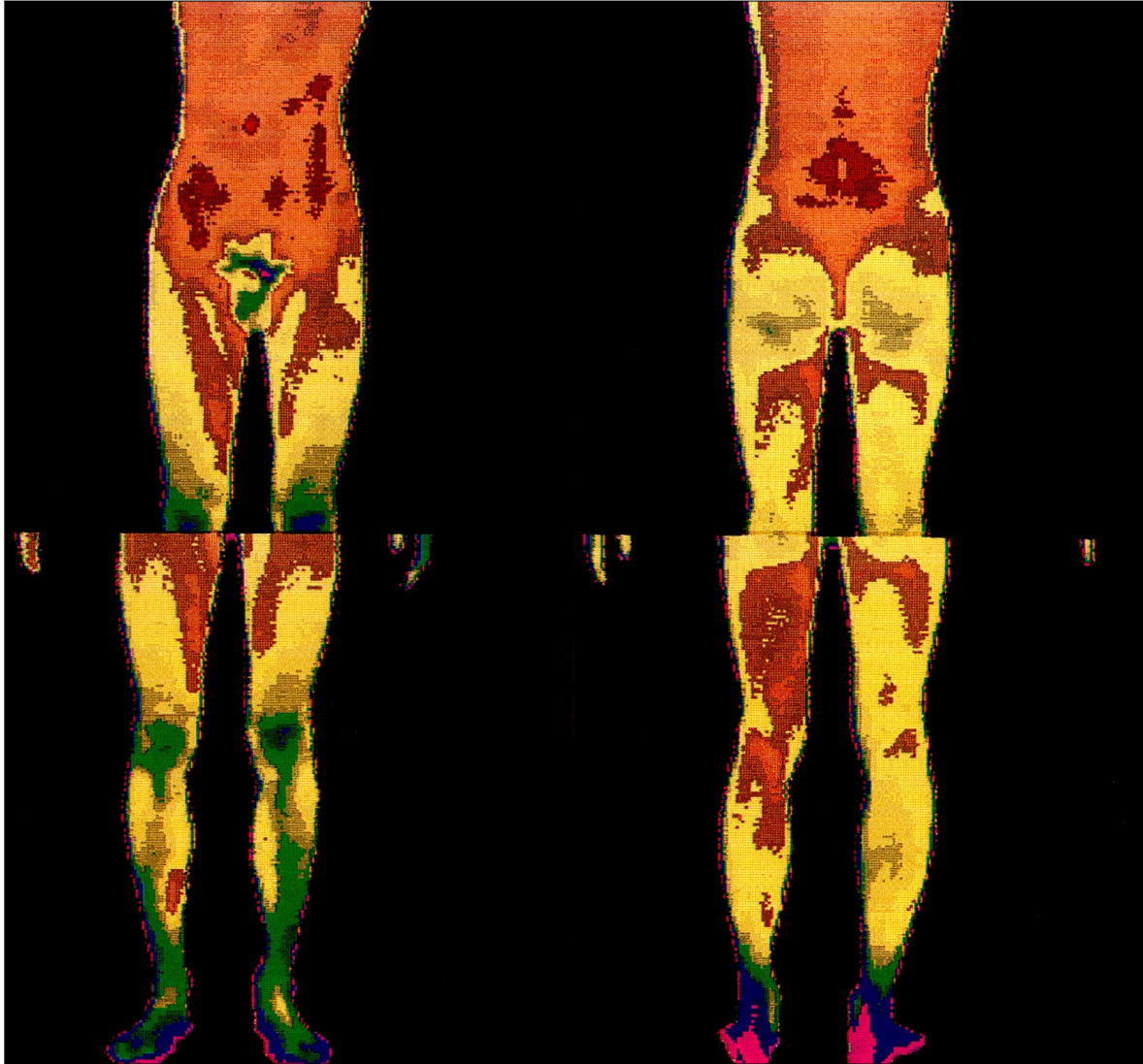


Fig. 3. Postoperative DIT1. After chemonucleolysis on L2/3 only, the severe hypothermic was markedly improved on right anterior thigh.

3) 81.4%

4) .

- : 1997 11 26
- : 1997 12 15
- :

: 02) 3497 - 3393, : 02) 3461 - 9229

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