

## 다발성 요추간반 탈출증에서 추간반조영술의 진단적 의의

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= Abstract =

### Diagnostic Significance of Discography on Multiple Lumbar Disc Herniation

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**Objective :** The introduction of MRI makes it easy to detect multiple lumbar disc herniation. However, MRI is not a physiologic test for detecting the symptomatic level. For the surgical plan, it is very important to determine the symptomatic level among the multiple lumbar disc herniation. In this regard, we studied diagnostic significance of discography on multiple lumbar disc herniation in determining the symptomatic level.

**Method and Material :** We retrospectively analyzed the discographic and clinical findings of 121 patients with multiple lumbar disc herniation for investigating the diagnostic availability of discography. All were surgically treated from January 1995 through May 1998.

**Result :** Discography provoked the same pain as usual symptom in 99 out of 121 patients(81.8%). Compared with surgical findings, the diagnostic accuracy of the discography in multiple lumbar disc herniation was 75.6%, sensitivity was 64.6%, and specificity 87.2%. There was no correlation between the pain provocation of discography and the extent of annular degeneration on CT/discogram. The pain provocation showed good correlation with the extent of annular disruption on CT/discogram. The rate of same result(correlation rate) between the discography and D.I.T.I was 81.4% in multiple lumbar disc herniation patients with unilateral leg pain.

**Conclusion :** These results indicate that in multiple lumbar disc herniation, the discography is considered useful diagnostic tool to determine the symptomatic level and to decide the surgical plan.

**KEY WORDS :** Multiple herniated lumbar disc · Discography · CT/discogram · D.I.T.I.

## 서 론

CT scan, MRI  
EMG, Discography, Digital Infrared Thermo-  
graphic Image(D.I.T.I.)

MRI

가

MRI

가

9)23)27)

CT/discography

axial CT scan

discography

3. 통증 유발 양상의 분류

MRI

25~40%

4).

MRI

가

2

3

가

4. 통계 분석

(accuracy), (sensitivity),  
(spesiticity) . CT/discogram

2

Chi - square test

1) 추간반 조영술의 정확도, 민감도 및 특이도

CT/discogram

121

95.9%

가

가

재료 및 방법

1. 연구 대상

1995 1 1998 5  
2

( 3 )

( 1, 2 )

가

3

121

1, 2

(Table 1).

2. 추간반 조영술의 방법

2% lidocaine

uroscopy

18G

C - arm

1.5

2cc

(conray)

1

CT/

**Table 1.** Correlation of discometry and symptomatic level (operated level)

	Operated level	Non-operated level
Pain provocation( + )	a*	b**
Pain provocation( - )	c***	d****

\*a = 106 levels

\*\*b = 20 levels

\*\*\*c = 58 levels

\*\*\*\*d = 136 levels

Prevalence of symptomatic level = (a + c)/(a + b + c + d)

Sensitivity of discometry = a/(a + c)

Specificity of discometry = d/(b + d)

Accuracy of discometry = (a + d)/(a + b + c + d)

Overall error of discometry = (c + b)/(a + b + c + d)

Positive predictive value = a/(a + b)

Negative predictive value = d/(c + d)

False positive rate = b/(a + b)

False negative rate = c/(c + d)

2) 통증유발양상과 CT/Discogram의 비교  
 CT/Dis - 71 58.7%  
 cogram . CT/discogram (Table 4). 2.6  
 (annulus fibrosus) 320  
 Dallas discogram scale (Table 2). 1 97 30.3%

3) 통증유발양상과 적외선 체열 촬영(D.I.T.I.)의 비교  
 2 97 30.3%  
 3 126 39.4% (Table 5).  
 59

3. 추간반조영술의 정확도, 민감도, 및 특이도

가

결 과

가

Table 1

1. 환자의 일반적 특성  
 121 가 49 (40.5%), 가 72  
 (59.5%) 1 : 1.5 . 13  
 72 , 45 ± 2.5  
 , 50 가 43 가 . 121  
 164 , 49 (40.5%)  
 , 72 (59.5%)  
 . 1.36  
 (Table 3). 6  
 95.9%

Prevalence of symptomatic level = 51.25%  
 Sensitivity of discometry = 64.63%  
 Specificity of discometry = 87.18%  
 Accuracy of discometry = 75.63%  
 Overall error of discometry = 24.38%  
 Positive predictive value = 84.13%  
 Negative predictive value = 70.10%  
 False positive rate = 29.90%  
 False negative rate = 15.87%

2. 추간반 조영술 부위와 통증 유발 양상의 분류  
 121 320  
 , 2 가 50 (41.3%), 3 가 54  
 (44.6%), 4 가 15 (12.4%), 5 가 2  
 (1.7%) . 121 3

4. 통증유발양상과 CT/Discogram의 비교  
 1) 통증유발양상과 섬유륜의 퇴행정도 비교  
 CT/discogram

**Table 2.** Dallas discogram scale<sup>21)</sup>

Degeneration(GD)	Annular disruption(AD)
0 ... No change	0 ... None
1 ... Local (<10%)	1 ... Into inner annulus
2 ... Partial (<50%)	2 ... Into outer annulus
3 ... Total (>50%)	3 ... Beyond outer layer

**Table 4.** Discogram levels

No. of levels	No. of patients(%)
2	50 ( 41.3)
3	54 ( 44.6)
4	15 ( 12.4)
5	2 ( 1.7)
Total	121 (100.0)

**Table 3.** Patient demographics

Characteristics	
Age distribution	13 - 72 years old
Mean age	45.3 ± 2.5 years old
M : F	49 : 72 = 1 : 1.5
Simple discectomy	49 cases (61 levels)
PLIF*	72 cases (101 levels)
Total operated levels	164 levels
Mean operated levels	1.36 levels

**Table 5.** Classification of discographic pain

Pain group	No. of levels(%)
Group 1*	97 ( 30.3)
Group 2**	97 ( 30.3)
Group 3***	126 ( 39.4)
Total	320 (100.0)

\*Posterior Lumbar Interbody Fusion

\*Group 1 : patients without provocation of pain on discography  
 \*\*Group 2 : patients with provocation of dissimilar pain on discography  
 \*\*\*Group 3 : patients with provocation of same pain on discography

**Table 4.** Discometry and general degeneration of annulus by dallas discogram scale

	GD-0(%)*	GD-1(%)**	GD-2(%)***	GD-3(%)****	Total(%)
Group 1	5(8.9)	7(12.5)	21(37.5)	23(41.1)	56(100)
Group 2	2(3.0)	9(13.6)	18(32.1)	37(56.1)	66(100)
Group 3	0(0.0)	12(14.1)	24(28.2)	49(57.6)	85(100)

\*GD-0 : no change

\*\*GD-1 : local degeneration, <10%

\*\*\*GD-2 : partial degeneration, <50%

\*\*\*\*GD-3 : total degeneration, >50%

**Table 7.** Discometry and annular disruption by Dallas Discogram Scale

	AD-0(%)*	AD-1(%)**	AD-2(%)***	AD-3(%)****	Total(%)
Group 1	4(7.1)	4(7.1)	35(62.5)	13(23.2)	56(100)
Group 2	1(1.5)	2(3.0)	34(51.6)	29(43.9)	66(100)
Group 3	0(0.0)	0(0.0)	17(20.0)	68(80.0)	85(100)

\*AD-0 : none

\*\*AD-1 : annular disruption into inner annulus

\*\*\*AD-2 : annular disruption into outer annulus

\*\*\*\*AD-3 : annular disruption beyond outer annulus.

**Table 8.** Correlation of discometry and D.I.T.I.

	D.I.T.I.*	
	Positive	Negative
Cases with group 3	41	7
Cases without group 3	4	7

\*D.I.T.I. : Digital Infrared Thermographic Image

Correlation rate : ( 41 + 7 ) / 59 × 100 = 81.4%

가 (p>0.05)( Table 6).

2) 통증유발양상과 섬유륜의 파열정도 비교

가 (p<0.05)( Table 7).

5. 통증유발양상과 적외선 체열 촬영(D.I.T.I.)의 비교

121 59

가 0.5 ( T>0.5 ).

81.4% ( Table 8).

고 찰

1) 320

가 1 97 30.3%,

60~90%

2 97 30.3%,  
 3 126 39.4% (Table 4).  
 121 99  
 ( 3 )  
 164  
 가  
 7), Hudgins 83%,  
 78% ,  
 92% 26) 가  
 가 ,  
 22),  
 가 8), 가 22),  
 CT/discogram  
 2)13)  
 25),  
 5),  
 21) Maezawa  
 20)  
 79  
 , 207 CT/discog -  
 가 ram  
 320  
 Dallas Discogram scale<sup>21)</sup>  
 Maezawa  
 가 ,  
 가  
 75.6% 142  
 164  
 ( 3 ) 106  
 64.6% , 156  
 1, 2 136 87.21% 가  
 (Table 8).  
 84.1% 1, 2 가 ,  
 29.9% , CT/discogram  
 ( 3 ) 가 가  
 15.9% 가 가  
 가  
 22  
 가 15),  
 가  
 81.4%

가  
( X- , , )  
가  
결 론  
2  
121  
1) 121  
99 (81.8%)  
2) 75.6%, 64.6%, 87.2%  
3) 가 ,  
4) 가  
5) 가  
6) 가  
81.4%

- : 1999 7 6
- : 1999 8 13
- :

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