## -Original-

# Surgical Results of Lumbar Disc Herniation in the Elderly

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## Abstract

We investigated the surgical results of lumbar disc herniation in the elderly. Ten elderly patients underwent surgical treatment between 1990 and 1999. There were 7 males and 3 females with a mean age of 68.2 years (range:  $60 \sim 85$  years) . Thirteen patients in their 20 s and 30 s were used as a control. Preoperatively, severe leg pain and gait disturbance, and higher rates of negative straight leg-raising were shown in the elderly group. Higher levels of herniation and higher graded disc degeneration were shown compared with the young. The mean total of the Japanese Orthopedic Association score in the elderly group improved from 5.1 points to 13.1 points postoperatively, and that in the young group improved from 6.9 points to 14.5 points. The recovery rate was 82.6% in the elderly group and 94.3% in the young group. Postoperatively, the recovery of gait disturbance in the elderly group tended to be poor compared with the young group. The elderly patients would not tolerate bed rest and would often do poorly if kept recumbent and in pain for long periods of time. Satisfactory results are being sought with regard to the operative management of lumbar disc herniation in the elderly. (J Nippon Med Sch 2001; 68: 50—53)

Key words: clinical results, lumbar disc herniation, the elderly

### Introduction

It is well known that lumbar disc herniation commonly occurs in young adults, but rarely in the elderly aged more than 60. The reasons for this are that the majority of cases of disc herniation in the elderly are associated with spinal canal stenosis or spondylolisthesis, and therefore pure disc herniation is uncommon. It has been reported that there are some differences in the clinical features of disc herniation between the young and the elderly. Despite severe leg pain and gait disturbance, straight leg raising (SLR) tests<sup>1</sup> are often negative. Conservative treatments are effective for most young patients. In contrast, the elderly patients often need surgical management because of the failure of conservative treatments. Nowadays, with increased social activity among the elderly, surgical treatment for elderly patients is showing increasing tend. The aim of this study is to report the clinical features, imaging findings and postoperative results in elderly patients with lumbar disc herniation.

#### **Materials and Methods**

Between 1990 and 1999, we performed surgery on 10 patients with lumbar disc herniation by Love's method. The age at the time of surgery ranged from 60 to 85 years with a mean age of 68.2 years (7 males and 3 females). The mean interval between the last attack of disc herniation and surgery was 2.1 months (range; from 0.75 to 4 months). Patients suspected of spinal canal stenosis or spondylolisthesis were excluded from the present study. Thirteen patients in

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their 20 s $\sim$  30 s who had surgical treatment by Love's method between 1995 and 1997 were used as a control. There were 7 such males and 6 females with a mean age of 29.3 years. The mean interval between the last attack and surgery was 2.8 months (range; from 1 to 4 months).

Clinical results were evaluated by the Japanese Orthopedic Association's scoring system (JOA score) including subjective evaluations [low back pain (LBP) (3 pts), leg pain (3 pts) and gait disturbance (3 pts)], and objective evaluations [straight leg raising (SLR) test (2 pts), sensory disturbance (2 pts), motor disturbance (2 pts) and urinary bladder function (UBF) (-6 pts)]. The recovery rate of JOA score was evaluated by the following equation:

The recovery rate=

postoperative score – preoperative score × 100

full marks (15 points) – preoperative score Disc height and sclerotic changes in the end-plate in the lumbar spine were evaluated by X-ray, and the disc degenerations on MRI were rated from grade 0 (normal) to grade IV by Gibson's method<sup>2</sup>. The type of herniation was classified into 4 types by Macnab's method: protrusion, subligamentous extrusion, transligamentous extrusion and sequestration.

The data were statistically analyzed by t-test, and p<0.05 was accepted as the minimum of significance. All statistical analysis of data was executed using an SPSS computer package.

## Results

In the elderly group, the mean total JOA score improved from 5.1 points to 13.1 points postoperatively, with a recovery rate of 82.6%. In the young group, the mean score improved from 6.9 points to 14.5 points with a recovery rate of 94.3%. Successful results were obtained in both groups, but the recovery rate in the elderly group tended to be lower than in the young group. Comparing each category of JOA scores between the 2 groups preoperatively, the elderly group had lower scores in leg pain and gait disturbance compared with the young group. The rate of negative SLR tests was higher in the elderly group (50%) than in the young group (7.7%) (**Table 1**). Postoperatively, the recovery of gait disturbance in the elderly group tended to be poor compared with the young group.

The levels of disc herniation in the elderly group were L 2/3 in 2 patients, L 3/4 in 2, L 4/5 in 4 and L 5/ S 1 in 2. Those in the young group were L 4/5 in 7 patients and L 5/S 1 in 6 patients. Disc herniation in the elderly tended to occur at higher levels compared with the young (**Table 2**). Regarding the type of herniation, in the elderly group, subligamentous extrusion was found in 3 patients, transligamentous extrusion in 4 and sequestration in 3. In the young group, subligamentous extrusion was noted in 8, transligamentous extrusion in 3 and sequestration in 2. No pro-

Table 1 Each item in the Japanese Orthopedic Association's score

pre-operative score (pts)										
	LBP	leg pain *	gait *	SLR *	sensation *	MMT	UBF	total		
Elderly(N = 10)	$1.3 \pm 0.9$	$0.5 \pm 0.5$	$0.2 \pm 0.4$	$1.3 \pm 0.8$	$0.9 \pm 0.3$	$0.9 \pm 0.6$	$0 \pm 0$	$5.1 \pm 2.2$		
Young $(N = 13)$	$1.4 \pm 0.8$	$1.1~\pm~0.5$	$1.5~\pm~1.0$	$0.6~\pm~0.7$	$1.3~\pm~0.5$	$1.2~\pm~0.6$	$-0.2 \pm 0.8$	$6.9~\pm~3.0$		
post-operative score (pts)										
	LBP	leg pain	gait *	SLR	sensation	MMT	UBF	total *		
Elderly(N = 10)	$2.8 \pm 0.4$	$2.6 \pm 0.5$	$2.5 \pm 0.7$	$2.0 \pm 0$	$1.6 \pm 0.5$	$1.6 \pm 0.5$	$0 \pm 0$	13.1 ± 1.9		
Young $(N = 13)$	$2.9 \pm 0.3$	$2.9~\pm~0.3$	$3.0 \pm 0$	$2.0 \pm 0$	$1.8~\pm~0.4$	$1.9~\pm~0.4$	$0 \pm 0$	$14.5~\pm~0.9$		
								* p < 0.05		

Table 2 Level of disc herniation

	L2/3	L3/4	L4/5	L5/S1
Elderly(N = 10)	2	2	4	2
Young $(N = 13)$	0	0	7	6

Table 3 Grade of disc degeneration with MRI

	0	Ι	П	Ш	IV
Elderly(N = 10)	0	1	2	6	1
Young $(N = 13)$	0	4	8	1	0

trusions were found in either group.

With regard to the degree of disc degeneration, the mean disc height was  $6.3 \pm 2.6$  mm in the elderly group and  $7.9 \pm 1.6$  mm in the young group with no significant difference. Sclerotic change in the endplate was shown in 60% of the elderly group, but in none of the young group. As for the disc degeneration on MRI, severe degeneration with grade III or IV was found in 70% of the elderly group and in 7.7% of the young group (**Table 3**).

#### Discussion

The rate of elderly patients in the entire population of disc herniation patients undergoing surgical treatment was reported to be 0.7% in 1962 (Matuda et al.<sup>3</sup>), 3.7% in 1984 (Nakahara et al.<sup>4</sup>) and 7.4% in 1995 (Inatomi et al.<sup>5</sup>), showing that the rate for elderly patients has increased in recent years. In our clinic, the rate was 2.3% in 1990 ~ 1994, and 11% in 1995 ~ 1999. Many factors are related to the incidence of disc herniation. The current tendency of long life spans, high social activity and the desire for a high quality of life may be significant in the increased rate of surgery in the elderly.

It has been reported that elderly patients with disc herniation frequently show negative in SLR tests. The rate of negative SLR tests has been reported to be 30  $\sim 60\%^{67}$ . Also in our study, the rate of negative results among the elderly (50%) was markedly higher than among the young (7.7%). As reasons for this, many authors have pointed out the loosening of nerve roots due to the narrowing of the discs with aging and the loosening of the sciatic nerve due to the shortening of limbs. Yoshida et al.<sup>8</sup> noted that negative SLR tests were frequently found in elderly female patients, and that this might be related to the greater physiological mobility of the hip in females.

In our results, disc herniation in the elderly was clinically characterized by a high rate of negative SLR tests as well as severe leg pain and a high incidence of upper level herniation. Murphy et al.<sup>9</sup> pointed out that chronic fibrosis of the roots due to local circulation disturbance with aging may account for the severe leg pain. In general, age-related changes in the disc begin in the lower level of the lumbar spine, indicating a



Fig. 1 Histological findings of a herniated mass in a 76-year-old male. Histology shows degenerated cartilage cells in the annulus fibrousus with an osseous end-plate. (HE, × 40).

high incidence of lower levels of disc herniation in the young population. With the advance in degenerative changes, the motion of the lower lumbar spine decreases. This leads to relatively increased motion in the upper levels of the lumbar spine, and ultimately results in the development of upper levels of disc herniation.

Yasuma et al.<sup>10</sup> classified lumbar disc herniation histologically into 2 types as a nucleus pulposus type and an annulus fibrosus type. The mechanism of herniation in the former type is that a nucleus pulposus with high elastic property herniates through the ruptured legions of the annulus fibrosus. This type commonly occurs in the young population. With respect to the latter type, which is often observed in the elderly, degenerated or ruptured annulus fibrosus herniates directly as a mass with occasional accompaniment of the end-plate.

In this study, most histologic specimens of herniated mass were composed of the annulus fibrousus with an osseous end-plate (**Fig. 1**). Generally, the symptoms of disc herniation are relieved with conservative treatment in young patients. Some authors have found spontaneous absorption of the herniated mass. However the osseous end-plate is difficult to absorb compared with the nucleus pulposus<sup>11</sup>. Thus, elderly patients do not respond to conservative treatments, and often require surgical intervention.

In summary, elderly patients can not tolerate bed rest and often do poorly if kept recumbent and in pain for long periods of time. Satisfactory results<sup>12,13</sup> are beJ Nippon Med Sch 2001; 68(1)

ing sought with regard to the operative management of lumbar disc herniation in the elderly.

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