## The Essence of Clinical Practice Guidelines for Lumbar Disc Herniation, 2021: 1. Epidemiology and Natural Course

Yasuhiro Shiga

Department of Orthopaedic Surgery, Center for Advanced Joint Function and Reconstructive Spine Surgery, Graduate School of Medicine, Chiba University, Chiba, Japan

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## **Epidemiology of Lumbar Disc Herniation**

## Summary

- The prevalence of lumbar disc herniation is approximately 1%.
- The most common affected levels are L4/5 and L5/S.
- The surgical treatment is slightly more common among patients in their 20s-40s and among men.

## **Commentary**

## The prevalence of lumbar disc herniation

The lumbar disc herniation was found in 0.6% of 39,673 19-year-old South Korean men who were examined for military service, of which 44.3% and 55.7% were accounted for by single-level herniation and multilevel herniation, respectively<sup>1)</sup>. A study in Taiwan has reported a prevalence rate of  $1.5\%-2\%^{2}$ , and a study in the United States has estimated that lumbar disc herniation affects approximately 1% of the population, 2.8 million people annually<sup>3)</sup>.

## The most common affected levels

The affected intervertebral disc was L5/S in 40.8% of cases, L4/5 in 50.6%, L3/4 in 6.4%, L2/3 in 1.8%, and L1/2 in 0.4%; herniation at L4/5 and L5/S accounted for the vast

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majority of cases in 19-year-old South Korean men<sup>1</sup>).

The affected disc was L4/5 in 50.4% and L5/S in 34.7%, and two levels of L4/5 and L5/S were affected in 10.7% of Chinese young patients aged 13-20 years; the data indicate that most young patients had lower lumbar disc herniation<sup>4)</sup>.

In a study in the United Kingdom, 97% of young patients aged 25-45 years had herniation at L4/5 or L5/S. Meanwhile, in patients aged  $\geq$ 65 years, only 40% were herniation of the L4/5 or L5/S disc, and more than half had upper levels of lumbar disc herniation. The mean patient ages in cases of herniation at L2/3, L3/4, L4/5, and L5/S were 59.6, 59.5, 49.5, and 44.1 years, showing that lumbar disc herniation at upper levels than L4/5 increased with age<sup>5</sup>.

A narrative review of pediatric lumbar disc herniation has reported that pediatric lumbar disc herniation is rare, accounting for 0.4%-15.4% of all hernia cases<sup>6</sup>.

## Natural Course of Lumbar Disc Herniation (Regression/Resorption, Type, Imaging Findings, Surgery Rate, and Relationship with Sports)

## Summary

- Regression on imaging is found in ≥60% of symptomatic cases of lumbar disc herniation.
- Sequestration and extrusion types of herniation are prone to resorption.
- Hernias imaged in a ring shape on contrast-enhanced MRI are prone to resorption.
- The time when resorption starts is unknown; however, resorption within 3 months is not rare.

- Surgery is required at varying rates depending on symptoms and morphological types of herniation.
- The proportion of patients who underwent conservative treatment and require surgical treatment later ranges widely from 20% to 50% and is related, to some extent, to the intensity of preoperative symptoms.
- No clear relationships between lumbar disc herniation and sports have been shown thus far, and we cannot determine whether sports induce or prevent the development of hernia.

## **Commentary**

A meta-analysis has reported a spontaneous resorption of  $66.6\%^{7}$ . Meanwhile, a study in residents observing asymptomatic lumbar disc herniation, detected on images, in a longitudinal manner has shown that the majority of hernias remained unchanged in size<sup>8</sup>.

# *Relationship between the type of lumbar disc herniation and resorption*

In the sequestration-type herniation group, symptoms improved 1.3 months after the onset on average. On imaging, hernia regression was confirmed in 9.3 months on average<sup>9</sup>.

A systematic review regarding resorption of lumbar disc herniation has shown that hernia regression was found in 96% of sequestration-type cases, 70% of extrusion-type cases, 41% of protrusion-type cases, and 13% of bulgingtype cases<sup>10</sup>. The complete resorption rate was 43% in sequestration-type cases, 15% in extrusion-type cases, 0% in protrusion-type cases, and 11% in bulging-type cases<sup>10</sup>.

A study in Japan has reported that protrusion-type herniated discs are resistant to resorption, and sequestration-type herniated discs are prone to resorption. Particularly, marked resorption or disappearance of herniated discs was observed in 84% of cases in which lumbar disc herniation migrated more than 1/3 of lower vertebrae in sagittal sections. Moreover, hernia resorption was observed within 3 months in 46% of cases<sup>11</sup>. In a longitudinal study in South Korea, resorption has been reported to be facilitated when herniation is extrusion-type or sequestration-type or when the initial hernia is larger<sup>12</sup>.

A study with contrast-enhanced MRI has shown that herniated discs imaged in a ring shape are prone to resorption<sup>13</sup>. The thickness of the contrast-enhanced part of margin and the size of protrusion have also been reported to be associated with hernia resorption<sup>14</sup>.

Therefore, symptomatic herniated discs are prone to resorption, and sequestration-type and extrusion-type herniated discs, craniocaudally extruded discs, and large herniation are more prone to resorption. Meanwhile, asymptomatic, accidentally discovered hernias often undergo no changes in size and may represent a different pathological condition.

## Surgery rate

In several RCTs, the percentage of patients undergoing surgery for lumbar disc herniation varies from 28% to 54%

among patients who underwent conservative treatment for a certain period and depends on symptoms and morphological types<sup>15-18)</sup>. In the study that investigates the preoperative pain intensity in patients who underwent herniotomy, the mean preoperative ODI and VAS (cm) were 56.7 and 6.1, indicating moderate to severe pain<sup>15)</sup>. The data have shown that the surgery rate is high among patients with moderate to severe pain even during conservative treatment. Moreover, in morphological types, the decreased rate of undergoing surgery was attributed to noncontained-type herniation, in which the tip of the herniated disc is extruded into the epidural space.

## Relationship with sports

Two studies comparing the effects of major sports (baseball, softball, golf, swimming, diving, aerobics, and racket sports) in LDH patients and healthy control showed no significant differences in the incidence of herniation between the two groups<sup>19,20</sup>.

No articles showing a clear relationship between lumbar disc herniation and sports activity were found also in the present literature search, and no conclusive statements can be made as to whether the sports activity induces or prevents herniation.

**Conflicts of Interest:** The author declares that there are no relevant conflicts of interest.

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