PROGNOSTIC VALUE OF PREOPERATIVE SCIATALGIA IN LUMBAR DISC SURGERY

Hossein Safdari Gh. MD, Hossein Nayebaghiaie MD, Shirzad J. Azhari MD, Massoud Shabephour MD

Background: All aspects of lumbar disc surgery are being currently commented in pertinent medical literature, but only few studies have dealt with comparative results and the outcome of surgical treatment.

Objective: To find out the possible correlation between preoperative symptomatic period and postoperative complete recovery time, and fitness to resume normal personal and professional life.

Methods: In a retrospective study, we evaluated the outcomes of lumbar disc surgery by reviewing records of 153 consecutive patients who were surgically treated for lumbar disc herniation. The endpoint of this study for each case was defined at the time of complete recovery and/or between 4 to 12 months after surgery.

Results: A highly significant correlation ($r = 0.6$) existed between the pre- and postoperative duration of sciatalgic symptoms ($P < 0.0001$). Regression analysis showed that postoperative recovery time in months = 1.29 + 0.58 × preoperative duration in months.

Conclusion: The duration of preoperative disabling leg pain has a significant predictive value for the overall outcome in lumbar disc herniation surgery.

Keywords: Lumbar disc surgery • postoperative sciatalgia • prognostic value of sciatalgia

Introduction

Lumbar disc herniation is a common condition with well-established criteria for medical treatment or timing for surgical therapy. It has a favorable outcome in the majority of circumstances. However, it seems that not enough attention has been paid to the predictive value of preoperative duration of disabling leg pain, when considering timing for disc surgery. The period for total relief of sciatic symptoms, after conduction of a successful surgery for lumbar disc herniation is variable among the patients. The reason for prolonged postoperative sciatic symptoms in some patients who have undergone successful lumbar disc surgery remains largely speculative.

Peripheral tissue damage or nerve injury often leads to a pathological pain process, which could persist for a variable period, even after perfect healing of the injured tissue. Mechanisms known as “central sensitization” are, however, not yet apt to explain clinically, why pain does persist when the peripheral stimulus is abolished.

Experimental studies on pain mechanisms have demonstrated that functions of central nervous system structures are modifiable. According to recent research that have demonstrated more long-term plastic changes in nociceptive transmission in the spinal cord, the nociceptive memory in dorsal horn structures seems to be underscored. The plasticity within the central nervous system and dorsal horn of the spinal cord could play an important role in the occurrence and persistence of pain, especially in the limbs. 1–6

There is a general feeling that patients who have had a long duration of sciatic pain may be at higher risk of developing long-lasting or chronic leg pain and/or paresthesia after lumbar disc surgery.
surgery. Only in a few studies pre- and postoperative duration of sciatic pain were correlated. This was the main reason to carry out this study.

Patients and Methods

Patient characteristics

This retrospective study was designed to evaluate the outcomes of lumbar disc surgery in 153 consecutive patients treated between March 21st, 1993 and March 20th, 1998, in Imam Hossein University Hospital of Tehran. Patients with an accurate indication for disc surgery, irrespective of age, sex, body weight, professional activity, and psychosocial profile were included in this study. Medical records of patients were the only source of information.

Clinical assessment

Signs and symptoms were highly suggestive of a typical sciatic leg pain involving one lumbar nerve root, with sharply positive Laseque’s sign and sensory and/or motor disturbances corresponding to the same root. All these patients have failed to show resolution or improvement of symptoms by appropriate medical and/or physical therapies. Magnetic resonance imaging or computerized tomography scans of lumbar region made unequivocal diagnosis of unilateral disc herniation on the corresponding disc space. Final confirmation of diagnosis came at the time of surgery by direct observation of the symptomatic nerve root under compression of the herniated lumbar disc. Preoperative duration of leg pain was defined as the period between the beginning of disabling leg pain caused by lumbar disc herniation and surgery.

Postoperative recovery time was defined as the time interval between disc surgery and complete relief of leg sciatic symptoms, including the pain and/or discomforting paresthesia to the point that patient be able to resume his normal personal and professional life without the consumption of pain killers. In almost all cases, at this stage of recovery, they requested permission for resuming their jobs with some minor precautions, or they already had resumed their professional activities. Their neurological examination at the end of follow-up time were completely or almost normal. Then, the follow-up was discontinued. The shortest follow-up time was four months, and the last postoperative clinical evaluation, taken into consideration for this study, was twelve months.

Exclusive criteria

All patients with the following criteria were excluded from this study: incomplete information in records, age >60 years, previous disc or lumbar spine surgery, lumbar canal stenosis, prominent spondylolysis or spondylolisthesis, other diseases of lumbar spine, other neurological diseases, and recurrent symptomatic disc herniation during the follow-up period.

Surgical procedure

Unilateral, one level fenestration was the main surgical approach. All patients included in this study were operated on by a member of the neurosurgical teaching staff or were closely supervised and/or assisted by them.

Statistical analysis

Correlation coefficients and Chi-square test were used to determine the statistical significance of the correlation between pre- and postoperative duration of leg sciatic symptoms. Postoperative duration of leg sciatic symptoms was evaluated by linear regression analysis, taking the preoperative duration of leg pain as the independent variable. One-way analysis of variance (ANOVA) was used to evaluate differences in duration of pain among groups.

Results

A highly significant correlation (r = 0.60) was observed between the pre- and postoperative duration of leg sciatic symptoms (P < 0.0001). The use of regression analysis for evaluation of postoperative recovery time in relation to preoperative duration of leg pain revealed the following linear equation:

\[
PostRT = 1.29 + 0.58 \times PreD
\]

Where PostRT and PreD designate the postoperative recovery time and the preoperative duration in months, respectively.

For further analysis of data, the pre- and

Table 1. Postoperative duration of sciatic symptoms in three preoperative time-groups

<table>
<thead>
<tr>
<th>Preoperative pain</th>
<th>Duration of postoperative pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Months</td>
<td>Mean</td>
</tr>
<tr>
<td>2 – 4</td>
<td>3.42</td>
</tr>
<tr>
<td>5 – 8</td>
<td>5.05</td>
</tr>
<tr>
<td>9 – 12</td>
<td>7.62</td>
</tr>
</tbody>
</table>
postoperative duration of leg sciatic symptoms were divided into three groups: 1) 2 – 4 months; 2) 5 – 8 months, and 3) 9 – 12 months (Table 1). The one-way ANOVA revealed the existence of a statistically significant difference between the mean postoperative recovery time among these three groups (P < 0.001), Chi-square test showed (Table 2) a statistically significant correlation between the duration of leg sciatic symptoms before and after the surgery for lumbar disc herniation (P < 0.001).

### Discussion

Many factors are reported to influence the decision-making in medical or surgical therapy of lumbar disc herniation and its outcome. Psychological aspect is probably one of the most important factors that should increasingly be considered in making a right decision for surgery.7

Results of a controlled prospective study of 180 patients with symptomatic lumbar disc herniation that were surgically and nonsurgically treated showed that, the outcome of surgery was significantly better in short-term period (one year). Nevertheless, in median- (four years) and long-term (ten years) follow-up, although the outcome after surgery seemed to be apparently better, the difference between surgical and medical treatment was not statistically significant.8

In a correlative study on lumbar disc surgery, the best correlation was found between imaging and operative findings, and the psychological score was the most significant predictor of surgical outcome.9 The predominant influence of psychosocial factor on the outcome of disc surgery is stressed and, it is underlined that the best results are achieved if operation performed within two months of disabling leg sciatic symptoms.10, 11 Therefore, a longer duration of preoperative sciatic pain could negatively influence the duration of postoperative recovery.

In agreement with another retrospective study, we showed a significant correlation between the three pre- and postoperative pain groups; the recovery time was significantly longer in patients with a longer preoperative symptomatic period.16

It is presumed that a longer duration of preoperative pain may lead to chronic sciatic symptoms and negatively influences the outcome of lumbar disc surgery. This implies that a preoperative conservative therapy should be performed within a certain time frame. The linear equation we found means that for each additional month of preoperative pain, postoperative recovery time will last 0.58 month (17 days) longer. Poor outcome or delayed recovery of postoperative sciatic pain, in successfully operated patients, is probably due to a chronic or unusually persistent sciatic pain. The role of central nervous system mechanisms, neurologic damage, intraneural fibrosis, or an altered behavior pattern is the matter of debate.1 – 3, 17, 18

### Table 2. Pre- and postoperative distribution of pain-groups.

<table>
<thead>
<tr>
<th>Preoperative pain groups</th>
<th>Postoperative pain groups</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 – 4 (79.6%)</td>
<td>32 (49.2%)</td>
<td>54 (35.3%)</td>
</tr>
<tr>
<td>5 – 8 (43.1%)</td>
<td>32 (49.2%)</td>
<td>65 (42.5%)</td>
</tr>
<tr>
<td>9 – 12 (5.9%)</td>
<td>14 (41.2%)</td>
<td>34 (22.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>73 (47.7%)</td>
<td>61 (39.9%)</td>
</tr>
</tbody>
</table>

### References

10. Hurme M, Alaranta H. Factor predicting the results of


