Predictive value of the duration of sciatica for lumbar discectomy

A PROSPECTIVE COHORT STUDY

L. C. L. Ng, P. Sell

From Leicester General Hospital, Leicester, England

The optimum timing of lumbar discectomy for sciatica is imprecise. We have investigated a number of prognostic factors in relation to the outcome of radiculopathy after lumbar discectomy. We recruited 113 consecutive patients of whom 103 (91%) were followed up at one year. We found a significant association between the duration of radiculopathy and the changes in the Oswestry Disability Index score (p = 0.005) and the low back outcome score (p = 0.03). Improvement in pain was independent of all variables. Patients with an uncontained herniated disc had a shorter duration of symptoms and a better functional outcome than those with a contained herniation.

Our study suggests that patients with sciatica for more than 12 months have a less favourable outcome. We detected no variation in the results for patients operated on in whom the duration of sciatica was less than 12 months.

There is considerable interest in the optimum timing of lumbar discectomy for patients with sciatica. Most patients with sciatica respond well to conservative management. Weber, Holme and Amlie1 reported that 70% of patients with sciatica had a considerable reduction in pain within four weeks. However, surgery is necessary for 10% of patients with an incomplete resolution of symptoms.2,3 It has been suggested that the probability of symptoms resolving with conservative treatment decreases progressively with time.4 In many studies prolonged morbidity has been regarded as a negative predictor.5-11 However, some have contradicted this impression.12,13 Our aim therefore was to examine the association between the duration of sciatica and the outcome of lumbar discectomy.

Patients and Methods

Between 1995 and 2000, 113 patients with clinical and radiological signs of herniation of the lumbar disc underwent surgery. Only those undergoing primary lumbar discectomy with clinical and radiological evidence of compression of the lumbar nerve roots were included in the study. We excluded patients who had revision discectomy, and those with cauda equina syndrome, spinal stenosis or a bony metastasis. Of the 113 patients, 103 (91%) were available for review at follow-up at one year. There were 58 women and 45 men with a mean age of 37.8 years (12 to 66). The mean duration from the onset of symptoms until surgery was 11 months (2 to 60). All operations were performed by the senior author (PS).

The outcomes were assessed according to the Oswestry Disability Index (ODI) score, the low back outcome score (LBOS), a visual analogue scale (VAS) for sciatica and the patients’ subjective evaluation of the surgery (excellent, good, fair or poor). Both the ODI score and the LBOS have been validated and their reliability and sensitivity to changes in functional status have been demonstrated.14-17 We recorded both the absolute value and the change in the ODI score between the pre-operative and post-operative scores at one year. A change of more than ten points, or 20% of the ODI, was considered to be clinically significant.18 The operative findings were classified as either contained or not contained herniated discs. A contained herniation included protrusion and subligamentous extrusion; a herniation which was not contained had had transligamentous extrusion and sequestration.19

Statistical analysis. Multiple regression analysis was performed to determine the significance of the relationship between the predictors and the outcome measurements. The differences between the groups of patients were calculated using one-way analysis of variance. Only when the overall significance had been identified, were the differences between pairs of means tested, using Fisher’s post-hoc test. Statistical significance was set at p < 0.05.
All the statistical analyses were performed using SPSS statistical software (version 11.5 for Windows, SPSS Inc, Chicago, Illinois).

Results
Table I gives the details of the findings at follow-up at one year and Figure 1 shows changes in the ODI score at one year; 79 patients (76.7%) had a significant reduction of 20% or ten points of the ODI score.

The duration of sciatica was related to the change in the ODI score (p = 0.005) and the LBOS (p = 0.03). If the result was expressed as a coefficient, an increase over one month in the duration of symptoms was associated with a reduction in the change of the ODI score of 0.6%. There was also a weak negative correlation between the duration of the sciatica and the change in the ODI score (Spearman rank correlation coefficient, -0.2) as shown in Figure 2. No association was found between the VAS score and the duration of sciatica (p = 0.09).

The association between the duration of sciatica and the surgical outcome was further analysed by dividing the patients into four groups with the duration of sciatica measured as either less than 4 months, 4 to 8 months, 8 to 12 months or more than 12 months. Table II shows the mean change in the ODI score for the four groups at one year. One-way analysis of variance showed a statistically significant difference (p < 0.01) among the means of the four groups of patients. Further analysis, using Fisher’s post-hoc multiple comparison tests, showed a statistically significant difference in the reduction of the mean score of the group of patients with a duration of sciatica of more than 12 months, compared with all the other groups. No statistically significant differences were found between any of the groups of patients with a duration of sciatica of less than 12 months. Figures 3 and 4 show that both the absolute value of the ODI score and the LBOS in the group of patients with symptoms for more than 12 months, remained persistently worse throughout the follow-up of one year. Of the 103 patients, 96 expressed their degree of satisfaction as excellent, good, fair or poor at one year, five gave no opinion, two neglected the instruction and rated their outcome ‘satisfactory’. Patient satisfaction with the outcome of surgery at one year is shown in Figure 5; 67 of the patients (65%) rated the operation as excellent or good. Further analysis of the duration of sciatica was performed by dividing the patients into four groups depending on their
level of satisfaction. It was shown that those who were dissatisfied with the outcome tended to have a longer mean duration of sciatica (Table III). The mean duration of sciatica for the seven patients who failed to comment was 11.4 months. One-way analysis of variance showed a significant overall difference ($p < 0.01$) in the mean duration of sciatica for the four groups of patients. There was a statistically significant difference in the mean duration of sciatica between the groups who were satisfied (excellent and good) compared with those who were dissatisfied (fair and poor) with the operation ($\text{post-hoc}$ multiple comparison test; Table III).

Patients with herniations which were not contained had a shorter duration of sciatica (mean 8.1 months, $SD$ 10.79) compared with the group with contained, herniated discs (mean 12.9 months, $SD$ 10.19). The unpaired $t$-test showed significant differences in the duration of sciatica between the two groups ($p = 0.03$). Patients with uncontained herniated discs as classified during the operation also showed a better functional outcome at one year compared with the group with contained herniations (unpaired $t$-test, $p =$
exceed two months. Dvorak et al. concluded that patients those patients in whom the duration of sciatica did not exceed two months. The most recent prospective study has shown that the duration of sciatica is associated with poor outcomes is variable in the literature. Hurme and Alaranta found the results to be better in those patients with a shorter duration of sciatica. The reasons why the duration of sciatica is said to affect the outcome of surgery for lumbar disc herniation is the ability of patients to undergo surgery are the major factors in the timing of surgery. The decision-making pathway of the patients can also be influenced by various psychosocial factors, which may act as confounding factors.

Discussion
Our study has shown that the duration of sciatica correlated statistically with a less favourable outcome as indicated by the ODI score and the LBOS. There was also a greater degree of satisfaction with the surgical outcome in those patients with a shorter duration of sciatica. The results indicated that there was an increased risk of a poor result if the duration of sciatica exceeded 12 months. We did not find a difference between patients who were operated upon at various intervals within 12 months of the onset of sciatica.

The reported threshold of the duration of sciatica which is associated with poor outcomes is variable in the literature. Hurme and Alaranta found the results to be better in those patients in whom the duration of sciatica did not exceed two months. Dvorak et al. concluded that patients with sciatica of less than six months duration had better long-term operative results. The most recent prospective cohort study suggested that the threshold for the duration of sciatica was eight months, but the findings were not comparable since different scoring criteria and evaluation protocols were used.

Our observations agree with those of Stromqvist and Jonsson that patients with an uncontained herniated disc tend to have a shorter pre-operative history of sciatica than those with contained herniation. This may be related to the increased severity of sciatica in patients with uncontained herniations thus indicating earlier operative treatment. Our results were consistent with those of Vucetic et al. who found that patients with uncontained herniated discs had better functional outcomes after surgery.

In view of the favourable natural course of herniation of the lumbar disc and the possible complications associated with surgery, most authors recommend a minimum period of conservative management of two months. This should not, however, exceed 12 months since the risk of poor functional outcome then increases.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References