Lumbar spinal stenosis: postoperative results in terms of preoperative posture-related pain

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Thirty-three consecutive patients with lumbar spinal stenosis were treated with decompressive surgery aimed at relieving pain. The selection criteria for surgery included marked symptoms and lumbar spinal stenosis demonstrated by myelography. Preoperatively, only 15 patients had claudication; however, 23 experienced relief or exacerbation of symptoms related to changes in posture. A good postoperative result was obtained in 82% of the entire series, but in only 50% of patients whose symptoms were not affected by posture. Of those whose symptoms did have a postural component, a good result was obtained in 96%.

The relief of back pain by decompressive surgery was significantly less successful than the relief of leg pain. It is therefore suggested that surgery be restricted to as few levels as possible.

KEY WORDS □9 spinal stenosis □9 neurogenic claudication □9 functional myelography □9 lumbar spine □9 outcome

DECOMPRESSION surgery for lumbar spinal stenosis has been the subject of numerous articles since the pioneer work of Verbiest2,22 in the 1950’s. It seems self-evident that pain or neurological deficit, associated with the compression of nervous tissue and its surrounding membranes, should improve following the decompression of that tissue. This has not, however, consistently been the case. It has been unusual to obtain excellent surgical results in more than two-thirds of the patients treated for this condition, as reported by many of the larger published series. Nonetheless, Sortland, et al.,19 achieved an excellent outcome in 20 of 22 operated patients. These authors emphasized the importance of functional myelography and the significance of changes in the sagittal diameter of the spinal canal between flexion and extension, as demonstrated by this technique.

The aim of the present study was to examine the significance on the results of surgery of postural changes discovered during clinical examination.

Clinical Material and Methods

A series of 36 consecutive patients underwent surgery for lumbar spinal stenosis between January, 1981, and December, 1986. Of these, one died of a heart attack, one had no pain at any stage of his illness, and one was lost to follow-up review. The remaining 33 patients form the basis of this report. All patients had a painful syndrome which could be related to a narrow spinal canal, and all were examined with functional myelography (Fig. 1). The selection criteria for operation included a marked clinical disturbance and a myelogram showing the changes of spinal stenosis. The follow-up time ranged from 1 to 6 years.

The following operations were performed: laminectomy with lateral recess decompression (29 patients); bilateral semihemilaminectomy with disc removal (three patients); and unilateral hemilaminectomy (one patient). In the last patient, stenosis was limited to one lateral recess.

The age, number of levels operated on, and the levels undergoing surgery were recorded in this series. The presence or absence of intermittent claudication in the clinical picture was recorded based on one or more of the following clinical findings: 1) the patient enjoys relative relief of symptoms while sitting or bending forward; 2) the patient finds it easier to ascend an incline and/or flight of stairs than to descend; or 3) there is lumbar flexion on examination at rest and/or while walking. If any of the above features were present, the illness was considered to have a postural component.

It is emphasized that the results were recorded in relation to pain alone, in either the back or the leg(s) (Table 1). The total score was the sum of the points for backache and leg pain, with a possible range from 0 to 6. A good result was a total of 4 to 6, while a poor result was a total of 0 to 3. Relief of neurological deficit, where present, is not recorded.
TABLE 1
Grading of postoperative relief of pain

<table>
<thead>
<tr>
<th>Postop Status</th>
<th>Back Pain</th>
<th>Leg Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>no improvement</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>some improvement</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>almost normal</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>no symptoms</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

FIG. 1. Functional myelograms, sagittal view. Left: A narrow spinal canal at L3-4 and L4-5 is shown in flexion. Right: The diameter is further reduced at these levels during extension and the spinal contents are thus more compressed in this position.

Results

Total Series

The mean age (± standard deviation) of the patients in this series was 57 ± 14.7 (range 21 to 84 years). The male:female ratio was 7.25:1. The mean number of levels operated on was 2.5 ± 0.83. The mean postoperative score was 2 ± 0.93 for backache and 2.45 ± 1 for leg pain. The better result with respect to leg pain compared with backache is significant (paired t-test, p < 0.002). The mean total score was 4.45 ± 1.8 with 27 (82%) good results and six (18%) poor results.

The distribution of lesions according to anatomical level is illustrated in Table 2.

Effect of Claudication

Fifteen patients had claudication symptoms, 18 did not. There was no difference between these two groups with respect to age, number of levels operated on, back pain result, or leg pain result. Thus, the presence or absence of claudication was not a prognostic indicator in this series.

Effect of Age

There was no correlation between age and the total result score.

Effect of Number of Surgical Levels

There was no correlation between the number of levels operated on and the total result score.

Effect of Posture

There were 23 patients in the group with a postural component to the clinical picture and 10 in the group without. There was no difference between these two groups with respect to age or number of levels undergoing surgery; however, the mean postoperative score for back pain in the group with a postural component was 2.3 ± 0.68 compared with 1.4 ± 1.2 in the group without. This difference is significant (Mann-Whitney test, p < 0.04). In addition there was a significant difference (Mann-Whitney test, p < 0.02) in the leg pain scores in the group with a postural component (2.8 ± 0.51 vs. 1.7 ± 1.4), as shown in Table 3.

The effect of posture on the total postoperative pain relief score is even more striking, as seen in Table 4. Of the 23 patients with a postural component 22 (96%) had a good result, while of 10 patients without a postural component only five (50%) had a good result. This difference was highly significant (Fisher's exact probability test, p < 0.006).

Discussion

The age composition, male:female ratio, and distribution of vertebral levels undergoing surgery were all in keeping with earlier reports. 2,6,11,12,14-18,21,23 Thus, the current series is comparable in its general composition with the studies of others. The early literature on spinal stenosis was mainly concerned with the syndrome of neurogenic claudication or "pseudoclaudication" as the clinical expression of a narrow lumbar canal. 1-4,8,15,16 It has subsequently been realized that the clinical picture of spinal stenosis can be varied and claudication is no longer the sine qua non of the diagnosis. In two recent
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large series, a marked proportion of patients did not have claudication. In the present series, the term "claudication" is restricted to patients whose pain arose following walking: 15 patients had this symptom while 18 did not. This is a very high proportion of patients without claudication compared with other series, and is because the pattern of clinical disturbance was not taken into account when selecting patients for surgery. The only requirements for selection were a marked pain syndrome in the lumbar region and the legs, and the presence of spinal stenosis as demonstrated on the myelogram. Moreover, the presence or absence of claudication did not have any relation to the results of surgery.

The significance of a postural component to the clinical picture was emphasized by Wilson. The radiological correlates of this feature were examined in detail by Sortland et al., and, using their new technique of functional myelography, they achieved an excellent result in 20 of 22 surgical patients. These are unusually good results, and it is important to examine the significance of a clinical postural component in spinal stenosis. Specific clinical findings related to posture have been described before without their presence being related to the quality of the surgical result.

Only one previous study has demonstrated a relationship between a clinical postural component of the illness and the quality of the postoperative result. Only one previous study has demonstrated a relationship between a clinical postural component of the illness and the quality of the postoperative result.

All of the patients in this study were examined with functional myelography (Fig. 1) as described by Sortland et al. We applied the same selection criteria for operation as were used by those authors; that is, the presence of marked clinical disturbance in addition to the relevant x-ray changes. The outcome in this series as a whole was: 82% good results and 18% poor. However, for those patients with a postural component to their illness the outcome was good in 96% and poor in 4%, while only 50% of those without a postural component achieved a good result. This is to be expected. Since functional myelography demonstrates that flexion relieves and extension exacerbates compression, it follows that decompressive surgery will be more effective in relieving pain in the presence of a postural component.

The failure of surgery to relieve pain in lumbar spinal stenosis may be related to the widespread spondyloitic changes that are the rule in this condition. Such changes can cause pain for reasons other than compression of the nervous tissue. In this respect it is of interest to note the contribution of persistent back pain or discomfort to a poor result, as found in this series. This is in agreement with the experience of other workers. In this study an attempt has been made to quantify this feature, and a significantly worse postoperative result was found for back pain as compared to leg pain. Moreover, back pain relief was less effective regardless of the presence of a postural component. Thus, it seems logical to operate on as few vertebral levels as possible, thereby decreasing the risk of postoperative symptoms due to instability. This is especially true in elderly patients with lumbar spinal stenosis, which usually progresses slowly.

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References


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