POSTDECOMPRESSION LUMBAR INSTABILITY

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ABSTRACT:

34 patients who had degenerative lumbar stenosis underwent total laminectomy and bilateral medial facetectomy were studied clinically and radiographically. The patients were invited to our outpatient clinic at the mean of 2.5 years postoperatively. Functional and 4 sided lumbosacral graphies were taken besides neurological examination at control. Patients were divided into two groups (Group 1: 22 cases without spondylolisthesis, Group 2: 12 cases with spondylolisthesis) according to the presence of spondylolisthesis in postoperative direct graphies.

82% of cases improved while the clinical outcome of 12% did not change and 6% worsened. The ratio of postoperative spondylolisthesis is 35% in this series. The rate of development of spondylolisthesis was very low in patients with intervertebral bone bridging. We observed a very high ratio of development of spondylolisthesis with laminectomy at three levels.

Key words: *spinal stenosis, spondylolisthesis, instability*

INTRODUCTION

Decompressive laminectomy is still the major surgical treatment of spinal stenosis. It has begun to be used extensively after the reports of Verbiest in 1950s. The success rate in decompressive laminectomy has been reported between 60–90% in the literature (4, 5, 7, 9-12, 16, 17, 19, 25, 28, 29). The opinion about the possibility of development of spinal instability in postoperative period despite these high success rates is still controversial. In various series spinal instability is considered to reduce success rate of the operation and it is suggested to add fusion to laminectomy (10, 16) and to make limited decompression (2, 15, 18, 30).

Our study aims to outline the incidence of instability following lumbar decompression and the clinical outcomes.

MATERIAL and METHODS

Decompressive laminectomy was performed on 78 cases with lumbar spinal stenosis between 1988–1996 in Neurosurgery Clinics of Trakya University Faculty of Medicine. Of 34 patient who had enough data, had no spondylolisthesis in functional graphies prior to operation, and no history of lumbar operations. 21 of our cases were male and 13 female. The age range was 51–70 and the mean age 64. The patients were invited to our outpatient clinic. The average follow–up period was 2.5 years (ranges 1–9 years). Functional and 4 sided lumbosacral graphies were taken besides neurological examination at control. Patients were divided into two groups according to the presence of spondylolisthesis in postoperative direct graphies.

Group 1: 22 cases without spondylolisthesis

Group 2: 12 cases with spondylolisthesis

Postoperative clinical status was evaluated in 3 groups as improvement (including very good and good) no change and worsening. For the evaluation of age statistically Student's t–test; for the evaluation of gender, Laseque, sensory examination, narrowing of disc interval and bone bridging Fisher's exact test; for evaluation of motor examination, reflex examination, lesion type, number of laminectomies and clinical outcomes chi–square test were used.

RESULTS

There was no significant difference between group 1 and 2 by means of gender and age ($p>0.05$). There were back pain in all patients and leg pain in 30 of them. 24 cases described neurogenic cladicatio. Mean

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symptomatic period was 3.8 years. The weakness of muscle was determined in 15 of the cases, and abnormal sensation in 22 and absence of reflex in 16. Laseque was found positive in 20 cases. There was no difference in mean symptom duration and neurological findings between the groups ($p>0.05$). Narrowing in disc spaces were determined in preoperative direct lumbosacral graphies of 21 cases in group 1 and 11 cases in group 2 ($p<0.05$). Diagnosis was made by myelography (29 cases), spinal CT (20 cases) and spinal MRI (7 cases). There were disc hernia in addition to spinal stenosis in 18 cases. There was no difference in the distribution of pathologies between the groups ($p>0.05$). Total laminectomy and bilateral medial facetectomy were performed in all cases. Additional discectomy was performed in 16 cases. In group 1, laminectomy at one level was performed in 40% of the cases, at two levels in 55% and at 3 levels in 5%. On the other hand laminectomy at one level, two levels and three levels were performed in 25, 42 and 33% of the cases in group 2 respectively ($p>0.05$). There was no case required the second operation. Mean duration of hospitalization was 11 days ($p>0.05$).

Spondylolisthesis was determined in postoperative direct graphies of 12 cases. There were sliding in sagittal plane to 10, 10-20 and 20-30% of 5, 6 and 1 of the cases respectively. As a result of postoperative neurological examination, there were improvement in 19 cases, no change in 2 cases and worsening in 1 case of group 1 while improvement in 9 cases, no change in 2 cases and worsening in 1 case of group 2 were observed ($p<0.05$). 82% of cases improved while the clinical outcome of 12% did not change and 6% worsened.

DISCUSSION

The extensively used surgical approach in spinal stenosis is decompressive laminectomy. Lamina, ligamentum flavum, capsular ligament and facet joints in various ratios are removed. While this intervention provides rapid improvement of symptoms, it also carries instability problems.

Postoperative spondylolisthesis is frequent as 10–20% (10, 24). This ratio is 35% in our series. Sliding was 20% or less in 91.5% of the cases. There was no significant clinical difference between group 1 and 2 although there was a radiological difference in postoperative period ($p>0.05$). It is reported that relevant results are obtained by decompressive laminectomy and there is no need for fusion (12, 16, 20, 22, 26, 27). The most potential candidates among cases of spondylolisthesis for concomitant decompression and fusion are cases with degenerative spondylolisthesis (2, 4, 10, 16) and scoliosis (13, 17). However; some investigators had successful results in cases with degenerative spondylolisthesis (9, 17, 25, 28) and scoliosis (23, 25) by only decompression. Addition of fusion to decompression prolong the duration of operation and anesthesia, increase blood loss, cause donor side problems and increase the cost of operation (17, 27). Shenkin and Haft (24) suggested bilateral facetectomy in cases with facet hypertrophy and emphasized that this rarely cause instability problems. Hopp et al. (10) support that fusion must be added in cases of unilateral and bilateral facetectomy. We performed total laminectomy and bilateral medial facetectomy in all our cases. It has been accepted that decompression is enough in these rangers (5, 9, 12, 16, 17). Our findings support this. Subject with spinal stenosis are generally elder individuals. The mean age was also 64 in our cases, we could not find any difference in age and gender between the groups. On the contrary, there are reports indicating that the probability of postoperative spondylolisthesis is high in young (24) or that there is no relationship between age and postoperative instability (8). It has also been reported that postoperative instability is more common in women (11, 24, 26). In our series, there is no smoker patient. Battie et al. (3), indicated that smoking increased lumbar disc degeneration and spinal deformities were more frequent in smokers.

Preoperative direct lumbar graphies are important for the evaluation of instability rate is higher (16, 21). Some authors have proposed that a narrowed, degenerative disc is more likely to lead to increased slippage postoperatively (10, 14, 17). In contrary, Herkowitz et al. (8) report that the alteration in height of the disc interval can not be a criteria for the development of instability and the need for fusion. Tuite et al. (27) suggest that abnormal disc interval angle is more indicative than the height of the disc interval. We did not observe any relation between the height of the disc interval and postoperative spondylolisthesis ($p>0.05$). The effects of bone bridging after decompression on stability are not clear in the literature. While some authors report that

degenerative alterations occurring with age support postoperative stabilization (30), some take these into consideration as factors giving access to instability (10). In our series the rate of the development of spondylolisthesis was very low in patients with intervertebral bone bridging ($p<0.05$).

The aim of decompressive surgery is to rescue neuronal formations from pressure. This is possible by enough numbers of laminectomy. Although it is reported that there is no relation between the number of laminectomies and postoperative shifting and clinical outcomes (11, 24); the general idea is the increase in the number of laminectomies cause instability problems (6, 11, 16, 24). Fox et al. (6) have identified postoperative spondylolisthesis from a total of 92 cases in 13, 53 and 59% of laminectomies at one level, two levels and three levels respectively. While we could not find any significant difference between the groups in the cases with laminectomy at one and two levels we observed a very high ratio of development of spondylolisthesis with laminectomy at three levels (75%) ($p<0.05$). On the other hand the percentage of shifting of these cases were low and did not show any clinical difference from the others. The most decompressed level was L4 and the most frequent postoperative shifting was also at this level. It is generally reported in the literature that spondylolisthesis occur generally in L4 vertebrae (5, 6, 16). It is suggested that the main reason is the range of movement of L4 vertebrae is more than the others besides it is the most decompressed level (5).

The role of discectomy on instability in addition to laminectomy is still controversial. We did not observe an additional stability problem in our cases which we performed discectomy. It is suggested that discectomy increase instability (1) and have no role in stability (6, 10, 26). Tuite et al. (26) report that in cases with discectomy added to laminectomy, the development of postoperative spondylolisthesis will be less than the ones with only laminectomy by mentioning the stabilizing effect of discectomy.

As a conclusion according to our findings; total laminectomy and medial fascetectomy are trustworthy methods in spinal stenosis without spondylolisthesis. The realization of bone bridging in preoperative radiological scans, will decrease the probability of postoperative shifting. While the ratio of spondylolisthesis increase in laminectomies at three levels or more, the addition of discectomy to decompression does not cause any important problems regarding instability.

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