Vertebral slipping after decompression for spinal stenosis

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Surgical treatment of central lumbar spinal stenosis includes laminectomy with partial or sometimes total facetectomy. The decompressive procedure might destabilize the lumbar spine leading to postoperative vertebral slipping. The incidence of postoperative vertebral slipping varies considerably in different reports. In patients with no preoperative slipping, an incidence between 5 and 20 percent has been reported. A preoperative degenerative olisthesis is a known risk factor for further slipping and the incidence of progressive slipping is considerably higher, varying in different reports from 40 to 100 percent.

The surgical method of choice has not been established and satisfactory results have been reported with different surgical attitudes.

Dall and Rowe (1985) reported superior results in patients where a total facetectomy was performed and noted also that postoperative slipping after this procedure was mild and of no clinical importance.

Other authors, however, have described superior results when a facet-joint preserving technique has been utilized. Lombardi et al (1985) reported a study where patients operated on with total facetectomy had a success rate of 30 percent compared to 80 percent in a patient group where only the medial part of the facet joints were sacrificed. Even better results, with a success rate of 90 percent, was noted in a patient group where a concomitant fusion was performed. This is in accordance with results in a recent report by Herkowitz and Kurz (1991). In their study, 50 patients with spinal stenosis and degenerative spondylolisthesis were operated on with either decompression only or decompression in combination with fusion. The authors stated that patients without fusion had an increased olisthesis postoperatively and the subjective results were better in the patient group with a concomitant fusion.

However, in 25 patients with a concomitant fusion, 7 had progressive postoperative slipping and 9 a pseudarthrosis of the fusion mass, so the results must be interpreted with caution.

The clinical importance of postoperative slipping has been studied by Johnsson et al. (1986). The authors noted that "in acquired spinal stenosis, an observed slipping was always consistent with a poor result. In degenerative spondylolisthesis this risk was much higher but it did not influence the results of the operation."

In this, as well as other reports regarding the incidence of postoperative slipping after laminectomy, the patients have undergone a combination of both partial and total facetectomies.

We have studied the incidence of vertebral slipping after decompression with a strictly facet-joint preserving technique (Jönsson et al 1992).

Patients

60 consecutive patients operated on for central spinal stenosis were included in a prospective study. Mean patient age at the time of operation was 64 (35–83) years and there were 35 men and 25 women. The average preoperative symptom duration was 4 years.

Methods

The surgical procedure consisted of resection of the spinous processes, the laminae and maximally half the facet-joint using the undercutting technique. One-level decompression was performed in 13 patients, two-level in 33, three-level in 11 and four-level in 3. No fusion was performed.

Sagittal vertebral slipping was measured from the preoperative radiographs and from a follow-up lateral radiograph obtained 12–15 months after surgery. The anterior displacement was measured according to Wiltse and Winter (1983) and a slip exceeding 2 mm was regarded as true. At the 1-year follow-up examination, the effect of the surgical procedure was graded by the patients.

Results

A preoperative degenerative olisthesis was seen in 19 patients, and all these slips occurred in the stenotic area. The mean value of the olisthesis was 7 (3–12) mm. In 17 of the 19 patients the olisthesis occurred at the L4-L5 level and in the remaining patients at the level above and below. One year after decompression there was an increase in slip in 6 of the 19 patients.

In the patient group with no preoperative olisthesis postoperative slipping was noted in only one patient, a 62 year old man with a 3-mm slip. Thus, the risk for slipping was 1 out of 3 in degenerative olisthesis, while this was true in only 1 out of 41 without slip preoperatively.

Subjectively, 45 of the 60 patients were improved 1 year postoperatively regarding leg symptoms. There was no difference in outcome in patients with or without postoperative slipping. Thus, in total there was 7 patients with increased or induced postoperative slipping and 5 of these patients were improved by the surgical procedure.

It is interesting to note that the majority of patients also reported improvement of back pain at follow-up and this was true irrespective of slipping.

Discussion

The method of determining vertebral slipping from a lateral radiograph used in this and corresponding studies is afflicted with error of measurement. This error of measurement has been determined in different studies and values varying from 3 mm up to 8 mm (or 20%) have been reported, mainly due to positional factors and to inter- and intraobserver errors.

Further studies are needed to elucidate the in vivo stability of the lumbar spine after different decompressive procedures. With the aid of roentgen stereophotogrammetric analysis (RSA), sagittal translation can be determined with an accuracy of 0.7 mm (Johnsson et al 1990). A study on the postdecompression stability of the lumbar spine has been initiated at our department. At surgery, 0.8 mm tantalum balls are implanted into the segments of interest and all patients are followed with RSA at regular intervals after surgery.

Conclusion

In our opinion, postoperative vertebral slipping is avoidable in patients with no preoperative olisthesis, provided that a facet-sparing technique is utilized. Patients with a degenerative spondylolisthesis have a 30 percent risk of progressive slip, but without associated clinical problems in the short term.

The routine use of spinal fusion is questioned and should be considered only when a total facetectomy has been required to obtain adequate decompression or in patients with a severe low back pain problem.

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