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INSTRUCTIONAL LECTURES & PANEL PRESENTATIONS

CHOICE OF SURGICAL TREATMENT FOR MULTISEGMENTAL CERVICAL SPONDYLOTIC MYELOPATHY

Kazuo Yonenobu, M.D., D.M.Sc.

Institution(s):
Vice-director, National Osaka-Minami Hospital
Clinical Professor, Department of orthopaedic Surgery, osaka University Medical School

Recent advances in surgical techniques have expanded the field of surgical treatment for cervical spondylotic myelopathy. For single-level spondylotic myelopathy, anterior surgery has been widely accepted. However, there is little agreement as to the best approach for multisegmental spondylotic myelopathy, especially when the condition is associated with a narrojw spinal canal. Some authors recommend anterior or posterior decompression exclusively for the surgical treatment of this condition. Others based their decision on various criteria including multiplicity of involvement and the anteroposterior spinal canal diameter. The validity of the opinions, however, has not been substantiated by statistical evidence. We have conducted several comparative studies of results of surgical treatment for cervical spondylotic myelopathy.

First, three surgical procedures for multisegmental cervical spondylotic myelopathy; laminectomy, (12-157 month) of 95 patients. Twenty-four multisegmental cervical spondylotic myelopathy; laminectomy, underbody fusion by the Cloward and/or Smith Robinson techniques, and 21 by subtotal spondylectomy and fusion. Results of subtotal spondylectomy were significantly (P less than 0.01) better when compared with those of the other two procedures. Reasons for the inferiority of laminectomy were malalignment and instability of the cervical spine and it was concluded that maintenance of cervical lordosis and stability was the key to stable surgical results after posterior decompression [(1-3)].

Secondary, we conducted a prospective comparative study of two procedures; subtotal corpectomy and laminoplasty, by which cervical lordotic alignment and stability was expected to be preserved[(4)]. Fortyone patients who received subtotal corpectomy and strut grafting (SCS) and forty-two undergoing laminoplasty were followed up for at least 2 years after surgery. Regarding factors known to affect surgical prognosis (age at surgery, duration of symptoms, severity of neurologic deficit, anteroposterior canal diameter, transverse area of the cord at the site of maximum compression, number of levels involved), the two groups were statistically comparable with each other. The severity of neurologic deficits was assessed by the Japanese Orthopaedic Association scale[(8)]. Results were evaluated in terms of postoperative score and recovery rate. The difference between the recovery rate and final score between the two groups was not statistically significant. Surgical complications were more frequent in the subtotal corpectomy and

strut grafting group than in the laminoplasty group. The most frequent complications encountered in the subtotal corpectomy and strut grafting group were related to bone grafting. Spinal alignment worsened in six patients of the laminoplasty group, but none of them suffered from neurologic deterioration. Another disadvantage of subtotal corpectomy and strut grafting was the longer postoperative period of bed rest needed to secure graft stability. We concluded that laminoplasty should be the treatment of choice for multisegmental cervical spondylotic myelopathy when neurologic results, incidence of complications, and postoperative treatment are taken into consideration.

We applied this principle to myelopathy caused by soft disc herniation and analyzed surgical results[5]. The results suggested that when the incidence of complications and the possibility of regression of herniated disc are taken into consideration, expansive laminoplasty can be selected for radiculomyelopathy due to cervical disc herniation.

Finally, we did a long-term follow-up study of two procedures; laminoplasty and subtotal corpectomy and compared surgical results[7]. Twenty-three patients treated with subtotal corpectomy and 24 patients treated with laminoplasty were followed up for 10 to 14 years after surgery. Neurologic recovery late deterioration, axial pain, radiographic results (degenerative changes at adjacent levels, alignment, and range of motion of the cervical spine), and surgical complications were compared between the two groups. No significant difference in neurologic recovery was found between the two groups 1 and 5 years after surgery, or at the latest follow-up assessment. Neurologic status deteriorated in one patient of the subtotal corpectomy group because of adjacent degeneration, and in one patient of the laminoplsty group because of hyperextension inujury. Axial pain was observed in 15% of the corpectomy group and in 40% of the laminoplasty group ($p<0.05$). In the corpectomy group, listhesis exceeding 2 mm developed at 38% of the upper adjacent levels, and osteophyte formation at 54% of the lower adjacent levels. In the laminoplasty group, kyphotic deformity developed in one patient (6%) after surgery. In the corpectomy group, the mean vertebral range of motion had decreased from 39.4 degress to 19.2 degress (49%) by the final follow-up assessment. In the laminoplasty group, the mean vertebral range of motion had decreased from 40.2 degress to 11.6 degrees (29%) by the final follow-up assessment. Neurologic complications related to the surgery occurred in two patients (one myelopathy from bone graft dislodgement and ona C5 root palsy from bone graft fracture) of the corpectomy group and four patients (C5 rot palsy) of the laminoplasty group. All of these patients recovered over time. The corpectomy group needed longer operative time ($P<0.001$) and tended to have more blood loss ($P=0.24$). Six patients in the corpectomy group needed posterior interspinous wiring because of pseudarthrosis. We concluded that subtotal corpectomy and laminoplasty showed an identical effect from a surgical treatment for multilevel cervical spondylotic myelopathy. These neurologic recoveries usually last more than 10 years. In the subtotal corpectomy group, the disadvantages were longer surgical time, more blood loss, and pseudarthrosis. In the laminoplasty group, axial pain occurred frequently, and the range of motion was reduced severely.

Through the studies, we found that many patients complained of neck pain after lami-

noplasty. Neck pain after posterior decompression had not been notified and we analyzed this nuisance complaint[6]. So far, no cause of this has been clarified and no effective preventive measures have been established.

Conclusively, in most patients with multisegmental spondylotic myelopathy, stable and endurable results can be expected regardless of surgical procedures, if surgery is done properly by expert's hands. However, when invasiveness of surgery and incidence of surgical complications are taken into consideration, laminoplasty is treatment of choice, specially when a condition is associated with a narrow spinal canal, On the other hand, correction of spinal alignment cannot be expected with laminoplasty and subtotal corpectomy should be chosen for patient with kyphotic alignment.

REFERENCES

1. Yonenobu K, Fuji T, Ono K, Okada K, Yamamoto T, Harada N.: Choice of surgical treatment for multisegmental cervical spondylotic myelopthy. Spine 10: 710-716, 1985.
2. Yonenobu K, okada K, Fuji T, Fujiwara K, Yamashita K, Ono K.: Causes ofneurologic deteroration following surgical treatment of cervical myelopathy. Spine 11: 818-823, 1986.
3. Yonenobu K, Hosono N, Iwasaki M, Asano M, Ono K.: Neurologic complications of surgery for cervical compression myelopathy. Spine 16: 1277-1282, 1991
4. Yonenobu K, Hosono N, Iwasaki M, Asano M, Ono K.: Laminoplasty vs. subtotal corpectomy. - a comparative study of surgical results in multisegmental cervical spondylotic myelopathy-. Spine 17: 1281-1284, 1992.
5. Iwasaki M, Ebara S, Miyamoto S, Wada E, Yonenobu K.: Expansive laminoplasty for cervical rediculomyelopathy due to soft disc hernia. A comparative study between laminoplasty and anterior arthrodesis. Spine 21: 32-38, 1996
6. Hosono N, Yonenobu, K, Ono K.: Neck and shoulder pain after laminoplasty: a noticeable complication. Spine 21: 1969-1973, 1996.
7. Wada E, Suzuki S, Kanazawa A, Matsuoka T, Miyamoto S, Yonenobu K.: Subtotal corpectomy versus laminoplasty for multilevel cervical spondylotic myelopathy: a long-term follow-up study over 10 years. Spine 26: 1443-1447, 2001.
8. Yonenobu K, Abumi K, Nagata K, Taketomi E, Ueyama K.: Inter-and intra-observer reliability of the Japanese Orthopaedic Association Scoring System for evaluation of cervical compression myelopathy. Spine 26: 1890-1894, 2001.