Long-Term Results After Operative Treatment of Cervical Myelopathy by Laminectomy

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We report on the late results in patients suffering from cervical myelopathy operated on by laminectomy in the fifties and sixties. Surgical treatment consisted of a more or less extensive laminectomy; in each case the dura mater was opened and the dentate ligaments cut. Early results were published by Kuhlen Dahl and Feltèn (9). Patients operated on by other methods during the last decade are not considered in this report.

Considering the various factors contributing to the pathogenesis of cervical myelopathy, there can be no single method for operative treatment. Laminectomy and cutting of the dentate ligaments was initially the method of choice (3, 4, 5, 8, 10). In 1960 Reid (11) demonstrated that cutting of the dentate ligaments to mobilize the spinal cord appeared superfluous. Consecutively, larger series of cases with extensive laminectomy without opening of the dura mater were reported (1, 2, 12). After the introduction of the ventral approach by Dreyermaker 1956 and by Cloward 1958, this technique has often been used in the operative treatment of cervical myelopathy (6, 7, 10).

The majority of the 96 patients of our series suffered from severe neurological deficits. Seventy cases had a spastic tetraparesis, 13 of which also had nuclear atrophies of the muscles innervated by the lower cervical segment. Nine had spastic paraparesis, and 17 showed lesions of the Brown-Sequard type. Our cases were subdivided into patients with prolapsed cervical discs and with chronic spondylotic myelopathy.

Thirty-nine patients, 33 men and 6 women, had prolapsed discs, mainly in the C7/V1 segment (16 cases), 12 in C4/V and the rest in CIII/IV and CIV/VII.

Fifty-seven patients, 50 men and 7 women, had spondylotic myelopathy, more than half of them several bars.

More than 50% of the patients of the prolapsed disc group were younger than 50 years of age. On the other hand, spondylotic myelopathy patients predominated in the age group above 50 (Figs. 1a, 1b).

Forty-five patients have died in the meantime. Twenty of these (out of 96) had prolapsed discs, 25 spondylotic bars.

One case of acute spinal cord compression by a prolapsed disc at CIII/IV died two months after the operation with tetraplegia; he had tetraplegia and respiratory troubles, however, on admission to the hospital. Six further patients died, 2 of pulmonary artery embolism following the operation, 1 of acute gastrointestinal hemorrhage, 1 of pneumonia, endocarditis and diabetes mellitus, 1 of septicaemia, 1 of diabetic coma.
Thirty-eight patients died many years after the operation because of other diseases or old age.

More than half of the patients with prolapsed discs had a history of less than 6 months, the rest up to a maximum of 2 years. This is different in patients with spondylotic bars: in this group almost half of the patients had first symptoms dating between 10 months and 3 years before the operation; 22 patients had a history of less than 10 months, 6 of 3 to 10 years (Fig. 2).

Operation in the patients of our series dates back as far as 27 years; 16 patients of the prolapsed disc group were followed up for a period of 6 to 15 years, 21 patients of the spondylotic myelopathy group for a period of 3 to 10 years, another 8 for 10-27 years (Fig. 3). Higher age at the onset of symptoms in patients with spondylotic myelopathy is responsible for shorter follow-up periods until these patients died.

Follow-up data were obtained partly by questionnaires, in the majority of cases by neurological examination. We distinguished the late results into improved, unchanged and worsened as compared to the preoperative situation. Excluding 32 patients whose addresses could not be found out, we considered 29 patients with prolapsed discs and 35 patients with spondylotic myelopathy.

Results

Of 29 patients with prolapsed discs non worsened, 19 were improved and 10 remained unchanged, i.e. with stationary neurological deficits. Special reference is made to the fact that in some cases complete recovery could be obtained.

In the spondylotic myelopathy group we found 14 patients improved, 12 unchanged and 9 with progressive signs of the underlying disease (Table 1).

### Table 1. Long-term results after operative treatment

<table>
<thead>
<tr>
<th></th>
<th>Cervical discs</th>
<th>Spondylotic myelopathy</th>
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<tbody>
<tr>
<td>Improved</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Unchanged</td>
<td>10</td>
<td>12</td>
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<td>Worsened</td>
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These results correspond to the findings of other authors (3, 4, 5, 7, 10, 13).

To discuss the question of how far the laminectomy should be extended, we have split up our cases according to the number of laminae removed. Our findings suggest that better results can be achieved by extensive laminectomy. Data are listed in Table 2. GORTER, however, did not confirm this in his findings.

From our data we conclude:

1. Laminectomy limited to two laminae as performed in the fifties appears to be insufficient as revealed by long-term follow-up investigations. We think that at least four laminae comprising the CIIIIII vertebral arch cranially in any case should be removed.