Anterior discectomy without interbody fusion for cervical disc herniation

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Summary. Between 1985 and 1990, 68 patients with cervical radiculopathy due to soft disc herniation were treated by anterior cervical discectomy without interbody fusion. Eleven patients were unavailable for follow-up examination. The mean follow-up was 23 months (range 12–54 months). Both clinical and radiographic follow-ups were done, and 92% of the patients was found to have excellent or good clinical results. Radiographic follow-up revealed that 34% had fused spontaneously and 66% developed fibrous healing of the disc space with an average range of mobility of 2.07 deg. All patients were shown to be stable on flexion-extension films. Complications included two transient CSF leaks. No neurologic deficits arose. One patient was reoperated and fused for intractable residual neck pain. We conclude that anterior cervical discectomy without interbody fusion is a simple, safe and effective procedure for patients with soft disc herniation.

Key words: Cervical disc herniation – Anterior cervical disc excision without fusion

Surgical management of cervical radiculopathies with anterior discectomy and interbody fusion was first developed by Robinson and Smith [45] in 1955. They proposed removal of the intervertebral disc and fusion via an anterior approach. The goal of their technique was to enlarge the neural foramen by distraction of the disc space and to arrest spondylotic spurring. Cloward [9] subsequently proposed in 1958 an instrumentation system using a dornel to perform adequate disk and spur removal and to insert a bony plug to provide stabilization and maintenance of height. In the literature, good or excellent results were noted in 80% to 90% [32]. Several studies have, however, reported a 10%-20% incidence of pseudarthrosis after cervical discectomy with fusion and the lack of clinical correlation between successful fusion and patient outcome [4]. Anterior cervical discectomy without fusion was subsequently proposed in order to simplify the decompression technique, shorten the postoperative hospital stay and permit earlier recovery.

The purpose of this study is to report our experience of surgical treatment of cervical radiculopathies with anterior cervical decompression without fusion in a specific series of patients with soft disc herniation in order to analyse the results and the complications of this procedure.

Materials and methods

Materials

Sixty-eight patients underwent this procedure, 57 have been reviewed, and 11 cannot be found. There were 39 men (68%) and 18 women (31%), with ages ranging from 22 to 66 years (mean 41.2 years).

Preoperative clinical status

Fifty-six suffered from cervico-brachialgia, one had associated pyramidal signs and one, a pure pyramidal syndrome. In 14 cases, the pain followed a mild cervical trauma, either immediately or a few days later. Traumas with instability were excluded. Twelve patients were admitted following a work-related accident. The pain duration before surgery was between 45 days and 7 months (mean 2.5 months).

Cervical pain was disabling in 41 patients (71%) and limited mobility in 33 cases (57%). Radicular pain was present in 56. Paraesthesia was found in 12 patients (21%), in one case bilaterally but mainly on the side of the hernia. If numbness was frequent (37 patients, 65%), deficit was less common (27 patients, 47%), 20 in one dermatome and 7 in two. Motor deficit was found in 12 patients (21%).

Preoperative investigations

Cervical X-rays and dynamic X-rays were done to ensure no primary instability existed. Computed tomography (CT) scan was performed in 45 cases and CT scan enhanced by myelography in 23 cases, including 10 where X-rays indicated a narrow cervical canal, and 13 to confirm doubtful scanner images. Magnetic resonance images were made in 12 cases, consisting of 5 to confirm doubtful scanner images, and 7 primary approaches. These were among the most recent cases. Electrophysiological study was carried out in 22 cases (38.5%) with electromyography, sensitive evoked potentials and somesthetic evoked potentials. These were carried out to confirm a doubtful radicular level (12 cases, 21%), when radiological findings and clinical examination did not correspond (4 cases, 7%), or when there were associated social difficulties. None of these patients would have been operated on if the results of the electrophysiological tests had been normal.
Table 1. Efficiency of the operation

<table>
<thead>
<tr>
<th></th>
<th>Number of patients</th>
<th>Percentage cured</th>
<th>Percentage improved</th>
<th>Percentage stabilized</th>
<th>Percentage worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck pain</td>
<td>57</td>
<td>44</td>
<td>49</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Brachialgia</td>
<td>56</td>
<td>85.6</td>
<td>8.7</td>
<td>5.2</td>
<td>0</td>
</tr>
<tr>
<td>Radicular motor deficit</td>
<td>12</td>
<td>66.6</td>
<td>25.1</td>
<td>8.3</td>
<td>0</td>
</tr>
<tr>
<td>Radicular sensory</td>
<td>27</td>
<td>70.1</td>
<td>21.8</td>
<td>8.1</td>
<td>0</td>
</tr>
<tr>
<td>Radicular numbness</td>
<td>37</td>
<td>94.6</td>
<td>2.7</td>
<td>2.7</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2. Cervical pain

<table>
<thead>
<tr>
<th></th>
<th>Preoperative (%)</th>
<th>Postoperative (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent or mild</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>Moderate</td>
<td>29</td>
<td>49</td>
</tr>
<tr>
<td>Severe</td>
<td>71</td>
<td>7</td>
</tr>
</tbody>
</table>

Operative procedure

Patients were operated on under general anaesthesia with endotracheal intubation, and in the supine position. Permanent radiofluoroscopic control was placed laterally to improve control. Somaesthetic evoked potentials were routinely recorded to ensure the quality of decompression. A standard right anterolateral approach was used.

The anterior part of the annulus was excised. The disc space was cleared of all disc material without excising the cartilaginous plates. When the posterior part of the vertebral body was reached, an interbody distractor was placed in order to put the posterior ligament in tension. This can reveal a hole in the ligament on the same side as the herniation. The posterior ligament must be completely removed to ensure full decompression. The herniated disc is often behind this ligament. The posterior osteophytes may also be removed. Decompression must be continued until the volume of disc removed corresponds to the volume expected according to the preoperative exams. The foramen has to be controlled using a blunt hook.

Aspirative drainage was placed for two days. A soft neck brace was worn for 6 weeks.

Results

Patients were reviewed from functional and radiological points of view. The follow-up lasted always at least one year (maximum 54 months, mean 23 months).

Perioperative findings

The level operated was C4–5 in 2 cases (3.5%), C5–6 in 16 cases (28.1%), C6–7 in 38 cases (66.6%) and C7–T1 in 1 case (1.7%).

There was a hernia excluded behind the posterior ligament in 41 cases (71.9%) and in front of or into the ligament in 6 cases (10.6%).

Osteophytes were found in 9 cases (15.7%) and no compression in 1 case (1.7%).

Complications included CSF leakage twice with no further sign during subsequent days.

No neurological deficits were noticed. A cervical haematoma with tracheal compression requiring urgent reoperation occurred a few months after the end of this series.

The mean hospitalization time was 6.3 days (range 5–10 days).

Postoperative findings

Postoperative radicular pain was absent or mild in 49 patients (85.6%), moderate in 5 (8.7%) and severe in 3 (5.2%) (Table 1).

Neurological symptoms which persistend postoperatively included arm numbness in 2 of 37 (5.4%), a sensory deficit in 8 of 27 (29.9%) and a motor deficit in 4 of 12 (33.3%).

There was some improvement in every case, but the recovery was not always total. The deficit was incapacitating for one sensory problem and two motor problems. The electrophysiological tests done in five of these cases showed no sign of subacute evolution.

Both patients with signs of myelopathy showed noticeable improvement, while the lower limb reflexes remained adequate, although walking was not uncomfortable.

Residual cervicalgia was very common: 32 of 57 patients (56.1%) (Table 2).

However, a more careful analysis showed that the operation was not followed by cervicalgia in patients who had not suffered from it prior to the operation. Cervicalgia was relatively frequent but not very intense in 14% and continuous in only 3.5% of the cases. It was incapacitating in only four cases (7%), but one patient suffered on an almost permanent basis, even under antalgic treatment. Some events triggered the cervical pain: climatic conditions in 22 cases (68.7%), hyperextension in 12 (37.5%), flexion in 6 (18.7%), Spurling maneuver in 9 (28%) and rotation in 9 (28%).

One patient required a second operation due to incapacitating cervicalgia combined with severe radiculargia. His preoperative electrophysiology tests showed no sign of subacute evolution. The condition of this unemployed, depressed patient did not improve following arthrodesis.

The postoperative radiographic evaluation (Fig. 1, Table 3) revealed that regional kyphosis in the neutral position varied from 0° to 11°, with an average of 5.14°. During flexion, it changed from 0° to 13°, with an average of 6.18°. Mobility was nonexistent in 34% of the cases but changed from 0° to 7°, with an average of 2.07°, in other cases.

The functional results have been categorized according to the criteria of Roosen and Grote and are given in Table 4. The patients classified in grades IV and V were depressed preoperatively.