NEURAL COMPLICATIONS OF CERVICAL SPONDYLOSIS:
THEIR RESPONSE TO LAMINECTOMY
AND FORAMENOTOMY*

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SPONDYLOSIS of the cervical spine as a cause of nerve-root and spinal-cord compression has been well documented.2,6,7,15,19 However, few detailed reports of the course of this disease have appeared in the literature.9,7 Many operative procedures have been employed when conservative measures have failed to arrest progression of neurologic deficit. Such reports have emphasized operative technique and observations.1,8,11,14,16,20,21,24,26 Others have reported neurologic or neuropathologic findings without a detailed consideration of changing neurologic deficit and symptoms following operative intervention.2,4,6,15,18,19

We wish to evaluate the course of this disease in 49 patients before and following cervical decompressive laminectomy and foramenotomy. Our intention is to emphasize the difficulties we have encountered in the management of these patients. By so doing we would wish to be able to identify specific circumstances in which this form of management may require modification.

No patient was able to work prior to surgical intervention. All were severely handicapped by progressive neurologic deficit despite vigorous conservative management. Thirty of these patients are now able to work.

CLINICAL MATERIAL

Sex. Of the 49 patients, 40 were males and 9 were females. There were 29 treated in a

Veterans Administration Hospital;* of these 29 veterans only 2 were females.

Age. The ages of these patients at the onset of symptoms and at the time of operation are shown in Table 1, corroborating earlier reports which have indicated the wide range of ages at which cervical spondylosis may become symptomatic.

TABLE 1

Number of patients in groups of decades at onset of symptoms and at time of surgical intervention

<table>
<thead>
<tr>
<th>Age</th>
<th>20–29</th>
<th>30–39</th>
<th>40–49</th>
<th>50–59</th>
<th>60–69</th>
<th>70+</th>
<th>At onset of symptoms</th>
<th>3</th>
<th>9</th>
<th>18</th>
<th>9</th>
<th>9</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>At time of operation</td>
<td>1</td>
<td>6</td>
<td>17</td>
<td>11</td>
<td>13</td>
<td>1</td>
<td></td>
<td></td>
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</tbody>
</table>

Duration of Symptoms. Symptoms persisted prior to operation for 1 to 6 months in 10 patients; 6 to 12 months in 5 patients; 1 to 2 years in 8 patients; 2 to 5 years in 14 patients; 5 to 10 years in 5 patients; and more than 10 years in 7 patients.

Factors Contributing to Onset of Symptoms.

Trauma. Of the 49 patients 16 dated the onset of symptoms to a specific single injury. Trauma was an equivocal provocative factor in 5. Of the 16 persons with a clear history of injury followed by persistent symptoms, 11 received blows to the head, neck or shoulder, 4 incurred flexion-extension injuries and 1 person first felt pain in the neck while lifting

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a heavy weight. The role of trauma in cervical spondylosis has been considered by others. Symonds\textsuperscript{25} described the development of symptoms following trauma in persons with pre-existing cervical spondylosis. Clarke and Robinson\textsuperscript{7} reported cases in which acute trauma of the neck was followed by development of spondylotic changes which later caused neurologic deficit. In this circumstance bony changes were more localized and occurred in younger persons. In the present group of patients a history of trauma was associated with a tendency for symptoms to begin at an earlier age than in those without trauma. Injury occurred in 2 of the 3 patients whose symptoms began before the age of 30 years; in 4 of the 9 patients between 30 and 39 years; in 9 of the 18 patients between 40 and 49 years; in 3 of the 9 patients between 50 and 59 years; and in 2 of the 10 patients over 60 years of age.

\textbf{Congenital Anomalies.} Six patients were found to have congenital anomalies of the cervical spine. Four had fusion of two vertebral bodies; 3 at the C2–C3 level and 1 at C4–C5 level. In addition to the congenital fusion of the vertebral bodies at C2–C3, 1 person had assimilation of the dorsal arch of the atlas to the occiput, fusion of the dorsal arches of C2 and C3 and platybasia with protrusion of the dens into the foramen magnum. This incidence of congenital anomalies is similar to that in the group of patients reported by Brain \textit{et al.}\textsuperscript{6} The alleged role of the “block-vertebra” anomaly in producing spurring at the joints above and below has been considered by Bradshaw\textsuperscript{3} and Brain \textit{et al.}\textsuperscript{6} In 3 of the present 4 cases spondylotic changes occurred at intervertebral levels next to the “block vertebra.” In 1 case, however, the major degree of spondylotic change was at C6–C7, four interspaces away from the “block vertebra” at C2–C3.

The 2 remaining anomalies identified at operation were a smooth prominence of bone from a pedicle (Fig. 6f) compressing a nerve root and a smooth laminar prominence projecting into the spinal canal (Fig. 4a, b).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig1.png}
\caption{Chief complaint, initial symptom, and total incidence of individual symptoms.}
\end{figure}

\textbf{SYMPTOMS}

The neurologic symptoms and physical signs in persons with cervical spondylosis are determined by the sites of compression of neural structures. They may be caused by spinal-cord compression, nerve-root compression or a combination of cord and root compression. Spasm of paravertebral muscles and tenderness and the “silver-dollar” sign may reflect ligamentous strain. The role of compression of the anterior spinal and vertebral artery in the production of the clinical syndrome of cervical spondylosis has been noted.\textsuperscript{15,22}

Pain in the neck and upper limbs was the most common presenting complaint in this group of patients (Fig. 1). Pain was the principal complaint of 26 patients. Weakness was the chief complaint of 12 patients, disturbance of gait of 7 patients, and upper-limb paresthesias of 5 patients. Eight persons had other presenting complaints. In the records of 5 persons the chief complaint was not stated clearly. Several persons had multiple chief complaints accounting for the total exceeding 49.

The first symptom noted by 25 patients was pain. Paresthesias were present initially in 14, and weakness was present in 8. Six persons had other initial symptoms (Fig. 1).

Pain in the neck and upper limbs and paresthesias in the upper limbs were the most common symptoms, 34 patients complaining of each (Fig. 1). Paresthesias in the lower limbs were noted by 10 persons. Pain in the lumbar region was noted by 3 persons.