Spasmodic Torticollis: Results after Cervical Rhizotomy in 50 Cases*

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Spasmodic torticollis is a neuromuscular disorder characterized by uncontrollable clonic or intermittently tonic spasm of various neck muscles, producing bizarre, variable head postures. The condition apparently is usually caused by striatal disease or is a localized fragment of a more generalized dystonic process. Although the disorder is commonly believed to be psychogenic, in our experience this etiology has been very rare. Considerable effort has been directed toward attacking the syndrome by producing lesions in the central nervous system, but the results have not been as successful as in the case of parkinsonism. More commonly, treatment has been directed at the effector mechanisms through partial denervations of the neck muscles.

A variety of denervations have been performed, and in 1965 Sorensen and Hamby\textsuperscript{1,2} reported the results of such operations performed on 71 patients at the Cleveland Clinic between July, 1946, and January, 1964. Among these patients the best results were obtained in a group of 25 whose denervations consisted of bilateral section of the spinal root of the spinal accessory nerve, and bilateral anterior C-1 to C-3 rhizotomy. Sixteen of the 25 patients were well satisfied with the results. Subsequently a second series of 80 patients have been so treated. The records of 50 consecutive patients treated by this method between May, 1964, and February, 1967, furnish the basis for this report.

Case Material

The present series extending from May, 1964, to February, 1967, comprised 50 cases, including 21 men and 29 women. Their ages at the onset of symptoms ranged from 9 to 59 years with a median of 40. Fourteen of the patients had had their symptoms for a year prior to surgery. Twenty-one of them had suffered from 1 to 5 years, and 15 had been afflicted for more than 5 years.

Onset of Symptoms. The onset of symptoms was insidious in most cases. Several patients gave a history of head tremor among other members of the family or had a sibling afflicted with torticollis or dystonia. Three patients definitely recalled having upper respiratory infections a few months before the onset. One nurse had had encephalitis 20 years prior to the development of torticollis. In a number of instances the onset of symptoms followed an emotionally stressful situation, but none of these patients responded to psychiatric therapy or improved after relief of the psychological stress. The symptoms of torticollis frequently were aggravated by anxiety or emotional fatigue, as is true in the case of other involuntary movement disorders.

A number of the patients attributed the onset of torticollis to some cervical trauma, but in the majority of such instances the patients already had symptoms of muscular difficulty prior to the trauma.

Types of Torticollis. Torticollis results essentially from imbalance of the numerous paired cervical muscles that maintain the posture of the head. The presenting type of torticollis depends upon the dysfunction of various muscle groups. Forty-three of our patients exhibited spasmodic torticollis in which the head would turn to the right or left side intermittently. In six cases the contracture was more tonic, producing an almost fixed posture. In one case rhythmic contractions of opposing muscles resulted in an oscillating movement of the head, superimposed upon spasmodic turning. In addition to the rotary movements, the associated contractures in seven cases pulled the chin downward into a position of antecollis, and

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in 13 cases the occiput was sharply retracted, lifting the chin into a position of retrocollis.

The lateral rotation of the face was to the right in 23 instances and to the left in 27. The clinical notes indicated that 42 patients were right-handed and two were left-handed.

In addition to rotation, 18 patients had a significant tilt of the head associated with elevation of the shoulder on that side. Twelve tilted to the right and six to the left.

The sternocleidomastoid muscle was predominantly active in 39 cases (right 23, left 16) and the trapezius was predominant in 21 (left 7, right 14). In practically all cases, however, abnormal muscular contractions could be felt in both sides of the neck.

**Surgical Treatment**

**General Considerations.** Spasmodic torticollis is considered to be a muscular imbalance of the supporting structures of the head, and surgical treatment therefore involves partial denervation of the neck muscles bilaterally to permit reestablishment of balanced head posture. The experience gained from the prior series led to the impression that this is best attained by bilateral section of the spinal roots of the spinal accessory nerves and of the first three anterior cervical motor roots. Because of individual variations in the presenting signs and symptoms, the routine was usually modified to fit the specific predominance of muscle pull in each patient. For that reason a few of the patients were treated with preliminary peripheral section of one eleventh nerve. In 39 cases both eleventh nerves were severed at the point of their crossing of the vertebral arteries and in eight instances the section was unilateral only. In the remaining three cases the roots of the eleventh nerve were not severed intracranially.

In all 50 instances the first three cervical motor roots were severed bilaterally. In 27 cases the fourth root also was severed ipsilaterally on the side of greatly predominant unilateral sternomastoid trapezius contraction.

Patients considered to be candidates for operation were given a mimeographed sheet detailing the results of surgery in our series, the complications and residua to be anticipated, and the details of the postoperative physiotherapy that would be required. This helped the candidate make his own decision concerning operation.

We feel the only contraindication to this operation for spasmodic torticollis is evidence of dystonia in other muscle groups. The relief or improvement of torticollis does not prevent the usual progress of the basic disease or symptom complex.

**Surgical Technique.** The operation is carried out with the patient sitting and the head flexed forward to permit easy access to the cisterna magna. An incision is made from the inion to the fourth cervical spinous process, and the muscles retracted. Laminctomy of C-1 through C-3 is performed and the posterior rim of the foramen magnum resected for a distance of 10 to 15 mm. The dura is opened in the midline and retracted, with clipping of the circular sinus if necessary. The arachnoid is opened. The spinal root of the spinal accessory nerve is followed upward to the point where it crosses the vertebral artery. Usually it is free of any vessels at this point but this detail is checked with visual magnification. If a vessel accompanies the root, the root is doubly clipped with a small Weck clip and severed bilaterally.

Anterior cervical rhizotomy is then performed. A crucial point here relates to the identification of the first cervical root; frequently it is completely absent or so difficult to identify that it may escape notice. Almost uniformly the upper attachment of the dento-ligament sweeps upward in a broad band to cover the dorsal surface of the vertebral artery; once this is identified and its edge lifted with a hook and severed, the vertebral artery then comes clearly into view. The first cervical motor root can then be seen as a prominent, transversely directed, white structure running between the spinal cord and the point of entrance of the vertebral artery into the cranial cavity. The root should be inspected carefully for accompanying vessels which must be dissected from its surface and protected while the root is doubly clipped and divided. A mistake in identification of the first root will lead to faulty identification of the lower roots, and the rhizotomy planned to include C-1 to C-3 will involve C-2 to C-4 and produce impairment of diaphragmatic function.

Roots C-2 and C-3 are then cleared of