Treatment of Essential Neuralgia of the 9th Nerve by Selective Tractotomy

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Essential neuralgia of the 9th nerve is much less frequent than that of the 5th nerve. The associated suffering, however, is much greater than that with trigeminal neuralgia; eating and even the swallowing of liquids produces new neuralgic attacks.

There are few reports of large groups of cases. Parsons operated upon 15 patients during a period of 25 years, and Olivecrona operated upon only 2 patients in 13 years.

The most generally used method of treatment is intracranial section of the glossopharyngeal nerve. It is little known that spinal tractotomy offers perfect relief from 9th nerve pain. This procedure was inspired by the findings of Brodal in 1947. In 4 cases, in which Torkildsen had performed tractotomy for trigeminal neuralgia, he also found analgesia in the area served by the 7th, 9th and 10th nerves. These findings were confirmed and utilized for relief of pain in appropriate cases of malignant tumors. Sweet made a similar observation in 1942 and 1943; in 1944 and 1945 he performed trigeminal tractotomies in cases with 9th nerve neuralgia caused by tumor. Tractotomy was not recommended for essential neuralgia where intracranial section of the nerve was still considered a much safer and simpler method.

In 1954 when we performed our first spinal trigeminal tractotomy for essential glossopharyngeal neuralgia we could find no comparable report. In 1961, Bues published an account of 7 operated cases.

The success, possibly by chance, of our first case stimulated our interest in the problem of the exact relation of the 9th nerve pathways to those of the spinal trigeminal tract.

In 1897, Ramón y Cajal was the first to find in the cat fetus and in newly born mice that a small bundle of afferent fibers of the 9th and 10th nerves enters the spinal trigeminal tract and forms approximately one sixth or one seventh of its dorsomedial part. Other anatomists have made similar mammalian observations that include the 7th as well as the 9th and 10th nerves. These findings were not generally known. Freeman in 1927 was the first to observe that some bundles of 9th and 10th nerves enter the spinal trigeminal tract in the human fetal brain. Clinical observations had already demonstrated that trigeminal tractotomy affects the pain pathways of these nerves, but the precise location of their fibers was not known. In the published anatomies of the human central nervous system either they are not mentioned, or the spinal trigeminal tract is considered to be a common somesthetic bundle of all head nerves. Electrophysiological methods could not solve this problem because of the rich synaptic connections between all these nerves. Operative observation placed the pain fibers of the 7th, 9th and 10th nerves in different parts of the spinal trigeminal tract. It appeared that these pathways were part of the trigeminal tract and that, to interrupt them, the whole tract would have to be cut.

Our experience conflicted with this assumption. We, therefore, tried to solve the problem in three ways: by stimulation during trigeminal tractotomy, by careful charting of sensation after tractotomy, especially after partial tractotomy, and finally by animal experiments. We came to the conclusion that in man the pain fibers of the 7th, 9th

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Selective Tractotomy for 9th Nerve Neuralgia

and 10th nerves form a distinct bundle, running between the Burdach bundle and the trigeminal tract (Fig. 1). We suggest calling it the “Tractus spinalis nervi facialis, glossopharyngici et vagi communis.”

The precise course of this bundle has been established by simple light mechanical stimulation with a thin needle especially constructed for this purpose and guided by the use of binocular lenses. The patient feels slight pain and localizes it in the auditory passage, the pharynx or the tonsil. Stimulation of the lateral portion of this small tract evokes pain in the area served by the 3rd division of the 5th nerve. Stimulation of the medial portion causes pain over the area innervated by the 2nd cervical spinal root. The fibers of the 9th and 10th nerves are located either directly on the surface of the medulla oblongata, or slightly deeper, where they may overlap the fibers of the 3rd trigeminal division. The fine traces of stimulation pricks, clearly visible under the binocular lens, indicate the extent of the tractotomy needed. Its painlessness and precision can be ensured by infiltration of the tract with 0.05–0.1 ml. of 1 per cent procaine. This method of anesthesia, since it is performed at the level of the medulla oblongata, is without danger.

Our study made selective tractotomy practical. It can be successful if one inserts a narrow scalpel at the margin of the Burdach bundle and spinal trigeminal tract to a depth of 2 mm. at the most, and about 12 mm. above the 2nd cervical root level. This procedure cannot produce undesirable neurological damage. The spinocerebellar, spinothalamic and pyramidal pathways are far from the incision in the tract. There is usually no effect on the Burdach bundle; occasion-

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**Fig. 1.** Diagram of the location of the pain and temperature fibers of the 7th, 9th and 10th nerves in the medulla oblongata in accordance with our operative and postoperative observations.