14. Spasmodic Torticollis: Experimental Study and Indication to the Stereotaxic Surgery

Hajime HANDA, Kazuo MORI, Morio ITO, Haruhiro SHIMABUKURO,
Shunichi YONEDA and Ikuo MIZAWA

Department of Neurosurgery, Kyoto University Medical School

The rotation (around the naso-occipital axis) and lateral flexion (around the dorsoventral axis) of the head are thought to be important components of posturing of spasmodic torticollis. In the present study, analyses of the bizarre posturing of the head both in man and in animals with experimentally produced spasmodic torticollis were carried out in an attempt to obtain some indications of making stereotaxic lesion to this involuntary disorder.

1. Experimental Spasmodic Torticollis in Cats.

Spasmodic torticollis-like posture could be produced by making an electrolytic lesion in the paramedian mesencephalic tegmentum in cats. Histological examinations revealed that the location responsible for the production of this abnormal posturing involved parts of the medial mesencephalic reticular formation, the medial longitudinal fasciculus, the central tegmental fasciculus and the brachium conjunctivum at the level of the magnocellular part of the red nucleus.

The electrical stimulation to this critical area produced a pattern of motor activity characterized by a concave bending with the rotation and lateral flexion of the head toward the side stimulated. Subsequent coagulation followed by the tonic flexion of the head to the opposite side and the phasic (spasmodic) rotation of the head with the chin toward the side of the lesion (the direction of rotation of the occiput was to the opposite side to the lesion). These involuntary movements persisted for several weeks until the animal was sacrificed and the bizarre posture of the head was striking in its similarity to clinical spasmodic torticollis.

At the level of the inferior olivary nucleus, unilateral stimulation elicited the ipsilateral tonic lateral flexion. Following destruction, animals showed the mirror-image defect. It was rather a tonic abnormal posture consisting of the flexion and slight rotation of the head to the opposite side and definite phasic component as has been observed by destructing the mesencephalic tegmental core, could not be noticed in any case.

2. Clinical Studies.

In order to eliminate the muscle discharges due to the stretch reflex, electromyograms were recorded at the position at which the patient's chin was kept in the middle passively.

From EMG findings, there may be distinguished three groups.

Group I: Cases in which the muscle discharges greatly abolished or even disappeared if the patient's head was kept in the middle position.

Group II: Cases with predominantly unilateral EMG involvement.

Group III: Cases with bilateral EMG involvement.

In the cases in Group II, thalamotomy was carried out on the side contralateral to the involved muscles and remarkable improvement was obtained in almost all cases. On the contrary, cases in Group III, no case showed a remarkable alleviation by the unilateral stereotaxic surgery. However, the thalamus affects the modulation of muscular activity on both sides of the neck, and the contralateral effect is usually more profound. In this respects, it is our tentative opinion that a unilateral thalamotomy should be attempted at first, to the side contralateral to the sternocleidomastoid muscle which reveals more active discharges in electromyogram recorded in a condition that the patient's head is maintained to the midline position.

15. Stereotaxic Transsphenoidal Cryohypophysectomy

Eiichi TANI, Yutaka ISHIJIMA, Takuro TAKASE and Hajime HANDA

Department of Neurosurgery Kyoto University Medical School

In a series of 20 patients who underwent stereotaxic transsphenoidal cryohypophysectomy, 8 were suffering from advanced breast cancer, 3 were from acromegaly, 2 from progressive diabetic retinopathy, and 7 from intrasellar chromophobe adenoma. Endocrinological evaluation of HGH and ACTH secretion indicated a destruction range of the pituitary gland in mammary cancer and diabetic retinopathy. The cryohypophysectomy required two symmetrical lesions in each lateral lobe of the pituitary gland, at temperature of -180°C for 15 to 18 minutes. Postoperatively, the response of fasting plasma HGH to hypoglycemia induced by insulin administration markedly decreased from 71.7 to 15.6 $\mu\text{g/ml}$, and the urinary steroids also diminished from 31.8 to 6.58 mg in metopirone test despite of no measurable changes in ACTH test. In addition, a complete destruction of the pituitary was grossly evident in autopsy.

Five cases with advanced breast cancer undergoing cryosurgery insufficient to destroy the pituitary completely revealed relief of subjective symptoms. It indicated greatly that the changes of subjective complaints are unreliable for evaluation of postoperative results. One patient who could not walk for extensive metastasis to pelvis, has attended our outpatient clinic by herself for 11 months after the surgery. Three cases showing a significant preoperative decrease of cardiorespiratory function, because of extensive metastasis in the lung and the pleura, were dead of severe cardiopulmonary decompensation. Transient diabetes insipidus was evident in 2 cases.

Marked elevation of HGH was measured in 3 acromegalic patients with diabetes mellitus. A transient, abrupt increase of plasma HGH noted during freezing indicated release of a great amount of HGH into the blood stream. The