Dysphonia Associated with Cortical Neoplasms

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HUGHLINGS JACKSON's fundamental paper on dysphasia entitled "Notes on
the Physiology and Pathology of Language" has the significant sub-title, "Remarks on those Cases of Disease of the Nervous System in which Defect of Expression is the most Striking Symptom." Medical and surgical neurologists encounter disorders of language or speech (dysphasia) and articulation (dysarthria) more frequently than disorders of phonation (dysphonia). The distinction between dysphasia, dysarthria, and dysphonia may be amplified by the following definitions: "Speech is the term employed for the whole process by which meanings are comprehended and expressed in words... Articulation is the motor function whereby words having been formulated are converted into sounds... In the dysarthric patient symbolic verbal formulation is normal; only the mechanism of verbal sound production is faulty... In aphony (dysphonia) phonation is lost but articulation is preserved; hence the patient talks in a whisper." Dysphonia is generally due to acute or chronic infection, trauma, or neoplasm of the larynx or pharynx, psychogenic factors, and certain systemic diseases (myxedema, tetany). Less frequent causes of dysphonia are neurological disorders including parkinsonism, pseudobulbar palsy, lesions involving brain stem or lower cranial nerves, and neuromuscular dysfunction as in myasthenia gravis.

When these etiological factors are absent, dysphonia in association with neoplasms of the cerebral cortex is rare, and to our knowledge has not been reported. On the other hand, disorders of vocalization are well documented in clinicopathologic studies, during stimulation of exposed cerebral cortex of patients undergoing surgery for cerebral seizures, and postoperatively following excision of lesions in the supplementary motor area. These disorders of vocalization would fall into the broader category of dysphonia and are distinct from the dysphonic disorder reported in this paper.

Case Reports

Case 1. This 59-year-old right-handed man had pain in the right shoulder and arm of 6 months' duration. Cervical disc disease was suspected and conservative therapy instituted. This provided minimal symptomatic relief. About 3 weeks prior to admission, he noted progressive weakness of the right arm and leg plus "hoarseness" of voice.

Examination. On admission he was normally oriented and cooperative. There was a minimal right spastic hemiparesis, the arm and face being more involved than the leg. The optic fundi were normal. Language function was normal, in that his ability to understand spoken and written words and express himself was undisturbed. But there was a marked reduction in volume and pitch of his voice which was described as "strained hoarseness." It was necessary for the examiner's ear to be very close to the patient's mouth to hear him. There were no visible changes accompanying spoken speech, in particular, no flushing of the face, eye blinking, or abnormal movements of the facial musculature. Tongue movements were normal, and there was no evidence of pharyngeal, laryngeal, or palatal weakness or edema. There was no paretal cortical sensory deficit. In view of the marked dysphonic quality of spoken speech, a lesion in the brain stem was suspected, perhaps due to ischemia in the distribution of the vertebrobasilar arterial system.

Two weeks after admission, the right hemiparesis had progressed to hemiplegia, and the dysphonia was also more marked. In addition, the patient had headache and early morning vomiting. Routine studies of blood, urinalysis, and skull x-rays were normal. The

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electroencephalogram showed slow waves in the delta frequency range over the left Sylvian region. A 5-mm shift of intracerebral midline structures to the right side was noted in the echoencephalogram. A left carotid angiogram showed evidence of a centroparietal space-occupying lesion extending to deeper structures, and abnormal circulation as in a tumor. Brain scan demonstrated moderate increased uptake in the left centroparietal region.

Operation. The exposed area of the left central cerebral cortex appeared grossly normal. There was a tumor in the white matter of the post-central and superior parietal regions; it included a cyst containing about 10 cc of hemorrhagic fluid, which was part of a friable, necrotic, and very vascular neoplasm (Fig. 1). The tumor appeared to extend deep to the basal ganglia.

Histological diagnosis confirmed the operative impression of a Grade IV astrocytoma (glioblastoma multiforme).

Postoperative course. Recovery was uneventful. By the time of discharge the dysphonia had improved markedly; the voice was louder although still somewhat hoarse. Despite residual right hemiparesis, the patient was able to walk with support.

Case 2. A 47-year-old right-handed woman presented a 5 months’ history of progressive weakness starting in the right leg and involving the arm and face, without headache, seizure, or speech disturbance.

Examination. The patient was alert and cooperative. The optic fundi were normal. She had a moderately severe right spastic hemiparesis, with marked weakness of the right shoulder muscles. There was no sign of parietal lobe dysfunction, or dysphasia. Routine blood studies, urinalysis, and skull x-ray were normal. The electroencephalogram showed slight abnormality over the left frontotemporal region. The echoencephalogram showed a 5-mm shift of intracerebral midline structures to the right side. A left carotid angiogram revealed a very vascular neoplasm in the parietal region. The brain scan showed a marked uptake in the left mesial parietal region.

Operation. A large meningioma of the falx and involving the posteroparietal region was totally removed (Fig. 2). The tumor vessels were mainly arterial branches from the falx, but there was a large contribution from two branches of the pericallosal artery. The surrounding brain was swollen, together with flattening of the post-central gyrus.