

GLOBAL APHASIA AND BILATERAL APRAXIA DUE
TO AN ENDOTHELIOMA COMPRESSING
THE GYRUS SUPRAMARGINALIS *

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Tumors involving the cerebral cortex, provided they are small and well limited, may furnish valuable information on cerebral localization.

In Dr. Cushing's clinic I have had the opportunity to observe a patient in whom a small endothelioma compressing the left gyrus supramarginalis had produced global aphasia and bilateral ideomotor apraxia, which disappeared after the removal of the tumor. The essential facts in the history are given in the case report.

History.—Mr. C. (Surgical No. 13344), aged 60, right-handed, in November, 1919, while driving his car experienced sudden numbness in the right arm and hand, with loss of speech. After driving ten miles in this condition, he was able to say only "Yes" and "I don't know." He soon had a generalized convulsion. All symptoms had disappeared by the following day. During 1920 five similar attacks occurred. Between the attacks the patient was apparently normal and continued to perform his duties as treasurer of a bank.

On Oct. 14, 1920, after the usual sensory prodromes, the patient had another generalized convolution which was soon followed by two other severe attacks. When brought to the hospital the same day the right arm was constantly twitching; he could not understand the simplest orders and could say only "I don't know." The next day the twitchings had disappeared.

Examination.—The general physical examination was negative. Neurologic examination showed slight obscuration of the temporal margin of the left disk without swelling; slight paresis of the right arm which, however, he was continually moving and which showed astereognosis. The radial reflex was exaggerated on the right. Other reflexes and the plantar reflexes were normal. The patient was good humored and made every effort to cooperate.

There was global aphasia. Incomprehension of speech was complete. Sometimes a word was recognized and the patient guessed the sense of the order. No object could be named. Speech was limited to "It is funny" and "I don't know." Alexia was present, and he could write nothing except his name correctly. There was bilateral ideomotor apraxia. When offered a familiar object (matchbox, purse, etc.) he took it with his right hand (with the left only on insistence). He would hide it in his bed, take it out and regard it with perplexity, put it on his head, or execute most absurd movements with it; for example, quick alternative flexion and extension of the elbow. When offered a cigaret and a box of matches together, he put the cigaret in his mouth but executed with the matchbox the same absurd movements. The same confusion, though to a less degree, was apparent when using familiar objects like a fork and spoon in eating. On the succeeding days the same apraxia persisted. The patient frequently turned the head and eyes to the right as though subject to visual hallucinations.

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Diagnosis.—The diagnosis of postcentral tumor was made, based on the sensory features of the attacks, the slight paresis of the arm, the global aphasia and the apraxia (Marie and Foix's syndrome of the gyrus supramarginalis).

Treatment and Course.—On October 19, Dr. Cushing enucleated from the left gyrus supramarginalis an endothelioma measuring 4 by 3.5 cm. (Fig. 1). Its position was easily recognized by the situation of the Sylvian fissure and vein. This was subsequently verified on the roentgenogram by the use of Marie's scheme (Fig. 2). The rest of the cortex seemed quite normal and the brain was under no increase of tension.

The operation, though a simple one, was unfortunately complicated by a postoperative clot which formed in the cavity left by the tumor and



Fig. 1.—Lateral view of the tumor showing dural attachment below.

necessitated reelevation of the flap later in the day. This accident unquestionably produced some local damage, for on the following day there was moderate hemiparesis predominating in the upper limb, without a Babinski sign. The same ideomotor apraxia persisted as before (amorphism of the movements suggested). This naturally could be observed only in the left hand owing to the right paralysis. Power of speech was recovered gradually and was characterized by marked dysarthria and some apraxia (perseveration). Incomplete right hemianopsia was found. Soon the apraxia took a milder character and persisted for more than a month. He had unquestionable comprehension of the act to do, as proved by his mimicry (e. g., his perplexity, Figs. 3 and 4), and his perseveration, was not agnostic, but showed



Fig. 2.—Postoperative roentgenogram showing outline of bone flap with dilated diploetic vessels. The circle of silver clips on the margin of the excised dura is shown, and at the center point "N" represents a burr opening in the flap which was the central point of the tumor in which a small bony exostosis was present on the inner surface of the skull. (Compare with Marie's *schema* indicating the radiographic projection of the cranial sutures and cerebral convolutions.)



Figs. 3 and 4.—Degrees of perplexity of the patient after long unsuccessful trials to light the candle. He had previously been unable to light his cigarette which was finally lighted for him.

either omission of one of the essential elements of the act or its replacement by an inappropriate one (striking the candle against the box of matches, etc., Fig. 5), without special clumsiness of the individual movements. Occasionally he would be able to perform a given test at once, as it were automatically, but when he had failed at the beginning he could rarely accomplish the test (perseveration). The expressive gestures were correct. His mental condition was excellent, as proved by his attentiveness, efforts to reeducate his speech, judgment, sense of humor and entire behavior.

Recovery was progressive and when seen for the last time, three months after the operation, he had still definite dysarthria but only

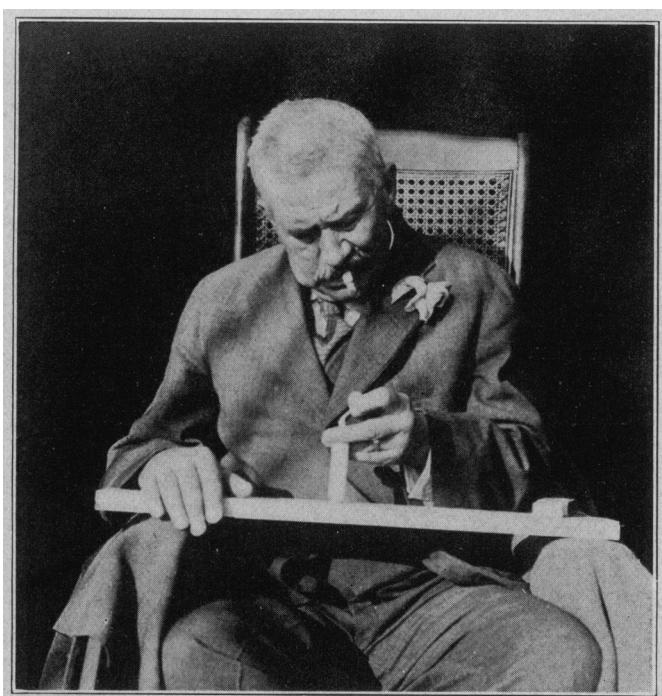


Fig. 5.—Patient endeavoring to strike the unlighted match on the candle.

slight aphasia (difficulty in writing words containing numerous vowels, but he could read perfectly). There was no further trace of the apraxia. He was in good general condition, could use his right arm perfectly and could walk several miles.

This case seems to fulfil all the conditions required for a brain tumor to furnish valuable evidence regarding localization; namely, a small and enucleable tumor and minimized pressure conditions, as shown by the absence of choked disk or distant symptoms. In three other of Dr. Cushing's patients occasion was offered to appreciate the

practical value of the localizations given by Marie and Foix: In a case of an encapsulated glioma the size of a large hen's egg situated in the region of the gyrus supramarginalis and angular gyrus there was the same global aphasia with apraxia, both of which disappeared after the removal of the tumor, the aphasia and alexia immediately, the apraxia and the agraphia after about eight days. The day following the operation, the patient, an accountant, could sustain a long conversation, was not only clear but witty, and yet when asked, for example, to light a cigaret forgot to strike the match, but struck it against the cigaret in obstinate and vain trials. He said later he thought the matches were "fake ones." This dissociation, during the recovery, between the aphasic and apraxic symptoms is rather interesting.

In two other cases a small gliomatous cyst of the frontal region had produced the type of aphasia characterized by the intensity of the dysarthria contrasting with the relative conservation of the understanding. This represents the syndrome anarthrique of Marie and Foix, which they showed to be produced by a lesion in the posterior part of the second frontal convolution and the adjacent part of the ascending gyrus.

1. A patient with a tumor of the gyrus supramarginalis showed slight paresis of the right superior limb with marked sensory disturbances, global aphasia, and ideomotor apraxia. These are the elements of the syndrome of the gyrus supramarginalis described by Marie and Foix grounded on their experience with aphasia resulting from war wounds.¹

2. The case agrees with the notion generally admitted of the possible production of bilateral ideomotor apraxia by a lesion at the level of the left gyrus supramarginalis. On account of the small dimensions of the tumor and its superficial situation, compression of the corpus callosum was out of the question. A lesion of the left gyrus supramarginalis has been found responsible for a true bilateral apraxia in thirteen cases of the forty-one with anatomic verification published in 1914 (von Monakow²). Marie and Foix, in their series, found apraxia in only two cases of injury of the supramarginal gyrus. They assume that the lesions may not have been sufficiently deep. But it may be that the apraxic symptoms had been transitory. In the other twenty-eight cases quoted by von Monakow, the lesions, always multiple, often extensive, were found in the most various regions of the brain, even in the thalamus (multiple thromboses or hemorrhage in arteriosclerotic brains, tumors of "unusual dimensions"). The inconclusiveness of the anatomic documents, together with considerations on the multiplicity of elements which must compose the normal handling

(Handlung) have led von Monakow to a rather skeptical opinion on the localizing value of the symptom apraxia. Therefore a case like the present one, and even the one alluded to in the foregoing, because they are real experiments, are most instructive.

1. Marie, P., and Foix, C.: *Les aphasies de guerre*, Rev. Neurol. **24**:53-87, 1917.

2. Von Monakow: *Die Localisation im Grosshirn und der Alban der Funktion durch kortikale Herde*, 1914.