ANGIOSARCOMA OF THE LEFT HEMISPHERE¹

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The clinical case I am about to report presents nothing new as to symptomatology or pathological findings, but is a record simply of a malignant infiltrating growth of the left hemisphere. The patient, Mrs. G., was referred to me by Dr. B. J. Merrill, of Stillwater, April 14, 1908. Since 1906 she had complained of certain peculiar attacks which had greatly frightened her, and for a year previous there had been a queer feeling in the right side of the face. She had also been subject to crying spells, sometimes crying all night. Ten days before consulting me she was observed to drop her fork and spoon when eating and for the first time it was noticed that her right hand was paretic. The day following she could not use the right hand at all, although she could move her arm slightly. She came on the electric line, a distance of nineteen miles, to consult me. She was able to walk, but with difficulty, and complained of great fatigue. Her hand and arm were paralyzed and there was involvement of the right face.

I find no record as to the stereognostic sense or the involvement of sensation on the affected side. The invasion of the brain by the growth leaves no doubt as to what the symptoms must have been in that respect. The mental reflexes were sluggish, yet she answered all questions intelligently. Within two days the entire right side was completely paralyzed and she had become semicomatose.

December 25, 1906, she awoke from a sound sleep and found herself unable to speak. She made a peculiar noise in the throat; the tongue seemed thick and there was a tonic spasm of the right side of the face; this attack lasted about five minutes. March 15 and 16 she had two similar seizures, both at night. Later in the month she had two more attacks, one at night, the other during the day, at which time her face became flushed. She was perfectly conscious and locomotion was unimpaired. There were only two attacks in June, 1907, both occurring during the day. In August she had but one, which rendered her speechless for nine hours; her face was drawn to the right for a short time and there was a twitching of the muscles of the throat and tongue; the twitching of the tongue continuing at intervals all during the

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day. The word "twitching" as used by the daughter does not fully describe the condition, because at these times the tongue would be protruded, the eyes roll upward, and the arm be extended and rigid. These attacks occurred every five minutes during waking hours from the last week of September to the middle of October, when there ensued an almost complete cessation for five months. After October there was observed a trouble of speech, she found it difficult to pronounce words, especially those of several syllables; her mental reflexes were slow, and she was inclined to sleep a good deal. Her talk at times was childish and her memory bad. There was no headache, no nausea, no vomiting. There was optic neuritis of both eyes.

Neither the family nor personal history of Mrs. G. revealed any facts bearing upon her case. When she came to the hospital she was in a stuporous condition. There was paralysis of the right face, arm and leg. The wrist, triceps, and knee-jerk of the right side were all exaggerated; there was also marked clonus of the right foot. The reflexes on the left side were all normal. There was no Babinski. Percussion elicited marked tenderness over left parietal region. Dynamometer, right hand, 0, left 20 degrees. The power of flexion and extension of the left arm was impaired, that of the right absolutely lost. The pupils were equal and normal in size; reacted sluggishly to light, but nothing in regard to accommodation could be elicited. Hemoglobin 80 per cent., red blood cells 5,248,000, leucocytes, 8,134.

On April 11, Dr. R. O. Earl, of St. Paul, made an exploratory operation. The brain surface in the left Rolandic region was dark colored and more resistant than normal; there was an infiltrating growth apparently extensively diffused through the brain tissue; there was also marked intracranial pressure. A radical operation being impossible, the bony flap was replaced and the skin sutured. The patient died two days later.

The brain was not as carefully handled at the time of autopsy as it should have been. Subsequent examination showed it to be extremely collapsed and flattened and there were four longitudinal cuts in each hemisphere, all of which made it very difficult to define the limits of the lesion with accuracy. The infiltration extended anteriorly to the precentral motor area and posteriorly it involved the sensory areas and extended into the temporal lobe. The growth penetrated deeply into the brain, involving the internal capsule. From the left hemisphere there were removed three tumors, two at the time of operation and one at the autopsy. These were examined by Dr. Rothrock, of St. Paul, to whom I am indebted for drawings from sections of the first two tumors and for the following description of the pathological findings in all three.

Small Tumor No. 1.—Removed at time of operation from Rolandic area. Tissue highly vascular, consisting of well defined

blood vessels with walls with considerable areas packed with blood cells in the intervening spaces. Stroma chiefly new forming connective tissue or tumor formation, leaving very little brain structure to be seen. Everywhere may be seen cells with densely stained nuclei varying in character, round and spindle type, the latter predominating in the preparation. There are two areas of considerable size to be seen, consisting of rather densely packed cells, round and spindle in type, the latter predominating, all with deeply stained nuclei. These areas are characteristic from the

FIG. 1. Drawing from one of Dr. Rothrock's sections of the tumor.

fact that the accumulation is massed around a well defined blood vessel whose walls are intact. Even these cell masses show in the interspaces numerous blood channels, some with walls, others without. Those without walls are separated by a fine net-work containing a few spindle-shaped cells with deeply stained nuclei. In a few places the cell nuclei contain much coloring matter, but could not be classed as constituting melanotic sarcoma, but rather cells rich in chromatin.

Small Tumor No. 2.—Removed at time of operation. General arrangement of tissue is similar to that of smallest tumor, but

character of cells more decidedly spindle type. In this specimen is a considerable area in which cells are massed and give a rather typical picture of spindle cell sarcoma, the nuclei of the cell staining very deeply with hematoxylin. In these densely packed areas it is noticeable that there is less extravasation of blood than in other portions of the section. In this preparation also the pigment cells are rather more marked and their distribution more general. Otherwise structure same as in preceding specimen.

Large Tumor No. 3.—Removed at post-mortem. Shows in the main an arrangement similar to the other two specimens. The tumor is highly vascular in places, resembling an angioma.

FIG. 2. Drawing from one of Dr. Rothrock's sections of the tumor, Spindle cells.

The general arrangement is almost identical, but the character of the cells differs. In one place is a mass of cells which are densely packed but do not stain clearly, consisting of small round cells. In other portions of the tumor, however, simple cells predominate.

Dr. Johnson of the University of Minnesota has made a study of the nerve cells in six different areas of the affected cortex. The sections were stained by neutral red to demonstrate the

tigroid bodies (Nissl). "All the sections show," says Dr. Johnson, "that the tumor was infiltrating and had no definite boundaries. They show also that the infiltration followed the blood vessels, affecting streaks and strands of cortical tissue and also of deep white matter, while leaving larger or smaller areas in normal condition. This accounts for the intermittence of the attacks and for the wide extent of the disease before a fatal onset in the motor area."