Primary Reticulum-Cell Sarcoma of the Brain

Victor E. Albites, M.D.
Department of Pathology, Isaac Albert Research Institute of the Jewish Chronic Disease Hospital, Brooklyn, New York

Primary brain sarcomas possessing a "reticulum-cell" histologic profile are known to have certain common morphologic features. Among them, the usually cited are the uniformity of cellular characteristics, the presence of argyrophilic reticulin, the fairly characteristic tumor-cell cuffing of the blood vessels within a concentrically laminated frame of perivascular reticulin, the absence or presence of cytoplasmic argyrophilia with Hortega's silver-carbonate method, the absence of neuroglia, the topographic predilection for the cerebral hemispheres and the high degree of malignancy manifested by the extremely short survival period of patients who harbor them.1-5,8,12,14, 16,23,28

A variety of histologic types have been described. The important contributions of del Rio-Hortega22 shed new light into the histogenesis of these tumors and made differential diagnosis from glial tumors much easier.

In view of the relative rarity of reticulum-cell sarcoma of the brain it seemed worth while to present the clinical and pathologic features of the following case.

Case Report

A 34-year-old, married, white female was admitted to the Jewish Chronic Disease Hospital in September 1961, transferred from another hospital, after a prolonged illness approximately 7 years in duration.

In 1954, the patient had onset of intermittent severe headaches associated with some visual disturbances. Initially these attacks were of daily occurrence, a few seconds in duration and characterized by "objects bobbing up and down with distortion of vision." During these brief episodes, it was not possible for the patient to walk. In the beginning rest in bed was sufficient to permit her to return to her normal state.

In 1956-1957, the patient was admitted to two different institutions because of a return of symp-

toms and, in addition, a loss of equilibrium about 5 days in duration. The episode resulting in her second hospitalization was characterized by sudden onset of blurred vision and ataxia with a tendency to fall to the left, unassociated with any seizures of vertigo. Severe headaches followed this episode. Weakness of the left shoulder and left lower extremity was elicited. An electroencephalogram showed a depression of the alpha rhythm on the right side. Roentgenograms of the skull and long bones were unremarkable. A right carotid angiogram showed no abnormalities.

Hemoglobin was 9.6 gm. per 100 ml., hematocrit was 35 per cent and count of white blood cells was 7,200 per c.mm. with a differential count of 46 polymorphonuclear cells, 6 stab forms, 37 lymphocytes, 1 eosinophil and 9 monocytes. Count of platelets was 212,000 per c.mm. Bone marrow was reported as normal. Fasting blood sugar was 71 mg. per 100 ml. and urea nitrogen was 12 mg. per 100 ml. Serum proteins were 7.8 gm. per 100 ml with 3.0 gm. of albumin and 4.8 gm. of globulin. Serum-protein electrophoresis showed an increase in alpha1 and gamma globulins. Indices of serum-globulin fraction-distribution showed an increase in mucoproteins "suggesting active inflammation or neoplastic disease." An L.E. preparation was negative. The patient was discharged on steroid therapy.

In the succeeding 4 years the patient was hospitalized repeatedly at other institutions for papilloma of the right breast (1957), tonsillectomy (1958), and recurrent attacks of convulsive seizures which apparently were controlled with derivatives of Dilantin.

Four weeks before the terminal admission, the patient had another attack of convulsions, on this occasion followed by 24 hours of unconsciousness.

Examination on admission revealed a chronically ill young female, fully conscious but showing marked impairment of memory and periodic confusion. Blood pressure was 130/90 and pulse rate was 90 per min. Slight exophthalmos was recorded. Eye grounds showed no papilledema, exudate or hemorrhage. A soft systolic murmur in the pulmonic area was noted. The patient's speech was intact. There was generalized wasting of the musculature. There was moderate weakness of both upper extremities and the left leg. There was diminution of sensations of pain and touch distally in all extremities.

Hemoglobin was 12.0 gm. per 100 ml., hematocrit was 37 per cent, count of red blood cells was

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of muscles became more and more prominent. Patient’s attitude was characterized by greater agitation. One day prior to death another lumbar puncture was performed; the fluid was clear and unremarkable biochemically. Following this procedure, she became more unresponsive and exhibited shallow respirations. The temperature exceeded 107°F. on the following day and was accompanied by basilar pneumonitis. The blood pressure became labile and she expired on Nov. 11, 1961.

**Autopsy.** The principal findings were limited to the brain and lungs. The brain weighed 1310 gm. The cerebral hemispheres were asymmetric grossly, the right one appreciably larger than the left and distorted by a large mass located in the temporal and occipital lobes and protruding through, up to the plane of the basilar meninges (Fig. 1). After fixation in 10 per cent neutral formalin, coronal sections disclosed a single, well circumscribed mass located principally in the parietal, temporal and part of the occipital white matter of the right cerebrum. The line of demarcation between the neoplasm and surrounding tissues was established sharply and in places a clear cleavage was possible. The growth was extremely dense, granular and colored a dark brownish-green.

**Histologic Study.** Sections of formalin-fixed tissue were stained with hematoxylin and eosin, phosphotungstic-acid hematoxylin, Masson trichrome and Gomori’s stain for reticulin. Frozen sections of wet formalin tissue were stained by del Rio-Hortega’s method for microglia.

The capsule described grossly was composed of collagenous tissue (Fig. 2) with intervening collections of hemosiderin. A considerable proportion of the neoplasm had undergone cystic degeneration and hemorrhage. However, at the inferior margin of the cystic encapsulation was a considerable mass of tumor composed of fairly uniform cells, characteristically averaging 15 to 20 microns in diameter, spherical and ovoid in external contour with a centrally located nucleus. No significant processes could be seen emerging from the tumor cells. In many areas, the cytoplasm was sharply defined and amphiphilic in staining characteristics (Fig. 3). In other areas, it was difficult to outline its borders. The phosphotungstic-acid hematoxylin stain showed no fibrils arising from the tumor cells. A characteristic feature was given by the presence of thick-walled blood vessels. A Masson trichrome stain showed the wall to be composed of rather thick bands of collagen. The lumen of these blood vessels was considerably small in comparison to the diameter of the entire cross section of the vessels. Sections stained for reticulin by Gomori’s method revealed delicate fibers arranged concentrically and streaming radially from the above mentioned vessels, commonly separating or enclosing groups of tumor cells (Fig.

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**Fig. 1.** Gross view of tumor which occupies most of the right temporal lobe.