METASTATIC PINEAL TUMORS
A CLINICOPATHOLOGIC REPORT OF TWO CASES*

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Metastasis to the lung from pineal tumor is known to be exceedingly rare. However, among 13 fatal cases of pineal tumor which reached the Army Institute of Pathology during World War II there were 2 in which metastasis to the lung had occurred. Only 1 such case has been previously reported—that of Stowell, Sachs and Russell.25 Their patient, a boy of 15, had been ill for 3 weeks before entering hospital. At operation a large tumor, diagnosed as a primary intracranial chorionepithelioma, was removed from the pineal region. Death occurred approximately 3 months after the onset of symptoms. On postmortem examination no pineal tissue was found, but there were many arenaceous bodies in the region where the pineal body normally is present. The conclusion reached was that the tumor arose as a teratoma in the pineal region and that its chorionepitheliomatous portion grew rapidly at the expense of the other elements, destroying the original teratoma and the pineal body. The tumor had invaded the superior sagittal sinus and other blood vessels, and had metastasized to all lobes of both lungs.

Metastasis of other primary intracranial tumors to extracranial structures is also infrequent. This mode of spread has usually occurred by way of the blood stream or lymphatics, or both, as will be noted in the following examples gathered from the literature: basophil adenocarcinoma of the hypophysis with metastases to liver;4 chromophobe cell carcinoma of the hypophysis to liver;18 adenocarcinoma of the hypophysis to liver and hepatic lymph nodes;6 adenocarcinoma of the hypophysis to liver, kidneys, urinary bladder, uterus, vagina and para-aortic lymph nodes;11 benign adenoma of the hypophysis to bones;27 malignant mixed chromophobe and chromophile hypophysial tumor to cervical lymph nodes;9 large-cell carcinoma of the hypophysis to cervical lymph nodes, lungs and pleura;2 sarcomatous meningioma to cervical lymph nodes;22 meningioma to one of both lungs;5,8,15,25 meningioma, in 3 cases, 1) to lungs, pleura, abdominal lymph nodes, lumbar vertebra, 2) to lung, liver, mediastinum, and 3) to pleura;21 hemangioblastoma to lungs and hilus nodes;1 medulloblastoma to subcutaneous tissue over sternum;23 medulloblastoma to vertebræ;19 spongioblastoma multiforme to lung, shoulder region and arm;7 glioblastoma multiforme to lungs;17 astroblastoma to thoracic vertebrae, ribs, lungs and peribronchial lymph nodes;24 probable atypical oligodendroglioma to neck.24

CASE REPORTS

Case 1.† A white male, aged 34 years, entered hospital‡ on Feb. 1, 1944. For 6 weeks he had had dull, constant headache, bifrontal and left occipital, and had noted visual fatigue on reading. For 5 weeks he had been unable to write, though he understood what he read and knew what he wanted to write. He denied having had motor weakness

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† Army Institute of Pathology Accession 157997.
‡ 38rd General Hospital, then in Tunisia.
or altered sensation. It is noteworthy that he had served as an infantry squad leader in combat until 3 weeks before admission.

**Examination.** The patient could understand adequately the spoken and written word; however, his writing was poorly performed. While walking, he held his head stiffly erect, and whereas the left arm was kept partly flexed, the right hung immobile. The Romberg test was positive, the patient tending to fall backward and slightly to the right. Coordination and succession tests were normal on the left side of the body but were defective on the right. There was motor weakness of the entire right side, including the lower part of the face. The right palpebral fissure was narrowed. On the right side the deep reflexes were slightly hyperactive and the Oppenheim and Hoffmann signs could be elicited. There was papilledema of 1 D. on the right, and 2 D. on the left.

Ventriculograms indicated a tumor midway between the posterior portions of the bodies of the lateral ventricles. The roof of the 3rd ventricle was displaced downward, and the walls of the posteromedial portion of the lateral ventricles bulged outward. Calcification corresponding to the position of the pineal body also was visible.

**Operation,** Feb. 8, 1944. Craniotomy (E.H.C., assisted by Dr. J. L. Pool) via a right parieto-occipital approach. The falx cerebri was normal. Slight yellowish discoloration was noted near the splenium of the corpus callosum. The posterior portion of the corpus callosum was split in the midline for a distance of 3 or 4 cm. Beneath it was found material which at first glance resembled an organized hematoma, but further dissection showed it to be a well-encapsulated tumor. Extirpation was then undertaken. A 5 cm. cone of the right parietal lobe was removed from the post-Rolandic region to afford exposure of the right and superior aspects of the tumor; then, in order to gain access to the left side of the tumor, the lower two-thirds of the falx cerebri were divided, clipped, and retracted. The corpus callosum was split further anteriorly. The tumor was found to be attached near the junction of the falx and incisura (Fig. 1A). At the attachment a vein, believed to be the right lesser vein of Galen, was found to traverse the tumor. The anterior pole, which extended fully 5 cm. anterior to the level of the incisura, was lifted from its bed, leaving the tela choroidea intact and exposed. On tipping the tumor, a thumb-sized posterior projection was seen to extend along the undersurface of the tentorium. Here arose a considerable portion of the tumor's blood supply.

The *postoperative course* was stormy, with prolonged unconsciousness and frequent fits involving the left side. On one occasion the wound was re-explored and old blood clots and necrotic tissue were removed. By Mar. 17, 1944, the patient was again alert and cooperative. The left hemiplegia had receded and sphincter control was being slowly regained. He was strong enough to walk, but was incoordinate on the left side. There was some reduction of hearing bilaterally. Improvement continued until April 26, 1944, when he showed unmistakable evidence of increasing intracranial pressure. A CSF fistula developed at the operative site. Death occurred on May 5, 1944, about 5 months after onset of symptoms and 3 months after operation.

**Pathologic Examination.** *Microscopic.* The tumor removed at operation revealed near the tip of its posterior extension, i.e., in the region where normally the pineal body is to be found, a number of arenaeocoeus bodies, which were embedded in masses of large spheroidal cells separated by an anastomosing connective-tissue stroma bearing a variable number of small cells (Fig. 1B). The large (parenchymal) cells had fairly abundant loculated cytoplasm (Fig. 2A). The nuclei were relatively large and contained a delicate chromatin network and one or two conspicuous nucleoli, generally basophilic. The characteristics of the small cells varied with the field examined. They were most abundant in the vicinity of the erstwhile pineal body. Most of them resembled small lymphocytes, i.e., they had a densely chromatic spherical or ovoid nucleus which contained fine or coarse chromatine bodies, and cytoplasm which was scanty and usually homogeneous. In some regions there were cells that resembled large lymphocytes and sometimes plasma cells (Fig. 2A). In a few stromal areas there were, in addition, scattered small polygonal and elongated cells with vesicular nuclei and homogeneous eosinophilic cytoplasm. An occasional eosinophilic leukocyte was noted. There were a few abnormal mitotic figures. This portion of the tumor, regarded as a "pinealoma," was clearly demarcated from the remainder of the tumor (Fig. 1B).