PINEALOMA WITH METASTASES IN THE CENTRAL NERVOUS SYSTEM

A RATIONALE OF TREATMENT*

FRED D. FOWLER, M.D.,† EBEN ALEXANDER, JR., M.D., AND COURTLAND H. DAVIS, JR., M.D.

Section of Neurosurgery, Department of Surgery, Bowman Gray School of Medicine, Winston-Salem, North Carolina

(Received for publication December 27, 1955)

The metastatic potentiality of pineal tumors has been demonstrated by a number of isolated case reports. In 1911, Bailey and Jelliffe summarized the literature pertaining to pineal tumors since the first report by Blane in 1800. In none of these cases was the occurrence of metastatic spread mentioned. In 1925 Horrax and Bailey reported 2 cases in which there were metastases and it has been shown subsequently that tumors arising from the pineal body may extend beyond their site of origin by direct continuity, by seeding through the cerebrospinal fluid pathways, and, occasionally, through the blood stream. These reports have been summarized in Table 1.

There are 3 reported cases of pineal tumors with extracranial metastases. Stowell et al. described a patient with soft, nodular metastases in his lung. This patient had been subjected to a transcallosal exploration in an attempt to remove his tumor. It is of interest to note that this neoplasm was histologically identified as a choriocarcinoma, and the chorionic gonadotropin was elevated both in the urine and cerebrospinal fluid. Tompkins et al. found metastases to the lung in 2 out of 13 cases of pineal tumors in which autopsy was performed. In 1 of their cases direct invasion of the straight sinus by the tumor was demonstrated. This patient had been explored through the right parieto-occipital cortex with incomplete removal of his lesion. He died 4 months postoperatively and pathologically this tumor was classified as a teratocarcinoma. In their second case the tumor was partially removed at surgery and was histologically identified as a pinealoma. This patient was given roentgen therapy to the posterior portion of the third ventricle. Ten months later a spastic paraplegia developed, and the cerebrospinal fluid at this time contained "fragments of necrotic tissue in which neoplastic cells were identified." Radiation was then given to the vertebral column, but the condition of the patient deteriorated and he died 6 months later. At autopsy tumor could not be identified at the site of the pineal body,

† Now at Children’s Medical Center, Boston, Massachusetts.
and the structures in this region were replaced by arenaceous bodies and dense fibrous connective tissue. However, tumor was found in the lung and tracheobronchial lymph nodes. Examination of the spinal cord was not done. As will be noted, all reported patients with extracranial spread of their tumor had been subjected to direct surgical exploration. It is probable that this has played some part in allowing the malignant cells access to the blood stream.

Spread by means of the cerebrospinal fluid pathways has been mentioned by Cushing\(^9\) who pointed out the similarity between the pinealoblastoma and the medulloblastoma stating that they are “akin . . . both in their microscopic appearance and behaviour (e.g., in their tendency to seed themselves in the floor of the third ventricle).” Horrax and Bailey\(^19\) noted in their series of 12 cases that there was spread to the anterior part of the third ventricle or posterior fossa in 2. Russell and Sachs\(^20\) reported that in 7 of 15 cases at autopsy there were metastases to either the ventricles or the subarachnoid space. Baggenstoss and Love\(^3\) reported a patient from whom a tumor, which was identified pathologically as a pinealoma, was removed from the suprachiasmatic region. Roentgen therapy was given to the head and the patient did well for 18 months at which time he began to have pain in his left leg. At laminectomy multiple tumor nodules, having the same histologic appearance as his cranial lesion, were found to be implanted about the cauda equina.

The occurrence of spread of pineal body tumors is likely to be more frequent than may be inferred from the number of reported cases because of the lack of pathologic examinations of the spinal cord. It has been shown that examination for these metastases must be done histologically, as, on occasion, diffuse meningeal involvement that is not grossly obvious may occur.\(^11\) It is also possible that before the use of palliative roentgen therapy, many of these patients died quite promptly with increased intracranial pressure as a result of their primary tumor, and thus metastases did not have time to occur or were not clinically significant prior to death. As the longevity of the patient is increased by decompression combined with roentgen treatment directed toward the primary lesion, an increased incidence of metastases may become apparent. The following cases are presented in the hope that a more general cognizance of this problem may lead to a more efficacious manner of therapy.

CASE REPORTS

Case 1. NCBH #185634. L.L., a 10-year-old white male, was admitted to the North Carolina Baptist Hospital on May 17, 1954. He had been in good health until 10 months previously, when his appetite became poor, he began to lose weight, and he seemed to tire more easily. He then began to have polydipsia and polyuria. Seven months before admission he started having frontal headaches and aching pains in his legs and was admitted to another hospital for metabolic investigation without any definite conclusions being reached. The patient became continually weaker, and began to have vomiting associated with his headaches. Studies done 3 months prior