Invasive Pituitary Adenomas

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Pituitary adenomas which extend beyond their capsular limits and invade surrounding structures cannot be grouped together into a well-defined clinicopathological unit. They occur infrequently; consequently, the accumulated data concerning their natural history are meager. The problem is confused further by the variability of their gross and microscopic patterns of growth. The following cases are reported in order to extend the collected knowledge of the diverse features of invasive pituitary adenomas.

Material

During the years 1952 to 1963 inclusive, adenoma of the pituitary gland was diagnosed and verified histologically in 53 patients at the Walter Reed General Hospital. Five of the 53 tumors had extended beyond their capsules, involved contiguous structures, and accordingly were considered to be invasive.

Case Reports

Case 1. A 26-year-old Army officer was admitted to the hospital on Sept. 8, 1951, following a 6-week history of left orbital pain, headache and projectile vomiting.

Examination disclosed hemorrhages and papilledema in both oculi fundi, a right homonymous hemianopsia and disorientation. Roentgenograms of the skull showed an enlarged sella turcica consistent with an intrasellar tumor.

Hydrocephalus was diagnosed and attributed to tumor obstructing the 3rd ventricle.

Operation. Following a ventriculocisternal shunt, a left transfrontal craniotomy was accomplished on Sept. 19, 1951. An invasive meaty tumor was found enveloping the optic chiasm, the left optic nerve and tract, with extension into the interpeduncular fossa. Subtotal removal was effected without incident.

Microscopic Examination. The tumor was composed of masses of cells lacking an orderly arrangement. The cytoplasm was agranular, amphophilic, and moderate in amount. The nuclei were pleomorphic and varied from vesicular to pyknotic. Connective-tissue stroma was inconspicuous. Occasional mitotic figures were seen. The blood vessels appeared normal. Mineralization was absent (Fig. 1). Diagnosis of invasive pituitary adenoma with cellular atypism was made.

Course. Following an uneventful recovery, roentgen-ray therapy utilizing the 1000 kV. unit was started on Oct. 3, 1951. Through 7×7 cm. frontal, right and left temporal ports, 4000 r were delivered to the tumor during 45 treatments distributed over 50 days, which were tolerated well.

During the remainder of his hospitalization detailed investigation of his endocrinologic status failed to reveal any abnormality. He was discharged on May 31, 1952. Residual deficit then was limited to the cuts in the visual fields noted on admission, and 20/200 visual acuity of the left eye.

During the ensuing 8 years the patient required replacement therapy with thyroid and cortisone. Despite progressive lethargy and weakness, however, he was able to continue working.

2nd Admission. In September 1960, he became progressively confused and reentered the hospital. Roentgenograms of the skull showed no change from those which were taken in 1951. Left carotid angiogram suggested the possibility of recurrent tumor.

2nd Operation. On Sept. 22, 1960, a right frontotemporal craniotomy was performed and the perisellar region was explored. Recurrent tumor was not found. The leptomeninges were markedly thickened, and the basal cisterns were obliterated.

Course. A ventriculostial shunt failed to improve his mental status.

He was transferred to another hospital for long-term care because he was unable to look after his own needs. Progressive deterioration of his mental status occurred until death, March 12, 1962. A complete autopsy was performed; the protocol and microscopic sections were available for our study.

Autopsy. Aside from the testicular atrophy, atrophy of the adrenal and thyroid glands, and a mild bronchopneumonia, significant findings were limited to the head. The brain weighed 1850 gm. and showed the residuals of the surgical procedures. The two tubes for shunts had evoked a marked ependymitis. The mammillary bodies,
tuber cinereum and infundibulum were distorted beyond gross recognition. There was a moderate degree of hydrocephalus. The leptomeninges were thickened so that the basal cisterns were obliterated. The sella turcica was greatly enlarged and was empty except for a loose fragment of tissue presumed to be the remnants of the pituitary gland.

The hypothalamus, subthalamus and cerebral peduncles showed sclerotic hyaline vessels and nonspecific gliosis compatible with the effect of radiation. The pia, subpial parenchyma of the basal cisterns, ependyma and subependymal grey of all the ventricles were involved with mililiary noncaseating granulomata. No organisms were seen or cultured. No pituitary tissue, either normal or neoplastic, was identified.

Case 2. A 20-year-old soldier was admitted on Jan. 12, 1954 because of sudden blurring of vision of the left eye 6 weeks previously. His only other symptom was increasingly severe intermittent bifrontal headaches.

Examination revealed a right homonymous hemianopsia with left visual acuity reduced to counting of fingers, and a depressed right corneal reflex. Destruction of the sella turcica and clinoid processes as well as erosion of the left greater and lesser wings of the sphenoid bone were evident on roentgenograms of the skull. Detailed investigation of the function of the endocrine glands disclosed no abnormality.

Operation. A left frontal craniotomy was performed on Feb. 2, 1954. A large tumor was encountered which had destroyed the posterior wall of the orbit on the left and displaced the optic nerve and chiasm superiorly. Extensive involvement of the neighboring structures permitted only attempt at subtotal removal, which was carried out without incident.

Course. He did well for 36 hours and seemed to be making an uneventful recovery, when he became comatose and died 48 hours after operation.

Autopsy. Pertinent findings were limited to the head. The brain weighed 1350 gm. The sella turcica was completely destroyed and replaced by tumor. The optic, oculomotor and trigeminal nerves, bilaterally, were surrounded by the tumor as they emerged from the brain. The tumor extended into the ethmoidal and sphenoidal sinuses and the left orbit. Although displaced and distorted, the brain itself was not invaded by tumor. Extensive recent hemorrhage surrounded the tumor.

Microscopic Examination. The tumor was composed of cells without an orderly arrangement. The cytoplasm was agranular, uniformly eosinophilic and moderate in amount. The nuclei were pale, vesicular and were minimally pleomorphic. Connective-tissue stroma was inconsiderable. Occasional mitotic figures were seen. Blood vessels were normal. There was no mineralization (Figs. 2 and 3). Diagnosis was invasive pituitary adenoma. Death was attributed to postoperative hemorrhage at the operative site.

Fig. 1. Case 1. Pituitary adenoma. Note pleomorphism. Hematoxylin and eosin, X620.