METASTASIZING CEREBELLAR TUMORS
THE DIFFICULTY IN DISTINGUISHING BETWEEN MEDULLOBLASTOMA AND NEUROBLASTOMA

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It is now 20 years since one of the first reports in the literature of cerebellar neoplasm with tumors in distant bones was presented from this clinic. In the ensuing years, evaluation of many of the clinical and radiologic problems attending cerebellar medulloblastoma has been pursued based on experiences with patients passing through our neurosurgical clinic. As a result, additional information has become available which warrants re-examination of the concept that medulloblastoma may occasionally metastasize to extraneural structures.

Although it is generally agreed that these tumors remain localized to the central nervous system, sporadic case reports of skeletal and visceral dissemination, in addition to the one mentioned above, have appeared in the literature. When all of these are critically appraised, it appears that the group of the "medulloblastoma" is not so unequivocally defined as it was originally thought to be. The term "medulloblast" was coined by Bailey and Cushing to designate a hypothetical immature, bipotential cell which may develop into neuroblasts or glioblasts. This concept implied the possibility that in some of these tumors, neuroblasts prevailed, in others, glial elements. A similar thought was expressed in the opinion of two opposing schools of thought as to the origin of the type cell of these tumors. Penfield and his co-workers suggest that a group of embryonal cells commonly found in the anterior medullary velum give rise to the formation of the medulloblastoma, whereas Stevenson and Echlin, and others derive them from the marginal layer of embryonal granular cells in the cerebellar cortex which gradually disappear in the third year of life. These authors prefer the name granulocytoma to medulloblastoma. Be this as it may, the consensus of opinion today is that there exists a common tumor of childhood of a particular type, located primarily in the cerebellar vermis, though later extending into the hemisphere. This tumor is extremely radio-sensitive in the beginning, without being completely destroyed by any present method of radiation. With repeated irradiation, it becomes increasingly insensitive, and eventually, lethal, after a course of from 1½ to 3 years. There seems to be no doubt that the tumor represents clinically, pathologically, and radiologically a well defined disease entity independent of the name given to it.

The ambiguous nature of the characteristic cell of this tumor, on the other hand, raises the question as to whether some of these neoplasms may not be part of the group of so-called sympathicoblastomas. This means neuro-
blastomas of the sympathetic nervous system, and would open the possibility that a primary tumor in the adrenals, the sympathetic chain, or anywhere else in the body in a sympathetic ganglion could metastasize into the brain and the bones. On the other hand such tumors might originate in various organs independently of one another or take their origin from sympathetic or other immature nerve cells in the brain and metastasize from there, although no precedent is known for this sequence of events.

It seems, therefore, important to review the subject of disseminating cerebellar tumors, using as a basis for discussion 1 of our early cases and 2 others recently observed.

**CASE REPORTS**

*Case 1.* A white female, aged 32, was admitted to the service of Dr. Frazier at the University Hospital on Nov. 1, 1919, her chief complaint being staggering gait. The symptoms and signs, which indicated cerebellar dysfunction and increased intracranial pressure, began about July of that year.

A 1st stage suboccipital craniectomy was performed several days after admission. Subdural tension was extreme, but on account of the poor condition of the patient, the 2nd stage was delayed for 2 weeks. At that time, the tension had subsided somewhat, and the only abnormality encountered was a somewhat enlarged right cerebellar hemisphere. Fifty mg. of radium were inserted into the cerebellar hemisphere and left there for 18 hours. Two weeks later, the patient was discharged in fair condition. Pathologic study of a small amount of tissue removed proved it to be edematous cerebellar tissue.

In January, 1921, another operation was necessary, and this revealed a large, soft, friable, grayish-red tumor covering the left cerebellar hemisphere. As much of this as possible was removed, and 50 mg. of radium were applied for 11 hours. Subsequently, the patient received 5 radium applications. The pathologic diagnosis at that time was "glioma (medulloblastoma)." Five months after discharge, she returned for more radium applications. She did not seem so well as previous to the operation. However, she had neither headache nor pain. For approximately ½ year, the condition remained about the same, and then there developed pain over the sacrum and shooting pains in the legs.

She did not return to the hospital, however, until October 1923, at which time there was severe pain in the back and shoulders, persistent edema of both legs, and emaciation. Whereas physical examination had previously given negative results except for the neurologic observations, the patient now appeared cachectic. There was a visible and palpable mass just above the left buttock over the sacro-iliac joint, and the back of the lumbosacral region was discolored. Rectal examination revealed extreme tenderness in both sacro-iliac joints. Roentgenograms of the pelvis showed evidence of an extensive growth involving both iliac bones, the right side of the sacrum, and probably the upper part of the right femur (Fig. 1). Roentgenograms of the lower part of the thoracic region and chest disclosed a large shadow to the right and in front of the spine and behind the heart which might have been a tumor originating in the sympathetic chain. Evidence of spinal involvement in this region was not present.

A cordotomy was performed at the 5th thoracic level to control her pain. Upon

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*Previously reported by Pendergrass and Wilbur.