Glioblastoma Multiforme of the Medulla oblangata.
A Case Report

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Summary. A case of glioblastoma multiforme of the medulla oblongata in a 13-year-old girl is reported. Clinical features included two-month evolution, involvement of cranial nerves, tetraplegia and sudden respiratory arrest. Anatomically, a necrotizing glioblastoma multiforme involving the lower half of the medulla and the neighboring cervical cord was found. 18 examples of primary glioblastoma of the oblongata were collected from the literature, but it is suggested that several others are probably included, though not emphasized, in the numerous published series of brain stem gliomas.

Key words: Glioblastoma multiforme — Medulla oblongata — Pons — Brain Stem Gliomas.

Introduction
Glioblastomas seldom arise in the posterior fossa (Signorelli et al., 1960; Zülch, 1965), the medulla oblongata being a specially uncommon site (Powell, 1947; Masucci et al., 1966). Reviewing 2636 gliomas, of which 449 in the posterior fossa, Signorelli et al. (1960) found 21 glioblastomas below the tentorium and only one in ponto-medullary location. Of 1144 glioblastomas assembled from four large series (Cushing, 1932; Davis et al., 1949; Frankel and German, 1958; Roth and Elvidge, 1960), only 14 occurred in the brain stem; 8 were specified as pontine and no mention was made to medullary origin.

A search in the literature revealed 18 instances of primary glioblastoma of the medulla oblongata (Table) but only a few of these were described in detail. This report provides another glioblastoma in this rare localization.

Case Report
S.I.P.B., a 13-year-old Negro girl, complained of persistent occipital and neck pain and of a lowering of muscle strength of 2 months duration. The latter involved progressively the right upper, right lower and finally both left sided extremities. A few days prior to admission she experienced urinary incontinence, dyspnea, difficulty in swallowing and her voice acquired a thick nasal quality. No reference was made to symptoms of increased intracranial pressure or to sensibility disturbances.

Examination revealed emaciation, diffuse skeletal muscle wasting, bronchopneumonia in the right inferior lobe and paralysis of the right hemidiaphragm. The following notes were made concerning the neurologic status: There was neck stiffness, flaccid tetraplegia and global areflexia. Plantar responses were absent bilaterally. Results of sensibility tests were not reliable. She had a neurogenic bladder with urinary retention. No papilledema. There was bilateral horizontal nystagmus. Ocular, facial and tongue movements seemed unimpaired. The patient's poor condition precluded a more detailed examination. A spinal puncture disclosed
a xanthochromic cerebrospinal fluid, with 13 cells per mm$^3$ (lymphocytes) and a protein of 256 mg per 100 ml. On the day following admission, the patient developed acute respiratory failure and lapsed into coma. Despite an initial improvement on artificial respiration, she pursued a rapid downhill course with hyperthermia and died 10 days after hospitalization.

**Post Mortem Examination**

Except for severe emaciation and bronchopneumonia, relevant findings were confined to the central nervous system. The brain weighed 1300 g. The cerebral hemispheres showed only hyperemia and slight edema. The *medulla oblongata* was not enlarged but, on the right side, it looked swollen with disappearance of the normal external surface landmarks. The brain stem was otherwise not remarkable. On section, a poorly circumscribed, brown, soft and cystic necrotic area, 0.6 cm in diameter, was seen at the right half of the *medulla*, displacing the median raphe to the left (Fig. 1). The necrosis involved the inferior half of the *medulla* and extended for a short distance into the neighboring cervical spinal cord. The total craniocaudal length of the necrotic area was about 3 cm. The upper *medulla* and pons presented no gross changes.

Microscopically, the necrotic area proved to be part of a very cellular neoplasm with large numbers of proliferated blood vessels (Fig. 2). Pseudopalisading around areas of necrosis was either faint or absent. At the level of the decussation of the pyramids, the tumor cells infiltrated the nervous tissue throughout as well as a nerve root (right vagus nerve, Fig. 3). The neoplastic cells exhibited moderate pleomorphism (Fig. 4). Most were small, rounded or fusiform, with dark nuclei and scarce eosinophilic cytoplasm, sometimes tapering into short bipolar processes. In certain subpial regions, the tumor cells often showed a perpendicular orientation to the surface of the *oblongata*. In other areas, more mature astrocytic forms were seen. Frequent giant cells with single or multiple hyperchromatic nuclei were interspersed with the smaller ones (Fig. 4). Mitoses were not frequent, but many of them were highly atypical (Fig. 4, inset). Small blood vessels usually displayed marked endothelial proliferation (Fig. 4), with occasional lumen occlusion or thrombosis; others assumed a telangiectatic pattern.

A few nerve cells, rare degenerating myelin sheaths and some thick, apparently unaffected axons (presumably from the hypoglossal nerves) were still visible within the growth. Glial fibers were absent in some areas but numerous in others. Rosenthal-fibers, “granular corpuscles” and reticulin fibers were not observed.

The histological aspect of the pons was normal, as well as of other areas in the brain and spinal cord.

![Fig. 1. Medulla oblongata: the tumor replaces most of the right half of the medulla shifting the midline raphe to the left. The neoplasm is necrotic at its center. Weil, × 4](image)