GLIOBLASTOMA MULTIFORME: A CLINICAL SURVEY

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According to Cushing there were only two operations for brain tumour at the Johns Hopkins Hospital prior to 1901. At a time when surgical specimens were a rarity, and most of the studies of brain tumours were from necropsy material, the catch-all classification of gliomata was simple and fairly satisfactory. However, with improved techniques and the introduction of ventriculography in 1911, the Potter-Bucky X-ray Grid in 1920, and electrocoagulation in 1927, more brain tumours were removed surgically and a more exact classification was required for prognosis and treatment. Classification progressed from a physical (solid gliomas, cystic gliomas and gliomatous cysts) to a histogenetic basis and the most malignant type of tumour was called gliosarcoma (Ewing), gliome à petites cellules (Masson), gliome polymorph (Roussy, Lhermitte and Cornil), neuroglioblastoma (Courville), spongioblastoma multiforme (Globus and Strauss), Penfield, and glioblastoma multiforme (Bailey and Cushing). The term glioblastoma multiforme was adopted by the National Conference on the Nomenclature of Disease. Subdivision of the glioblastoma multiforme has been proposed by Deery, Busch and Christensen, Davis et al., and Davidoff and Feiring.

There have been many clinical and pathological studies that have included the glioblastoma multiforme. The Cushing series (The Brain Tumor Registry, Yale University School of Medicine) is probably the most widely known. There are also studies by Elvidge et al., Grant, Bennett, Pennybacker et al., Adson et al., Rowbotham et al., MacCarty, and Zülch. Glioblastoma multiforme, specifically, has been the subject of studies by Elsberg and Globus, Netsky et al., Sachs, and Marsh.

During the period 1928–1953, specimens of 2,295 neoplasms of the central nervous system were submitted to the department of neuropathology of the Montreal Neurological Institute. Of these, 1,289 (56 per cent) were classified as gliomas and 506 (22 per cent or 39 per cent of all gliomas) as glioblastoma multiforme. Adequate follow-up was obtained in 495 (98 per cent) of the glioblastoma multiforme, and these cases constitute the present survey. Five patients were untreated surgically, 73 had only needle biopsy, and 13 had only biopsy at operation. The remaining 404 patients were operated upon and removal of their tumour was attempted.

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The average age at admission was 48 years. There was no difference between the average age of males and females. The youngest patient was a 4-year-old with a tumour of the pons; the oldest was a 77-year-old woman with a tumour of the right frontoparietal lobe. Seventy-one per cent of the patients were male. There appeared to be a much better prognosis, in operated cases, for the younger age groups. Of the group under 35 years of age, 28 per cent survived operation 18 months or longer, while only 8 per cent of those over 35 years survived the same period (chi square p = <.001). There also appeared to be a slightly better prognosis, in operated cases, for females. After 18 months 17 per cent of the 121 females operated upon were alive while only 10 per cent of the 283 males operated upon survived that period (chi square p = <.05). At the end of a 5-year postoperative period, 4 men (1.4 per cent) and 8 women (6.6 per cent) were still alive.

The location of the tumours is given in Table 1.

Seventy-four per cent of the temporoparieto-occipital and 59 per cent of the frontal tumours were in the right hemisphere, while 62 per cent of the temporoparietal tumours involved the left. Of the 438 tumours that were lateralized, 235 (53.6 per cent) were in the right hemisphere.

**INTRACRANIAL GLIOBLASTOMA MULTIFORME AS A GROUP**

In this series, 489 of the 495 patients had intracranial tumours. The first symptom and the interval between the onset of this symptom and admission were determined in 485 cases (Table 2). One patient had suffered generalized seizures, attributed to a right frontal tumour, for 9 years prior to admission. Another, with a right frontal tumour, had severe emesis 3 days before admission. The variations between these two extremes are shown by the percentage of patients having symptoms for a given period. Twenty per cent of the patients had symptoms for 1 month or less, 41 per cent had symptoms for 1 to 3 months, 18 per cent had symptoms for 3 to 6 months and 10.5 per cent had symptoms for 6 to 12 months prior to admission. The remaining 10.1 per cent had symptoms longer than 12 months.

All symptoms given by the patient on admission are listed in Table 3.

The objective findings on admission are tabulated in Table 4. Among patients with unilateral papilloedema 45 per cent occurred on the side opposite to the lesion, and of those with unequal papilloedema it was greatest on the contralateral side in 30 per cent. In patients with anisocoria 44 per cent had the larger pupil on the side opposite the tumour and 42 per cent of patients with unilateral 6th nerve palsy had this sign on the side opposite their lesion.

In an attempt to determine whether any particular symptoms were of prognostic value, the patients were divided arbitrarily into 1 group of 442 patients who died within 18 months of operation, and a second, of 47 who survived this period. A comparison of the first symptoms and their average duration is shown in Table 5. Some symptoms are omitted because there was no difference between the 2 groups, or because of the small number of