GLIOBLASTOMA MULTIFORME
REVIEW OF 219 CASES WITH REGARD TO NATURAL HISTORY, PATHOLOGY, DIAGNOSTIC METHODS, AND TREATMENT
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It is a curious fact that our current neurosurgical literature exhibits a striking paucity of articles about our greatest problem: glioblastoma multiforme. While the contemporary literature on cancer swells to an overabundance, our “cancer” of the nervous system appears to receive scant attention—certainly not through complacency. Since communication is a leaven of ideas, the present one is offered with that intent. Harvey Cushing continuously recorded his experiences with various types of intracranial tumors, culminating in the great meningioma monograph, with Louise Eisenhardt. In the preface to his *Intracranial Tumours* he stated, “The laying bare of one’s mere mortality percentages, however, is only a start toward what will ultimately be called for: namely, figures relating to the expectancy of life of those who have survived tumor extirpations. And still more important would be figures for each kind of tumor which would show the percentage of surviving patients whose wage-earning capacity has been restored by operation and for how long a time.” It is for this purpose that this study was undertaken.

MATERIAL

The 219 cases collected here comprise all the verified cases of glioblastoma multiforme seen at the New Haven Hospital during the period 1924–1952. The microscopic sections were reviewed and the diagnosis was verified. A number of doubtful cases were discarded. We are grateful for the valuable assistance of Dr. Louise Eisenhardt and Dr. Elias Manuelidis in reviewing the microscopic sections when the diagnosis was questionable.

Aside from histological verification, the cases are not selected in any sense. Some of the patients were never seen by a neurosurgeon. Those who came to operation were treated by many different surgeons, many of them residents. The time span represents an entire generation during which many surgical advances came into being, including the blood bank, fluid replacement in its modern sense, and antibiotics.

The follow-up is complete on all of these patients. All have died. Autopsies were done on 105 of the 219, and the findings are known in all but 1 case, in which the autopsy was performed at another hospital.
METHOD

For this statistical survey the hospital charts, microscopic sections, autopsy protocols, and records of the hospital Tumor Registry were used as sources of information. Using a code suitable for transferring the information to IBM punch cards, 50 different items were recorded.* The cards were run through an IBM card counting sorter, permitting computation and correlation of various factors.

AGE INCIDENCE

The age at onset of symptoms is presented in Fig. 1. Two-thirds of the patients were in the fifth and sixth decades. The youngest was 12 years old, and the oldest 73. There were only 2 patients below the age of 20, and 2 over 70.

SEX INCIDENCE

The present series consists of 127 males, or 58 per cent, and 92 females, or 42 per cent. This difference suggests that there might be something in the female endocrine makeup which serves as protection against the occurrence of this tumor. If this were the case, one would suppose that the incidence of glioblastoma might be particularly low in the group of females with actively functioning ovaries.

To examine this question the state of ovarian function was tabulated in the 73 cases of females in which this information was available. None of these patients was prepubertal, 39 per cent were in the reproductive period, while 60.3 per cent were menopausal or postmenopausal. However, in the third and fourth decades, corresponding to the reproductive period, the incidence was greater in females than in males. Also, the peak incidence for both sexes is in the fifth and sixth decades, which corresponds to the menopausal or postmenopausal period of females (Fig. 1). The evidence fails to support a significant correlation between the state of ovarian function and the incidence of glioblastoma.

TOTAL DURATION OF DISEASE

The survival curve is seen in Fig. 2. Total duration is defined as the time from the appearance of the first symptom until death. At the end of 7 months, 50 per cent of the patients were dead while 67 per cent failed to survive 1 year. Another 22 per cent died during the second year. The remaining 11 per cent lived for periods of 2 to 5 years.

The age of the patient seems to have little effect on the duration. When divided into 3 groups consisting of those under 30, those from 30 to 49, and those 50 and over, the survival curves for the 3 groups are not strikingly different (Fig. 3). The course of the oldest group is slightly more rapid, perhaps a reflection of the fact that these older patients are poorer surgical

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