A STUDY OF THE RESULTS OF SURGICAL TREATMENT
IN 2,326 CONSECUTIVE PATIENTS
WITH BRAIN TUMOR*

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To be asked to give the Max Peet Oration is not only a high honor but a particular pleasure. Max was my good friend. His training preceded mine with Dr. Frazier and consequently we thought along similar lines about many things. In addition to his keen clinical judgment and amazing manual dexterity in the operating room, his reputation among ornithologists was equal to his surgical standing among surgeons. Max Peet was a man of many ideas. When one's contribution to neurosurgery ranges from hypertension to poliomyelitis and from the neuralgias to head injury, it is a definite indication of an active, observant, yeasty mind. He was always intrigued by the problems presented by brain tumors. It is with great pleasure therefore that I discuss with his associates some of the results obtained in the handling of such lesions. That this material should be presented from the clinic where he obtained his earliest training appeals to me as very proper and fitting.

One advantage accruing from the survey of such a large group of brain tumors is the determination of just how much a surgeon’s skill and judgment, in comparison with his luck in exposing one type of lesion rather than another, have to do with the final results. The most widely quoted statistics on brain tumor surgery are those from Cushing’s clinic. It must be remembered, however, in totaling these figures, that either Cushing or his equally skillful assistant, Horrax, performed all the operations. In the series here studied, the patients were operated on during the last 30 years by Frazier, Grant, and a succession of residents. The training of residents has become, over this same period, an integral and important part of the duties of any neurosurgical service. The figures of this present series go far toward showing what group of cases can, with justification, be turned over to the residents and what type of case should be handled exclusively by more experienced staff members. In many instances, the patient’s situation is entirely hopeless, regardless of the experience or inexperience of the operator. But when a more favorable tumor is encountered a complete cure or at least a long survival period for the patient may depend upon expert skill at the operating table. And since the hopeless group is equal in numbers to the more favor-

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able type, it seems reasonable to assign the hopeless group to the inexperienced surgeon rather than those patients lucky enough to harbor a relatively benign tumor.

The division of the cases in the present series into 2 groups and the reference to them as brain tumors and intracranial mass lesions will further emphasize this point, albeit in a rather clumsy fashion. The brain tumors are those lesions that arise from the glial tissue, the cells of the brain itself. The intracranial mass lesions arise from any tissue within the cranium other than brain tissue—the dura mater, the glands, the blood vessels. In the first group fall all the gliomas; in the second, the fibroblastomas, pituitary tumors, hemangiomas, and all others of nonglial origin. In this series of over 2,300 cases, roughly half of the tumors were of glial origin and half fell into the intracranial mass lesion classification. Of the patients in the glial group, 146 lived 5 years or over. One hundred and fifteen of the tumors were solid or cystic fibrillary astrocytomas. There were 677 out of the 1,100 patients with intracranial mass lesions who lived over 5 years. It is obvious, therefore, when preoperative evidence indicates the presence of an intracranial mass lesion, or when a resident exposes a lesion that appears to fall into this group, that the conscientious chief of service should take over, should stand by and supervise, or should thoroughly assess the resident's skill and judgment before allowing him to assume the full responsibility for the extirpation of a potentially favorable tumor. In reviewing this group of cases, especially when the operative notes were carefully considered, it is my opinion that our operative mortality could have been reduced by 20 to 25 per cent, had a more experienced surgeon been in charge throughout. And incidentally this impressed me most obviously during the years 1920 to 1930, when I was Dr. Frazier's resident and assistant. It is essential that the resident have training and experience. But let him get his training and experience on the glial group of tumors, where no operator, no matter how gifted he may be, can accomplish very much.

The localization of a brain tumor is now a very simple matter by air studies or angiography. Notice the lack of emphasis on neurology. The history of the patient, the way in which the symptoms developed, and the over-all neurologic picture are important. But no experienced neurosurgeon would operate on these findings alone. He must have the more positive localization afforded by air studies or angiography. In this series, 37 tumors were found at autopsy to be in areas other than the operative field. Thirty-one of these cases occurred prior to 1935. Other cases that did not come to autopsy might raise the total. However, the autopsy rate on the neurosurgical service has never been less than 85 per cent. For 4 consecutive years, 1948 to 1952, it was 100 per cent, so that most of our errors in localization must have been discovered.

There were 2,326 brain tumors verified by tissue study and the survivors were all carefully followed between January 1, 1924 and January 1, 1954. In 192 cases the diagnosis was verified by autopsy. There were 2,725 opera-