LONG-TERM FOLLOW-UP OF 106 CASES OF
ASTROCYTOMA, 1928–1939*

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In 1926 Bailey and Cushing\(^1\) divided the astrocytomas into fibrous and
protoplasmic subgroups which may occur in the cerebrum or in the cere-
bellum. In 1935 it was suggested by Elvidge, Penfield and Cone\(^2\) that the
astrocytomas could be practically divided into three subgroups. This classi-
fication was based upon the clinical and histological study of some 55 cases
of astrocytoma. At the time it was felt that these tumours presented a rather
characteristic histological picture and manner of growth and fell naturally
into their respective histological groups from a clinical and statistical point of view.

The present survey is based upon a total of 112 cases of astrocytoma oc-
curring in the period November 1928–December 1939 (11 years) with a long-
term follow-up in 90 per cent of the cases until June 1953. Of these 112 cases,
6 have been finally omitted in the subgrouping--2 tumours considered as
glioblastoma multiforme, 1 an intramedullary cyst without sections avail-
able and 3 tumours considered as malignant astrocytomas unclassified.

Of the remaining 106 cases, 53 fell into the piloid subgroup, 29 into the
diffusum, and 24 into the gemistocytic.

ASTROCYTOMA DIFFUSUM
29 cases (25.8 per cent)

Astrocytoma diffusum has been the most difficult astrocytoma to classify,
and the last to be recognized as a definite subgroup of practical value in our
series. The type cell is a small, stellate astrocyte. In most instances it is diffi-
cult to find any formation of neuroglial fibrils and some would undoubtedly
prefer to call this therefore a protoplasmic astrocytoma. The tumour is very
invasive, penetrating widely the gray and white matter in all directions.
While involving the gray matter, the cells do not tend to form fibres, but
when they invade the white matter they may appear as small fibrous astro-
cytes. One cannot therefore be satisfied with merely calling this a protoplasm-
ic astrocytoma. The protoplasmic astrocytoma described by Bailey and
Cushing occurred both in the cerebral and cerebellar hemispheres, whereas
the astrocytoma diffusum has been found by us only in the cerebral hemi-
spheres.

* A review of 176 cases of astrocytoma for the ten-year period from 1940–1949 has been made by
The tumour grows in a rather characteristic fashion, invading brain tissue in a most insidious manner, and with a minimum amount of change in gross appearance. It is rather difficult, therefore, to recognize its limits at postmortem examination, and even its presence at operation. Horizontal section through the brain will show generally an enlarged hemisphere, and the line of demarcation between the tumour and normal brain will not be easily evident. Surgically exposed, the cortical surface may appear somewhat whitish or light yellow in colour, and there may or may not be widening of convolutions. The neoplastic cells spread beneath the pia mater forming more cellular nodes of growth. It enters the white matter, where it spreads widely and deeply in all directions, turning up at one point and then another, and may invade the corpus callosum.

In the gray matter, the cells wander amongst the nerve cells without causing them to show signs of degeneration. For this reason the tumour has sometimes been mistaken for a ganglieneuroma. (In 2 cases of our series the possibility of ganglieneuroma was considered; the first tumour was finally classified as a piloid astrocytoma with inclusion of neurones and the other as an astrocytoma diffusum with typical areas of increased satellitosis.) It is characteristic for the cortical nerve cells to be surrounded by a fair number of tumour satellites. In fact, satellitosis is a distinguishing feature in this tumour. Mitotic figures are sometimes fairly frequent, and one or more were found in 34.4 per cent of our cases. In some cases more embryonic cell types, unipolar and bipolar cells were found.

Areas of degeneration and cystic formation do not as a rule occur, and beyond the finding of microscopic cysts in very few tumours, none have shown gross cyst formation. There are no particular vascular changes that are characteristic. It is difficult to place this tumour in any category proposed by Svien et al.9

The average age of the patient at the time of admission to the hospital for diagnosis and therapy was 33.7 years. The ages of all patients at the time of their first admission for treatment are grouped by decades in Table 1. Thirteen of the 29 patients (44.8 per cent) were in the 4th decade of life.

Considering sex distribution in the 29 cases of astrocytoma diffusum 16 (55.1 per cent) occurred in males and 13 (48.8 per cent) in females (Table 2).

Of the 29 tumours, 27 were located in the cerebral hemispheres, and 2 in the 3rd ventricle involving basal ganglia. No instance of astrocytoma diffusum of the cerebellum has been found in this series. An approximate summary of their localization is shown in Table 3.

The average pre-operative duration of symptoms was 27.6 months. This figure is similar for the piloid and gemistocytic groups (Table 4).

Epilepsy occurred in 21 of the 29 cases, i.e. 72 per cent. It was the first symptom to appear in 18 instances (62 per cent). Also in 18 cases (62 per cent) the attacks were described as focal and in 3 (10.3 per cent) as generalized.