Oligodendrogliomas
An Analysis of 63 Cases

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We are reporting an analysis of 63 cases of oligodendroglioma studied
and treated at the Montreal Neurological Institute. These comprise 2.7% of
the total series of brain tumors at this institution.

Clinical Features

Seizures. The most common initial symptom (79%) in the series was seizure. In this
group the average preoperative duration of symptoms was 7.3 years and the postopera-
tive survival 5 years, compared to 2.5 and 6.8 years respectively in those who did not
have seizures. Eleven percent had headaches, 3% weakness, and 3% mental
changes. Forty-eight percent had hemiparesis, 39% papilledema, and 31% mental
changes on the first admission. Only one pa-
tient had no signs.

Radiological Studies. Ventriculograms
correctly diagnosed and localized the tumor
in 100% of 25 cases tested; they were done
on patients who had evidence of raised intracra-
nial pressure, 75% of whom showed pap-
illedema.

Pneumoencephalograms localized the
tumor in 57% of 30 studies; there was no
evidence of pressure or papilledema in any of
the patients studied by pneumoence-
ephalography. In several cases the pneumo-
genogram was misinterpreted as showing atrophy
on the side contralateral to the tumor; in
none of these was there a shift of the midline
structures.

Angiography was carried out in 22 cases
73% of which showed some abnormality.
No angiogram demonstrated pathological
vessels, tumor blush, or early filling of tumor
veins.

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Electroencephalography. The EEG was
abnormal in 89% of 47 cases. It consisted of
a slow-wave focus in 51% and a slow-
and-sharp-wave disturbance in 49%, and
had localizing value in 83% of the abnormal
group.

Brain Scans. Brain scans were carried out
on 18 patients using an automatic contour
device with Hg-197 or Hg-203. The different-
ential activity from corresponding areas on
opposite sides of the head was compared
quantitatively.

There was a wide variation in the degree
of differential uptake over the tumors. The
presence or absence of uptake, and its inten-
sity, did not correlate with survival.

Lactic-Dehydrogenes Isozyme Pattern. This pattern was determined in two cases; in
one it was that of a malignant glioma, in the
other, that of a normal brain.

Fluid Protein Content. The lumbar or
ventricular cerebrosplinal fluid protein was
not significantly elevated in the 37 cases in
which it was measured. The protein content
of the cyst fluid approximated that of serum
in nine cases. The electrophoretic pattern of
one sample of cyst fluid was obtained and
was similar to that of blood and not of cere-
brosplinal fluid.

Calcification. Plain x-rays showed calcifi-
cation in 56% of the tumors. In all cases in
which calcium was demonstrated radiologi-
cally, it was found in the pathological sec-
tions. Patients with calcified tumors were
more likely to have calcified pineals. In
approximately half of the cases in which the pi-
neal was calcified, it was not displaced.
There was no increased incidence of calcifi-
cation in the older age groups. The average
preoperative duration of symptoms in those
patients having calcified tumors was longer
and the postoperative survival shorter than
in those with noncalcified tumors.

Patients with large tumor calcification did
not show any greater shift of midline struc-

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Oligodendrogliomas

The gross tumor characteristics recorded at operation are given in Table 1. There was great variety in the histopathological features. The pathological findings in patients known to have died was correlated with the mean duration of life from the onset of symptoms and the mean duration of postoperative survival. This analysis revealed a slight tendency for patients with marked nuclear pleomorphism to survive for a shorter period than those whose tumors were marked by a uniform “honeycomb” structure (Table 2).

In five patients, histological examination of the tumor was carried out twice. The time intervals between operations were 3 to 6 years. Two cases showed no significant change in the pathological picture. The remaining three showed changes generally associated with increased malignancy, including greater pleomorphism, the presence of giant cells, and more frequent mitoses. Autopsy carried out on two cases after readmission showed residual tumor with diffuse spread through subarachnoid spaces and brain-stem hemorrhages.

Two cases were originally called glioblastoma multiforme on the basis of increased vascularity, endothelial proliferation, pleomorphism, frequent mitoses, areas of necrosis, and palisading. Both, on review, showed areas of homogeneous oligodendrogial cells and some calcifications. One patient survived 5 years, and the other is still alive, without any progression, 17 years postoperatively.

Radiation Therapy

Each of the 63 patients in this series had at least one operative removal; 56% also received radiation therapy at some time during the course of their illness. The decision to treat the patient in this manner was made by the attending neurosurgeon, and no consis-

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**TABLE 1**

<table>
<thead>
<tr>
<th>Gross tumor characteristics noted at operation in 63 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor Characteristic</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Greyish-red, gelatinous</td>
</tr>
<tr>
<td>Mushrooming tumor at surface</td>
</tr>
<tr>
<td>Gross cyst(s)</td>
</tr>
<tr>
<td>Swollen, pale gyri over tumor</td>
</tr>
<tr>
<td>Pseudocapsule</td>
</tr>
<tr>
<td>Gritty</td>
</tr>
<tr>
<td>Dural attachment</td>
</tr>
</tbody>
</table>

**TABLE 2**

Analysis of fatal oligodendrogliomas (33 cases)

<table>
<thead>
<tr>
<th>Pathological Characteristics</th>
<th>No. of Cases</th>
<th>Mean Duration Life From Onset Symptoms (yrs)</th>
<th>Mean Duration Postoperative Survival (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marked nuclear pleomorphism</td>
<td>9</td>
<td>8.2</td>
<td>3.9</td>
</tr>
<tr>
<td>Tumor at margins of removal</td>
<td>12</td>
<td>10.6</td>
<td>4.3</td>
</tr>
<tr>
<td>Microcysts</td>
<td>13</td>
<td>10.8</td>
<td>4.3</td>
</tr>
<tr>
<td>Frequent mitoses &gt; 1/h.p.f.</td>
<td>8</td>
<td>7.9</td>
<td>4.4</td>
</tr>
<tr>
<td>Calcium</td>
<td>17</td>
<td>10.7</td>
<td>4.4</td>
</tr>
<tr>
<td>Marked endothelial proliferation</td>
<td>10</td>
<td>11.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Uniform honeycomb structure</td>
<td>18</td>
<td>12.4</td>
<td>6.1</td>
</tr>
</tbody>
</table>