RESULTS OF SURGICAL TREATMENT OF INTRACRANIAL METASTASIS FROM PULMONARY CANCER

REPORT OF A CASE WITH FIVE-YEAR SURVIVAL

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The increase in frequency of lung cancer of the population confronts neurosurgeons with the aspect of an increased number of cerebral metastases. Although the indication for surgical removal of these tumors must remain on an individual basis, no reasonable policy can be formulated without knowing the chances of survival and relief from symptoms.

In neurosurgical statistics metastases of bronchopulmonary origin represent 16 per cent,1,9 23 per cent2 and 48 per cent3 of all cerebral metastases. Lessie and Netsky4 concluded from their autopsy material of 595 cancer patients that lung cancer metastasized to the central nervous system with great frequency, giving rise to cerebral implants in 50 per cent of the cases. However, one-third of the metastatic tumors were asymptomatic in life and probably developed shortly before death. Similar data have been given by Knights.7

There is fairly good agreement among various statistics that about one-third of the metastases to the cerebrum are solitary.1,5,9 These figures are not broken down according to the origin of the neoplasm. However, of 85 examples of cerebral metastases of bronchial origin studied by Flavell,4 26 were solitary and in 8 of these cases the cerebral lesion represented the only metastasis in the body. On the other hand, King and Ford6 concluded from their 100 cases of metastases to the central nervous system from carcinoma of the lung that the deposits in the brain are usually multiple and of relatively small size.

There is general agreement on the bleak outlook of patients with pulmonary and cerebral lesions. Metastases to the brain from cancer of the bronchus are among the most malignant and the average survival from the first neurological symptoms is not more than 3 months8 or 6.6 months.10

With a high operative mortality and poor postoperative prognosis it is no wonder that follow-up data are rare. In the large series of Olivecrona10 the average postoperative survival of all patients with metastatic lesions was shortest in those with lung cancer, a mere 2.6 months. Only 2 of the 15 surviving patients lived over 6 months and none over 12 months. Yet there are individual cases in the literature that give evidence of occasional better results. Two of Petit-Dutaillis' patients lived 15 and 17 months respectively following the removal of cerebral metastases; 1 also had the pulmonary lesion removed.9

In the 10 years between 1945 and 1955, 64 patients with intracranial metastases of known primary site were operated upon on the Neurosurgical Service of the Massachusetts General Hospital. A seemingly complete removal of the lesion attacked was performed in 50 cases, partial resection in 8 cases and decompression alone in 6 cases. The primary tumor was situated in the lung in 27 patients (42 per cent).
Table 1 shows the relative survival period of those 62 patients who were followed up closely.

Of the 4 patients who survived over 1 year following the removal of a cerebral metastasis of nonpulmonary origin, 3 had had carcinoma of the breast removed before the onset of intracranial symptoms. Two lived 18 and 27 months respectively after craniotomy. The third patient is still alive 3 years later. The fourth patient in this group died 16 months following the removal of a cerebral metastasis which originated in the Fallopian tube.

The survival of patients with metastasis from the lung was very short indeed, although this group included 4 who had had previous pulmonary resection. They did not fare better than those who had had no pulmonary surgery. Of this entire group

**TABLE 1**

*Results of operation for intracranial metastatic tumors*

<table>
<thead>
<tr>
<th>Postoperative Survival</th>
<th>Primary in Lung</th>
<th>Primary Elsewhere</th>
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<tbody>
<tr>
<td>0–1 month</td>
<td>12 (44.5%)</td>
<td>12 (34.3%)</td>
</tr>
<tr>
<td>1–6 months</td>
<td>13 (46.4%)</td>
<td>12 (34.3%)</td>
</tr>
<tr>
<td>6–12 months</td>
<td>1 (9.1%)</td>
<td>7 (20.0%)</td>
</tr>
<tr>
<td>Over 1 year</td>
<td></td>
<td>4 (11.4%)</td>
</tr>
<tr>
<td>Total</td>
<td>27 (100%)</td>
<td>35 (100%)</td>
</tr>
</tbody>
</table>

about half of the patients died within 4 weeks and the other half in less than 6 months. One patient lived 10 months and was able to work for the first 7. Only 1 patient lived for 5 years, quite unexpectedly, and his story will be given in full detail.

Whether the increasing number of combined resections of primary and secondary lesions will improve the generally bleak outlook of these patients remains to be seen. Complete cure is theoretically possible. A patient of Flavell's is alive, well and working, 10 years after the resection of both pulmonary and cerebral lesions.

The following case demonstrates an unusually long survival following removal of a cerebral metastasis in a patient whose pulmonary cancer was not resected.

**CASE REPORT**

#755751. G.W., a 42-year-old man, was admitted to the Massachusetts General Hospital on Oct. 22, 1951 with a chief complaint of headaches. He had always been a heavy smoker and had "cigarette" cough, but 5 weeks before admission he once coughed up a small amount of blood.

*Examination.* The most striking finding was very marked papilledema of both eyes. The reflexes on the left side were somewhat livelier than on the right but the limbs were not spastic and abnormal reflexes could not be elicited. Position sense may have been somewhat diminished over the left side of the body. In spite of his complaints of occasional unsteadiness and clumsiness of the left hand he performed tests of coordination quite well.

Roentgenograms of the skull were not remarkable. Films of the chest demonstrated a mass, about 5 cm., in diameter, surrounding the upper portion of the root of the left lung and radiating anteriorly and superiorly into the anterior and apical segments of the left upper lobe. Through the bronchoscope a papillary carcinoma was seen occluding the superior division of the bronchus to the left upper lobe without fixation. Electroencephalogram was abnormal with slow activity of low voltage over the left temporal lobe and also, to a lesser