TUMORS OF THE MAXILLARY SINUS

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Cancer of the maxillary sinus is a relatively rare condition. It represented, according to Schreiner, 1.8 per cent of all cases of cancer at the New York State Institute for the Study of Malignant Disease, and, according to Ewing, 1.95 per cent of all cases of cancer admitted to the Memorial Hospital in 1916–1917. Not all tumors involving the antrum are primary in the antrum. Many tumors of the superior alveolar process invade the antrum secondarily. These have a more favorable prognosis than tumors which are primary in the sinuses. Of 168 malignant tumors of the antrum examined by New (1926), 39 had invaded the antrum secondarily. Of 75 cases reported by Holmgren and Berven, only 43 were proved to be primary in the antrum. Stein found that 50 per cent of all antral tumors were primary.

The present report includes 11 cases, all of which were proved squamous-cell carcinoma, and all of which were, as nearly as could be determined, primary in the antrum. It is quite possible, however, that some of these may have had their origin in the ethmoid cells, since in almost every case the ethmoids were more or less involved at the time of operation.

Treatment of carcinoma of the antrum has undergone a decided change in recent years, and the results are now better than formerly though still far from satisfactory. The first form of operative treatment, resection of the maxilla, introduced by Gensoul in 1827 (Rabe), had an extremely high mortality, and the results, as far as cure was concerned, were disappointing. In 1874 Rose advocated operating with the head lowered, so that the blood might collect in the pharynx and be removed, in this way preventing aspiration pneumonia. This procedure diminished the operative mortality. In 1897 Martens reported 48 resections with 19 (39 per cent) operative deaths. Stein (1902) in 47 total resections had 7 (14.8 per cent) operative deaths. In 1901 Krönlein collected reports of 273 total resections of the upper jaw for tumors, with a mortality of 25.6 per cent. In 35 total resections which he performed himself in the period 1881–1901 there was but one operative death.
He attributed his low mortality to the type of anesthesia used—very light ether for the skin incision, and no further anesthetic.

More recently Saxen has reported 19 radical operations for primary carcinoma of the antrum with 6 (32 per cent) operative deaths. Schley has recommended operative treatment as the best procedure for carcinoma of the antrum, and states that this procedure, in the hands of all operators, results in a 12 to 13 per cent mortality. Blaisdell in 1921 said, however: "The average patient with carcinoma in his antrum has had little to choose in the past but the manner of his dying."

In patients surviving operation, early recurrence has been the rule. Of the 48 patients with carcinoma of the upper jaw in which total resection was done, reported by Martens, there were only 8 (16.6 per cent) free from recurrence at the end of three years. In a series of 49 additional cases with follow-up data which Martens collected from the literature, there were only two patients (4 per cent) who were free of disease at the end of three years. In the 46 cases of total resection of the upper jaw for cancer reported by Stein, there were 4 cures of five years' duration or longer (8 per cent). The average length of life after operation was eleven months. Bloodgood stated that in thirty years he had not had a single cure of undoubted carcinoma or sarcoma of the antrum, treated by operation alone. Harmer and Glas reported 7 total resections for squamous-cell carcinoma of the antrum with no permanent recoveries. Six of the patients died in less than six months. Donoghany and Lénart found no microscopically proved case of carcinoma to have been definitely cured.

The use of cautery for destruction of tumors of the antrum is not a new form of treatment, but has rather recently been revived. Lawson, in 1872, reported a case treated in this manner, and Ochsner reported a case so treated about thirty years ago. The method was revived by New in 1920. More recently surgical diathermy has replaced the use of the hot iron, and surgical diathermy alone or in combination with radium is now quite generally accepted as the proper treatment for carcinoma of the antrum. The tendency, however, seems to be to depend more and more upon radium for destruction of the carcinoma. At the present time a number of clinics are using surgery only for exposure and drainage.

There are a number of recent reports giving the late results of radium therapy in antral carcinoma. Schreiner reported 20 per cent five-year cures in 15 cases without metastases at the time of
treatment. He had no five-year cures in 16 cases in which there were regional metastases at the time of treatment. Johnson reported 26 cases, in only 4 of which were the patients known to be free from disease at the time of the report; only one had passed the five-year mark. New (1926) reported 82 cases of primary carcinoma of the antrum, 36 of which were selected for treatment. Of those treated, 8 (22.2 per cent) were living more than three years and 4 (11.1 per cent) more than five years.

Berven reported 32 cases treated by operation and postoperative radiation. Five patients (19.3 per cent) lived five years or more, free of recurrence. The average postoperative length of life of those dying of recurrence was 9.7 months. Radiation alone was used in nineteen cases. Although 7 cases were operable there were no cures. The average length of life after treatment was 19.5 months. One patient lived three and a half years. Twelve cases were considered inoperable. In those the average length of life after treatment was 7.6 months.

To report together sarcoma and carcinoma, and to include both primary tumors of the antrum and those which invade it secondarily, seems to be the common custom. If one is to compare different forms of treatment, it is essential that the cases compared shall as far as possible be similar. There are obviously many variable factors which can never be accurately controlled, as the extent of the disease, degree of malignancy, resistance of the patient, but the different histologic types of tumor should at least be distinguished and the results of treatment of carcinoma and sarcoma determined separately. The series here reported includes only carcinoma, apparently primary in the antrum, and all of the squamous-cell type.

The 11 cases here reported are listed in Table I. There were 5 cases in males and 6 in females. The average age was fifty-one, with a range from thirty-five to sixty-two years. The average delay from the time of the first symptom until the patient was treated was approximately eight months. Estlander (1879) in 20 cases found the average period from the first symptom to the time the patient came for operation to be 6.7 months. The greater part of the delay in the series reported was on the part of the patient, in consulting a physician, approximately six months. The average delay after a physician was consulted was only three months. The most common first symptom observed was swelling or pain, one of these being present in 7 of the 11 cases. Tooth extrac-
<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>First Symptom</th>
<th>Previous Nasal Symptoms</th>
<th>Delay before Consulting Physician</th>
<th>Delay after Consulting Physician</th>
<th>Previous Treatment</th>
<th>Glandular Involvement Micros.</th>
<th>Gross</th>
<th>Length of Life after Onset (in months)</th>
<th>Length of Life after Treatment (in months)</th>
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</thead>
<tbody>
<tr>
<td>M.</td>
<td>35</td>
<td>1 ½ mo. Swelling</td>
<td>0</td>
<td>Months 0</td>
<td>Months 1</td>
<td>Teeth extracted</td>
<td>0</td>
<td>6</td>
<td>3½</td>
<td></td>
</tr>
<tr>
<td>F.</td>
<td>39</td>
<td>3 mo. Swelling</td>
<td>+</td>
<td>3</td>
<td>0</td>
<td>Teeth extracted</td>
<td>0</td>
<td>0</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>M.</td>
<td>50</td>
<td>1 mo. Pain</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>None</td>
<td>0</td>
<td>0</td>
<td>Living 21</td>
<td>Living-recurrent 19</td>
</tr>
<tr>
<td>M.</td>
<td>50</td>
<td>6 mo. Abscess</td>
<td>0</td>
<td>1 ½</td>
<td>0</td>
<td>Teeth extracted; Drainage</td>
<td>0</td>
<td>0</td>
<td>Living 69</td>
<td>Living 67</td>
</tr>
<tr>
<td>F.</td>
<td>50</td>
<td>5 mo. Pain</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>Medical; Irrigation</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>F.</td>
<td>50</td>
<td>12 mo. Pain</td>
<td>0</td>
<td>8</td>
<td>4</td>
<td>Teeth extracted; Radium</td>
<td>0</td>
<td>—</td>
<td>14</td>
<td>2</td>
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<tr>
<td>M.</td>
<td>51</td>
<td>36 mo. Swelling</td>
<td>+</td>
<td>30</td>
<td>6</td>
<td>Teeth extracted; Electric</td>
<td>0</td>
<td>0</td>
<td>62</td>
<td>26</td>
</tr>
<tr>
<td>F.</td>
<td>54</td>
<td>8 mo. Pain</td>
<td>0</td>
<td>6</td>
<td>2</td>
<td>Drainage</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>9</td>
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<tr>
<td>F.</td>
<td>57</td>
<td>7 mo. Swelling</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>Removal of polyp</td>
<td>0</td>
<td>—</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>F.</td>
<td>61</td>
<td>10 mo. Pain</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>Drainage; X-ray</td>
<td>+</td>
<td>—</td>
<td>16</td>
<td>7</td>
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<tr>
<td>M.</td>
<td>62</td>
<td>2 mo. Swelling</td>
<td>0</td>
<td>½</td>
<td>1½</td>
<td>Teeth extracted; Biopsy</td>
<td>+</td>
<td>+</td>
<td>4</td>
<td>2</td>
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</table>

- = No data.
tion was the most frequent type of treatment received before the proper diagnosis was made. Six patients of this series had teeth extracted for the relief of pain. Others had single or multiple operations for drainage, irrigations, etc. Regional glands were palpable in 2 cases and were found to be microscopically involved in 2 cases.

Two of the 11 patients are still living, one more than five years without recurrence. Those dead of recurrence lived approximately twenty-one months (average) after the onset of the disease and ten months after treatment. In the series of 20 cases studied by Estlander in 1879 the average duration of the disease, from onset to death, was 12.6 months, and the average postoperative survival 6.3 months.

The carcinomata in this report were treated with radiation or cautery and radiation. One patient (now living more than five years) was treated primarily with radiation and later by surgical exenteration of the eye. Another, now dead, was treated with high-voltage x-ray only. The external carotid artery was ligated in most of these patients as the first part of the operative procedure. The tumor mass was removed by surgical diathermy and radium was immediately applied, followed by high-voltage x-ray therapy, if possible within fourteen days after the operation. The dose of radium varied considerably, but averaged approximately 1700 mg. hrs. or millicurie hours with 1 mm. brass filter. The maximum dose was 2428 mg. hrs. and the minimum 900 mg. hrs. Three or four radium capsules were made up so that the total amount of radium in these capsules was from 75 to 125 mgm. and they were placed against the wall of the operative defect widely separated from each other and held in place by packing.

Summary

1. Cancer of the antrum constitutes approximately 1 per cent of all cancer.

2. Surgery alone, total excision of the maxilla, carries a high mortality (15 per cent to 40 per cent), and results in very few, if any, permanent cures.

3. With proper combination of surgery and radium five-year cures may be obtained in 10 per cent of all cancers of the antrum coming for treatment.
BIBLIOGRAPHY

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