Diagnosis and treatment of head and neck sarcomas: personal experiences

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Abstract: Sarcomas are a rare group of tumors. They do not commonly manifest as malignancies in the head and neck region. The rare nature of these tumors has resulted in a limited number of publications. This is a descriptive study. We included patients with primary sarcomas of the head and neck, observed between 1991 and 2011 in the department of Otorhinolaryngology (University of Chieti, Italy). We studied the following variables: age, gender, race, origin, primary anatomical location of the neoplasm, pathology, diagnosis and type of cancer treatment employed. During the study period, we found 9 patients with head and neck sarcomas. Of this sample, 6 were males, and 3 were females. The man/woman ratio was 2:1. As far as age is concerned, the most affected age range was between 60 and 80 years. The mean age of the patients was 62. As far as pathology is concerned, we found 7 histopathological variations of sarcomas, and the most common type was the leiomyosarcoma. The most widely used treatment modality was surgical treatment. The data in this study show that head and neck sarcomas are rare tumors with high histological variability, which may involve different anatomical sites. Since these are rare and not well-known lesions, further epidemiological studies must be carried out, in order to give us more knowledge about the disease.

Keywords: Sarcoma, Head and Neck, Multivariate Analysis, Treatment Outcomes

1. Introduction

Sarcomas are a heterogeneous group of malignant neoplasms having as a common denominator their origin from mesenchymal cells. About 15% to 20% of all sarcomas are diagnosed in head and neck region [1-2]. These neoplasms are designated by their tissue of origin, histologic grade and anatomic subsite of head and neck region in which they are found. Approximately the 80% are of the soft tissue type while approximately the 20% are of bony or cartilaginous origin [3]. Muscle, vessel, nerve, fat and fibrous tissue can each give origin to a heterogenous group of malignancies whose histologic characteristics reflect their tissue of origin. Some types have no clear association with any particular tissue, and it remains unclear which soft tissue elements potentiate these lesions [4]. Histologic grade is a reliable predictor of prognosis. Most head and neck soft tissue sarcomas are high grade [5]. These malignancies occur in the nasal cavity, paranasal sinuses, nasopharynx, hypopharynx, oropharynx, ear, scalp, oral cavity and salivary glands [6]. The most common histological types are: osteosarcoma, rhabdomyosarcoma, pleomorphic sarcoma and angiosarcoma [7-8]. The histopathological examination of the lesions is important for their treatment. In fact, the treatment depended more on grade, stage and operative considerations in relation to the site.

2. Materials and Methods

We have collected patient, tumour, treatment, and outcome data on all patients with bone and soft tissue sarcomas for 20 years at the our department of Otorhinolaryngology (University of Chieti, Italy). During the study period, we found 9 patients with head and neck sarcomas. Of this sample all subjects of white race, 6 were males, and 3 were females. We have identified all patients with soft tissue sarcomas in the head and neck, defined as sites above the level of the clavicle. We have made a number of observations related to patient demographics, tumour variables, treatment modalities, outcome, and follow up for patients with head and neck soft tissue sarcomas. The results were plotted in Table 1.
Table 1. Patient, age, sex, site of origin, diagnosis, treatment, follow up

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Sex</th>
<th>Site of Origin</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1991</td>
<td>W</td>
<td>Nasopharynx and left mastoid and temporal region</td>
<td>Embryonal rhabdomyosarcoma parameningeal</td>
<td>Chemotherapy</td>
<td>Tumor recurrence in the '95, '97, '05 and died in the '06.</td>
</tr>
<tr>
<td>II</td>
<td>2001</td>
<td>W</td>
<td>Thyroid</td>
<td>Leiomyosarcoma</td>
<td>Surgical treatment</td>
<td>Died after 6-7 months.</td>
</tr>
<tr>
<td>III</td>
<td>2002</td>
<td>M</td>
<td>Right parapharyngeal region</td>
<td>Kaposi's sarcoma treatment with α-interferon</td>
<td>Treatment with α-interferon</td>
<td>Died of acute myocardial infarction.</td>
</tr>
<tr>
<td>IV</td>
<td>2004</td>
<td>M</td>
<td>Left parotid</td>
<td>Epithelioid sarcoma</td>
<td>Surgical treatment</td>
<td>Died after 6-7 months.</td>
</tr>
<tr>
<td>V</td>
<td>2005</td>
<td>M</td>
<td>Larynx</td>
<td>Leiomyosarcoma</td>
<td>Surgical treatment (partial laryngectomy)</td>
<td>Died after 6-7 months.</td>
</tr>
<tr>
<td>VI</td>
<td>2006</td>
<td>W</td>
<td>Right nasal cavity</td>
<td>Chondrosarcoma</td>
<td>Surgical treatment</td>
<td>Tumor recurrence in the '06 (surgery) and no tumor recurrence after 5 years.</td>
</tr>
<tr>
<td>VII</td>
<td>2007</td>
<td>M</td>
<td>Left fronto-parietal region</td>
<td>Malignant peripheral nerve sheat tumor (MPNST)</td>
<td>Surgical treatment</td>
<td>Tumor recurrence in the '11 (parotidectomy and radio-chemotherapy).</td>
</tr>
<tr>
<td>VIII</td>
<td>2009</td>
<td>M</td>
<td>Parotid and right headset region</td>
<td>Myxofibrosarcoma</td>
<td>Surgical treatment</td>
<td>No tumor recurrence after 2 years.</td>
</tr>
<tr>
<td>IX</td>
<td>2011</td>
<td>M</td>
<td>Base of the tongue and free edge of the epiglottis</td>
<td>Leiomyosarcoma</td>
<td>Surgical treatment</td>
<td>No tumor recurrence after 8 months.</td>
</tr>
</tbody>
</table>

Sarcomas of the head and neck are rare mesenchymal malignant neoplasms accounting for less than 10% of all soft tissue sarcomas and approximately 1% of all head and neck neoplasms [85, 9-139]. There are several histological subtypes of sarcoma (Table 2) which present with a variety of clinical characteristics [14].

Table 2. Classification of head and neck sarcomas

- **MALIGNANT SOFT-TISSUE TUMORS**
  (Fibrosarcoma, Pleomorphic sarcoma or so-called malignant fibrous histiocytoma, Leiomyosarcoma, Rhabdomyosarcoma, Angiosarcoma, Liposarcoma, Sinovial sarcoma, Epithelioid sarcoma, Kaposi sarcoma, Malignant peripheral nerve sheath tumor, Dermatofibrosarcoma protubersans, Alveolar soft-parts sarcoma.)

- **MALIGNANT TUMORS OF BONE AND CARTILAGE**
  (Condrosarcoma, Osteosarcoma.)

- **HEMATOLYMPHOID TUMORS**
  (Extramedullary myeloid sarcoma, Histiocytic sarcoma, Follicular dendritic cell sarcoma/tumor.)

- **NEUROECTODERMAL TUMORS**
  (Ewing sarcoma.)

- **ODONTOGENIC SARCOMAS**
  (Ameloblastic fibrosarcoma.)

- **RADIATION-INDUCED SARCOMAS**

Among these different subtypes we think it could be useful to present the clinical characteristics of the tumors we observed:

2.1. **Leiomyosarcoma (3 case)**

It is the least common soft tissue sarcomas to originate in the head and neck region, probably because of the paucity of smooth muscle tissue [15]. The source of smooth muscle tumors in oral cavity may be the arterial tunica media, the ductus lingualis, the circumvallate papillae and pluripotential mesenchymal cells. The jawbones appear to be the site of predilection for oral leiomyosarcomas [16]. Other intraoral locations include the tongue, cheek, gingival, soft palate, upper lip and floor of mouth. Other location is neurovascular bundles of the facial bones [17]. Patients generally presents in fifth or sixth decade of life. In our experience this subtype was the most frequent and it grew also in old patients.

2.2. **Rhabdomyosarcoma (1 case)**

It is an aggressive soft tissue sarcoma of children and adolescents involving the head and neck region [18-21]. It is subdivided into three major groups: embryonal (most common in children and teenagers), alveolar and pleomorphic (most common in adults) [22]. Men and women are nearly equally affected [20-21, 23].

2.3. **Fibrosarcoma (1 case)**

It is considered the second most common soft-tissue sarcomas after rhabdomyosarcoma in the head and neck. It occur in all ages, with a peak in the fifth decade. There is a 3:2 female: male gender predilection [7]. Usually, it appears as a painless firm mass of the scalp, face, or neck [24-26].
The fibrosarcoma is characterized by high local recurrence rate and a low incidence of locoregional lymph node and/or distant hematogenous metastases [27]. Myxofibrosarcoma is one of its variety with fibrotic myxoid elements.

2.4. Epithelioid sarcoma (1 case)

Epithelioid sarcoma is a histologically distinct malignant soft tissue sarcoma of uncertain histogenesis [6]. It mainly occurs in young adults from 15-40 years of age and has a predilection for the fingers, hands, forearms and lower limbs. It is very rare on the trunk and head and neck regions. The clinical presentation is usually that of a slowly growing, painless swelling, which may be a solitary nodule or, more rarely, consists of multiple nodules and has firm consistency [28].

2.5. Kaposi's sarcoma (1 case)

Kaposi's sarcoma is an angioproliferative disorder characterized by proliferation of spindle-shaped cells, neo-angiogenesis, inflammation and edema [29-30]. Four major forms have been identified: Classic, African endemic, Immunosuppression-associated or transplant-associated, and AIDS-associated [31-32]. A new Kaposi's sarcoma-type in HIV-negative men having sex with men has been described in a recent cohort study [33]. Whilst head and neck involvement is frequent in AIDS-associated Kaposi's sarcoma, craniofacial manifestations in the other Kaposi's sarcoma varieties are scarce [30, 34]. Kaposi's sarcoma-lesions occur in ten variants: patch, plaque, nodular, lymphadenopathic, exophytic, infiltrative, telangiectatic, ecchymotic, keloid, and cavernous or lymphangioma-like [35-36]. Have been described in the literature cases of classic Kaposi's sarcoma with oral involvement [37]. The hard palate and gengive are most frequent locations [37]. Additional sites include the tongue, buccal mucosa, lips, submandibular duct area, parotid gland, and intra-parotid lymph nodes [37- 42]. Non-AIDS Kaposi's sarcoma cases have been identified in the palate and oropharynx [38].

2.6. Malignant peripheral nerve sheath tumor (1 case)

Synonyms of malignant peripheral nerve sheath tumor are neurogenic sarcoma, malignant schwannoma, neurofibrosarcoma, Triton's tumor [7]. It is a spindle cell sarcoma usually arising in proximity to peripheral nerves or shows nerve sheath differentiation. In 80% of the cases occurrence is in adults and in 20% in children and adolescents [43]. The clinical presentation is that of an enlarging soft-tissue mass arising in the head and neck region with or without pain and dysesthesis [7].

2.7. Chondrosarcoma (1 case)

It is a rare malignant tumor of the head and neck region [37-38]. Most of the remaining chondrosarcomas of the head and neck region occur in the mandible and the larynx [39-42]. Patients generally present in the third and fourth decades of life, with symptoms dependent on the affected site [39].

The usual presentation of a sarcoma in the head and neck is a painless mass that, depending on the site of origin, represents an enlarging subcutaneous or submusosal mass. A high index of suspicion is necessary, despite the relative rarity of these lesions, because prompt diagnosis and appropriate management affect outcome. Histologic grade is a reliable predictor of prognosis and is a designated component of the American Joint Committee on Cancer staging system for sarcomas [4]. Cancers as angiosarcoma, synovial sarcoma, osteosarcoma are considered as high-grade lesions [13, 44-45], dermatofibrosarcoma protuberans as low-grade neoplasm [46-47]. Other types of sarcomas, including fibrosarcoma, leiomyosarcoma, liposarcoma, chondrosarcoma, require individualized grading according to pathologic analysis [4]. Genetic and environmental factor contribute to the development of sarcomas. The genetic factors include p53, Rb1 while environmental include radiotherapy [4, 48].

3. Results

The man/woman ratio was 2:1. As far as age concerned, the most affected age range was between 60 and 80 years. The mean age of the patients was 62 (Figure 1)

As far as pathology is concerned, we found 7 histopathological variations of sarcomas (leiomyosarcoma, rhabdomyosarcoma, fibrosarcoma, epithelioid sarcoma, Kaposi sarcoma, malignant peripheral nerve sheath tumor, chondrosarcoma), and the most common type was the leiomyosarcoma (Figure 2).
Site of tumor origin was grouped into the following anatomical locations: 1 Nasopharynx, mastoid and temporal region, 1 Thyroid gland, 1 Parapharyngeal region, 3 Parotid gland (2 primary and 1 metastatic), 1 Larynx, 1 Nasal cavity, 1 Base of the tongue and free edge of the epiglottis. Fine-needle aspiration (FNA) was the first step to obtain a histologic diagnosis of a mass. When the sample was insufficient, we performed a biopsy. CT and/or MRI are used to evaluate the extent of the primary lesion the regional lymphnodes and distant metastases. Disease was staged according to the American Joint Committee on Cancer (AJCC). It is based on grade, tumor size, lymphnode involvement and distant metastases (Table III) [49].

<table>
<thead>
<tr>
<th>TNM</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>No evidence of primary tumor: Tumor ≤ 5 cm in greatest dimension</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor &gt; 5 cm in greatest dimension</td>
</tr>
<tr>
<td>T1a</td>
<td>Superficial tumor</td>
</tr>
<tr>
<td>T1b</td>
<td>Deep tumor</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor &gt; 5 cm in greatest dimension</td>
</tr>
<tr>
<td>N0</td>
<td>No regional lymph nodes</td>
</tr>
<tr>
<td>N1</td>
<td>Regional lymph nodes metastasis</td>
</tr>
<tr>
<td>MX</td>
<td>Distant metastasis cannot be assessed</td>
</tr>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastasis</td>
</tr>
</tbody>
</table>

Multimodality therapy is the most common strategy for patients with sarcomas of head and neck region. The methods of treatment we used were 2 :surgical treatment and chemotherapy. Although we must remember that the head and neck poses particular surgical problems however because of the proximity of so many important structures and the near impossibility of obtaining wide surgical margins in many cases. The local recurrence rates for high-grade soft tissue sarcomas after surgical excision have been reported to be high as in the literature [5, 50-51]. 33% of patients developed local recurrence in our study. For patients with local or regional recurrence, curative re-resection remains an option. Patients with one or a combination of negative factors (massive recurrence, extensive high-grade lesions, poor functional status, known distant disease) may be best served by palliative therapy or supportive care [51].

4. Discussion

Sarcomas represent a group of very rare diseases. Literature shows survey studies involving head and neck sarcoma [5, 8-12, 52-64] which investigate patient profile and disease prognosis. In this study, in 20 years, the frequency of malignant head and neck neoplasms is about 1 every 2 years. The case number 1 concerns a child of only 6 years of which has been diagnosed with embryonal rhabdomyosarcoma parameningial. The lesion involved the nasopharynx and left mastoid and temporal region. The chemotherapy treatment was chosen based on the extension of the tumor and the young age of the patient. After a disease-free interval, which lasted 4 years, the disease has recurred several times leading to death of the patient 15 years after the first response. This case report reflects many of the features of sarcoma: it is not a frequent tumor and it has come back several times in spite of a continuous surveillance and several cycles of chemotherapy with various chemotherapeutic drugs. Our 3 cases of leiomyosarcoma, even though insurgents in different locations (thyroid gland, larynx and base of the tongue and free edge of the epiglottis), were all treated surgically and today 2 of them (case 5 and 9) are alive and disease free. The case number 3 is a Kaposi’s sarcoma. Lesions similar to that found by us in the right parapharyngeal region had already been detected at the level of his lower limbs. Based on the histological nature we decided to submit it to 6,000,000 U/24h alpha-interferon in cycles of 15 days with 3-4 weeks intervals for a 6 months period. After 3 months of treatment the patient achieved a good remission with improvement of symptoms. But after 5 months of therapy there was the death of the patient for acute myocardial infarction. The case number 4 concerns a patient treated surgically for epithelioid sarcoma arising from the left parotid gland. The surgical treatment led to complete removal of the left parotid gland and the functional latero-cervical left dissection (levels 2-4). Despite surgery, the tumor aggressiveness has led to the death of the patient in few months. Cases number 6 and 8, a chondrosarcoma and myxofibrosarcoma, were treated surgically and patients are now alive disease free. The case number 7 concerns a very aggressive form of malignant peripheral nerve sheath tumor (MPNST) arose for the first time in 2007 in the skin of the left scalp. The lesion was treated surgically because it was several times relapsed. About 3 months ago, the patient came to our department for left metastatic parotid lesion. He was treated surgically but this was not sufficient to eradicate the disease. The patient has been sent to a sarcoma center for choose the ideal treatment where a chemo-radiotherapy has been proposed. The international literature agrees that is difficult to establish a standard treatment for head and neck sarcoma [54, 65]. The optimal treatment is complete resection [5, 65-66]. Postoperative adjuvant radiotherapy is indicated for patients with low-grade tumors who have close (< 1cm) or positive margins, as well as those with high-grade tumors [66-67]. Patients with incompletely resectable tumors are treated initially with radiotherapy [50-51, 66]. The value of adjuvant chemotherapy is unclear [48, 66]. Chemotherapy
may be useful in local control of disease and in case of distant metastases [66, 68-72].

5. Conclusion

The data in this study show that head and neck sarcomas are rare tumors with high histological variability, which may involve different anatomical sites. The affected individuals were 9, in the age range between 6 and 77, with mean age of 62. The predominant histological type was the leiomyosarcoma and the most common locations were the face and the neck. The most common treatment modes were surgery and chemotherapy. Sarcomas of the head and neck region represent a heterogeneous group of tumors with distinct prognostic implications. They are rare and not well-known lesions so we need further epidemiological studies, in order to provide us with more knowledge about the disease.

References


