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CO_2 LASER IN THE TREATMENT OF LARYNGEAL SYNOVIAL SARCOMA: A CLINICAL CASE

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Synovial sarcoma is a rare mesenchymal neoplasm that is usually located in the limbs. Its occurrence in the head and neck region, and particularly in the larynx, is exceptional, with only 16 cases reported to date. Two histological variants have been described, a biphasic and a monophasic variant. Immunohistochemistry is determinant in the differential diagnosis between synovial sarcoma and other spindle and biphasic neoplasms. The treatment of choice is conservative surgery with tumor-free margins, while radiotherapy is effective in local control of the disease after recurrence. Chemotherapy is indicated for the treatment of distant metastases. We present a case of monophasic synovial sarcoma of the laryngeal ventricle that was successfully treated with CO_2 laser excision and we briefly review the literature on the subject.

Key words: CO_2 laser, larynx, soft tissue tumor, synovial sarcoma.

Introduction

Sarcomas of the head and neck represent less than 10% of all sarcomas of the soft tissues[1]. Of the large and heterogeneous group of soft tissue tumors, angiosarcomas, epithelioid sarcomas, fibrosarcomas, leiomyosarcomas, malignant fibrous histiocytomas, liposarcomas, rhabdomyosarcomas and synovial sarcomas have been observed in the head and neck[2]. Synovial sarcomas (SSs) account for 8-10% of soft tissue malignant tumors[3,4], and are most often observed in the limbs[5,6], where they originate from tendon sheaths, articular bursae and joints. The occurrence of SSs is rare in the head and neck[1,4,7,8] and exceptional in the larynx, where only 16 cases have been described to date.

We present a further case of SS of the larynx that was treated with CO_2 laser excision and briefly review the literature on the subject.

Case history

A 57-year-old man presented in March 2005 at the ENT department of our hospital with dysphonia that had been present for a few months. Upper airway endoscopy showed a polypoid lesion originating from the anterior portion of the left laryngeal ventricle. The glottis was normal and laryngeal mobility was preserved. The piriform sinuses were normal. Neck examination did not show enlarged cervical lymph nodes. The lesion was biopsied under laryngeal suspension. Histological examination documented the presence of a sarcomatoid proliferation of neoplastic spindle cells with frequent mitoses. Immunohistochemical examination of the neoplastic cells showed reactivity for vimentin and CD99, while reactions for cytokeratin, epithelial membrane antigen, CD34, factor VIII, smooth muscle actin and S-100 protein were negative. The morphological and immunohistochemical features of the lesion were suggestive of a monophasic synovial sarcoma of the larynx (Figure 1).

CT scan of the neck with contrast medium confirmed the absence of metastases in the cervical lymph nodes, and the tumor was staged as T1N0M0. The patient underwent «en bloc» resection of the tumor by means of a type III CO_2 laser cordectomy of the left vocal cord. Histological examination of the sample confirmed the integrity of the surgical margins, and no chemotherapy was deemed necessary. The patient is free of disease 14 months after the original diagnosis.

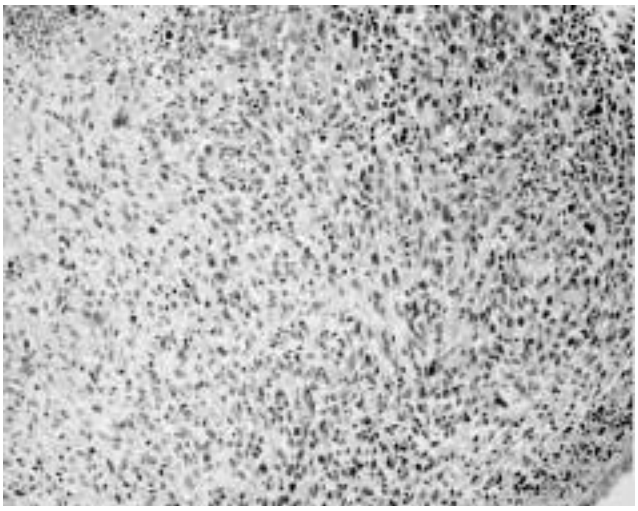

Figure 1 - Laryngeal biopsy sample showing a monophasic synovial sarcoma with superficial ulceration (H&E, ×20).

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Discussion

The diagnosis of SS of the head and neck is particularly difficult due to the rare occurrence of the tumor in this region and its resemblance to other tumors occurring more frequently in the head and neck. SSs are histologically divided into two subgroups: biphasic SS, characterized by the admixture of spindle and epithelioid cells, the latter often organized in gland-like structures, and monophasic SS, in which only one cell component, either spindle or, less often, epithelioid, is present[7,9-12]. Biphasic SS needs to be distinguished from a carcinoma with partial sarcomatoid differentiation, while monophasic spindle cell SS requires a differential diagnosis with all spindle cells tumors, including hemangiopericytoma, malignant schwannoma, and spindle cell carcinoma. Immunohistochemistry is pivotal in the differential diagnosis of spindle cell tumors of the head and neck. However, the expression of cytokeratin in epithelioid areas and the coexpression of cytokeratin and vimentin in the spindle cell component are not discriminating between SS and sarcomatoid carcinoma; the latter can be excluded only by means of CD99 reactivity, which is not observed in epithelial neoplasms. Monophasic SS and malignant tumors of peripheral nerve sheaths/malignant schwannoma, which normally express CD99, can be distinguished with S-100 protein stain, which is consistently present in malignant schwannomas but only in 20% of SS[13]. The most specific marker for a SS diagnosis is, however, the (X;18)(p11.2;q11.2) translocation, which can be identified by molecular techniques[10]. Unfortunately, it requires the analysis of fresh unfixed tissue, which is difficult to obtain from routine microlaryngoscopic biopsies of small lesions of the vocal cord. The occurrence of SS in the head and neck region is hard to explain on the basis of the cellular origin of the tumor: according to Hajdu *et al.*[14], SS originates from pluripotent mesenchymal cells present in articular surfaces, tendons and aponeurotic structures.

In the upper airways, as well as in other districts, SS presents as an exophytic, nonpainful mass, with superficial ulceration. All age groups may be affected, although most patients are young, and there is a slight male prevalence[9,15]. Symptoms are nonspecific and related to the site of the tumor. They most frequently include dysphagia, dyspnea, dysphonia, pain, and facial mass[11]. Metastatic involvement of the locoregional lymph nodes

Table 1 - Literature review of synovial sarcomas of the head and neck

Author, year	Age/sex	Tumor site	Treatment	Evolution	Follow-up
Jernstrom[7], 1954	21/M	Left hemilarynx, hypopharynx	None	Death	0
Pricolo[20], 1957	37/M	Left hemilarynx, hypopharynx	Tumorectomy, RT	Unknown	Unknown
Miller[21], 1975	23/F	Right arytenoid, interarytenoid region	Tumorectomy, partial laryngectomy, total laryngectomy	NED	12 years
Gatti[22], 1975	28/M	Left hemilarynx, hypopharynx	Pharyngolaryngectomy CT, RT	Lung metastasis Death	1 year 2.5 years
Geahchan[23], 1983	24/M	Left arytenoid, aryepiglottic fold	Partial laryngectomy Total laryngectomy	Recurrence Lung metastasis	4 years 6 years
Quinn[24], 1984	76/M	Right hypoglottis	Hemilaryngectomy	NED	12 years
Kitsmaniuk[25], 1985	15/M	Right glottis, arytenoid, epiglottis, pyriform sinus	Total laryngectomy	NED	8 months
Kleinsasser[26], 1988	58/F	Subglottis	Partial resection	Recurrence	7 years
Pruszczynski[6], 1989	28/F	Right aryepiglottic fold and false cord	Tumorectomy, RT (66 Gy)	NED	3 years
Ferlito[27], 1991	28/M	Right aryepiglottic fold, epiglottis	Preoperative RT (25 Gy), supraglottic laryngectomy, cervical node dissection, postoperative RT (50 Gy)	NED	16 years
Danninger[28], 1994	53/M	Right aryepiglottic fold	Radical laryngectomy, neck dissection, RT (64 Gy)	NED	1.3 years
Morland[29], 1994	14/M	Left arytenoid	Tumorectomy Total laryngectomy, CT, RT (60 Gy)	Recurrence NED	3 years 10 months
Dei Tos[30], 1998	27/M	Right aryepiglottic fold	Tumorectomy, hemilaryngectomy CT, RT (62 Gy)	Recurrence NED	3 months 9 months
Bilgic[31], 2003	24/M	Left aryepiglottic fold, arytenoid, epiglottis	Tumorectomy, hemilaryngectomy Total laryngectomy, neck dissection RT (45Gy), CT	Recurrence Lung metastasis NED	1 year 10 months 3.5 years
Papaspyrou[32], 2003	16/M	Right aryepiglottic fold	CO_2 laser resection, RT (50 Gy)	NED	2 years
Boniver[33], 2005		Right aryepiglottic fold	CO_2 laser resection	NED	3 years
Present case	59/M	Left ventricle	CO_2 laser resection	NED	15 months

RT: radiotherapy; CT: chemotherapy; NED: no evidence of disease

is observed in 12% of cases[9,10], while distant metastases occur in 50%. The lung is most often involved (49%), followed by bones (24%), liver (14%) and brain (11%)[9]. Local recurrences are also frequent (30-40%)[8]. The 5-year survival ranges between 23.5% and 45%[9,16,17], while the 10-year survival is 11.2-30%[9,16,18].

A review of the literature showed that surgery is the treatment of choice for SS of the head and neck (Table 1)[6,7,19-33]. As the first surgical approach, conservative surgery aimed at tumor excision with wide tumor-free margins is indicated[34], while bulk demolition of anatomical structures is reserved to salvage surgery of recurrent disease[31]. Given the rare occurrence of nodal metastases, neck dissection is not required in the absence of clinical evidence of cervical node involvement[28,30,31]. When the surgical margins are involved by the tumor, adjuvant radiotherapy or chemotherapy can be given[31]. Radiotherapy has been reported to be effective in disease control[9,11,19,34], while the effectiveness of chemotherapy is controversial[4], although it can be useful in the treatment of distant metastases[4,35]. High-dose ifosfamide, either alone or in combination with adriamycin, has been reported to be effective, in particular in controlling lung metastases[6,20-29,31-33,36-37]. Interestingly, in localized lesions, tumor resection using CO_2 laser seems to be as effective as conventional surgery (partial or total laryngectomy) for disease control, with reported disease-free survival of 2 years[32], 3 years[33], and 15 months (the present case), provided that wide tumor-free margins have been obtained.

Negative prognostic factors that imply a high risk of distant metastases are capsular invasion[9], age older than 25 years, tumor larger than 5 cm, and poor differentiation of tumor cells[9,19]. A proliferation index, evaluated by Ki-67 immunostain, higher than 10% is associated with a dismal prognosis[31,37]. p53 mutations have been associated with reduced survival in a study involving 34 patients[31]. Cagle *et al.* identified a high mitotic index and a limited epithelioid component as negative prognostic factors, especially for disease-free survival[9,38].

In conclusion, SS of the head and neck should be considered an aggressive tumor, like its counterpart in the limbs. In limited lesions, CO_2 laser resection can be suggested as an effective, less invasive approach than partial or radical laryngectomy. The main issue for the surgeon and the pathologist is the assessment of surgical margins, whose integrity is the principal indicator of disease-free survival.

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