CASE REPORT
HEAD AND NECK SURGERY & ONCOLOGY
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Low-Grade Myxofibrosarcoma of the Deep Neck Spaces

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ABSTRACT

Myxofibrosarcoma of the head and neck is rare and even rarer are myxofibrosarcomas occurring in deep neck spaces: only 2 cases have been previously reported, both of which were low grade. Here we described a new case of low-grade myxofibrosarcoma which occurred in the carotid space. The clinical, radiological, histopathological, and prognostic features of the neck localization of this malignancy have been discussed. Radical surgical resection with free margins is the treatment of choice for neck low-grade myxofibrosarcoma. Chemotherapy and radiotherapy are not indicated. This malignancy is characterized by local recurrence and metastatic spread. For these reasons, all patients with neck low-grade myxofibrosarcoma should be recommended for long-term follow-up.

Keywords: Carotid space, head and neck, myxofibrosarcoma, neck dissection, soft tissue neoplasm

Introduction

Myxofibrosarcoma (MFS) is a fibroblast-derived soft tissue neoplasm accounting for approximately 5%-10% of all malignant soft tissue tumors.[1,2] About 77% of MFS cases occur in the extremities with a predilection for the upper ones. Myxofibrosarcoma can also originate in the trunk (12%), the retroperitoneum or mediastinum (8%), the abdominal wall, and the heart.[3,4]

Myxofibrosarcomas of the head and neck are rare, and the few reported cases mainly concerned the paranasal sinus, orbit, mandible, parotid gland, hypopharynx, larynx, thyroid gland, pterygopalatine fossa, tongue, and scalp.[5] Even rarer are MFSs occurring in the neck spaces; to the best of our knowledge, only 2 cases have been previously reported. They arose in the submandibular space[6] and a not otherwise specified cervical space.[7]

Case Presentation

A 64-year-old Caucasian male was referred to our otolaryngology section with a 20-year history of a right-sided neck mass that recently started to grow and become painful. At clinical examination, a firm, bi-lobed, 3-cm mass attached to the underlying tissues at the right carotid space (corresponding to IIA Robbins' level) was found.

Ultrasonography revealed a heterogeneous and delimited mass of 3.0 × 3.1 × 3.0 cm on the right side of the neck. No lymph nodes were detected. A head and neck contrast-enhanced computed tomography (CECT) showed an IIA Robbins' level 3.5 cm mass without contrast enhancement (see Figure 1 A, B, C). Fine-needle aspiration cytology showed some inflammatory cells, vascular structures, and spindle and stellate-shaped cells in a myxoid matrix. The cytological picture pointed toward a diagnosis of soft tissue neoplasm.

The lesion was surgically removed using intraoperative monitoring to preserve the marginalis mandibulae nerve. The incision was performed approximately 2 cm below the right mandible branch. The submandibular gland and the mass were easily identified. The latter occupied the right suprahyoid carotid space and was about 5 × 4 cm in diameter, yellowish, poly-lobed, and solid elastic (Figure 2A). Anteriorly, the mass was in contact with the posterior margin of the submandibular gland and the posterior belly of the digastric muscle without adhering while it was attached to the intermediate tendon. Posteriorly, the mass was in contact with the anterior border of the sternocleidomastoid muscle, jugular vein, and carotid artery. The neoplasm was easily separated from all adjacent structures, except for the part adhering to the intermediate tendon of the digastric muscle. The resection

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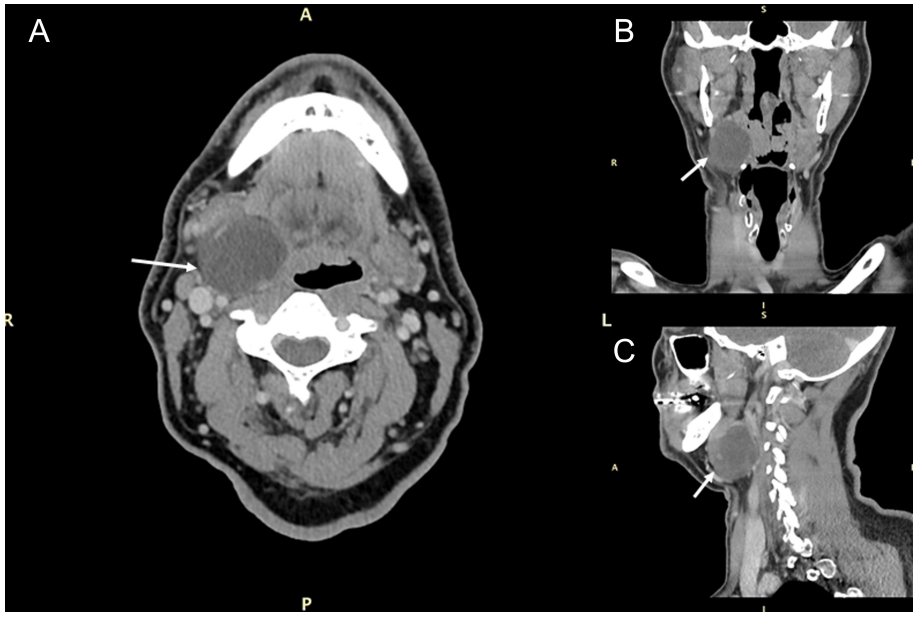

Figure 1. Head and neck contrast-enhanced computed tomography showing in axial (A), coronal (B), and sagittal (C) views a mass (indicated by the arrow) approximately 3.5 cm in its main diameter, not contrast-enhancing.

of a part of the tendon was necessary to achieve a macroscopically free-margin excision. No nerve damage occurred. A surgical drain was placed and removed on the third postoperative day (POD). Moreover, on the third POD, the patient was discharged.

Histologically, low magnification revealed a multinodular tumor of low cellularity. The cells had slightly eosinophilic cytoplasm and indistinct cell borders; the nuclei were hyperchromatic and mildly pleomorphic with only rare mitotic figures (see Figure 2B, C, D). Occasional cells had cytoplasmic vacuolation. The tumor showed elongated, curvilinear capillaries. There was a tendency for the tumor cells to align themselves along the vessel periphery. Immunohistochemically, the cells stained strongly and diffusely for vimentin, although there was focal staining for muscle-specific actin and smooth muscle actin. CD34 staining was seen, indicative of myofibroblastic differentiation. Mucin 4 (MUC4), s-100, epithelial membrane antigen (EMA) were negative.

The patient was re-evaluated with: (i) neck CE magnetic resonance imaging (MRI) and (ii) chest, abdomen, and pelvis CECT scan, those did not show residual disease or distant metastases. Considering the complete resection, though not wide, and the low histological grade, a close follow-up was planned. The patient is currently being followed up monthly. Twelve months after the surgical procedure, there was no evidence of local disease relapse.

Main Points

- Myxofibrosarcoma (MFS) of the neck spaces is extremely rare.
- All reported MFSs of the neck spaces were low-grade ones.
- There seems to be a difference between the MFS behavior of the deep neck spaces and that of the other deep sites.

The patient signed a detailed informed consent form and gave his written permission for clinical case publication. Data were examined in agreement with the Italian privacy and sensitive data laws, and the internal regulations of Padova University's Otolaryngology Section. Furthermore, the patient signed a form in which he consented "to the use of his clinical data for scientific research purposes in the medical, biomedical, and epidemiological fields and also in order to be recalled in the future for follow-up needs."

Discussion

Myxofibrosarcoma comprises a very wide morphological spectrum divided into 3 categories depending on the degree of cytological atypia (low, intermediate, or high). The classification of the MFS is nowadays based on the fifth edition of the World Health Organization Classification of Soft Tissue Tumors.[8]

Histological Diagnosis

Low-grade MFSs (LGMFS) show hypocellular to moderately cellular architecture with a prominent myxoid matrix. Tumor cells are fusiform, round, or stellate with hyperchromatic and irregularly shaped nuclei and mild pleomorphism. Mitoses are seen only occasionally.[9] The differential diagnosis includes myriad benign and malignant myxoid soft tissue neoplasms such as myxoid neurofibroma, myxoma and superficial angiomyxoma, and myxoid liposarcoma. Differential diagnosis also includes a more aggressive malignancy and fibromyxoid sarcoma, which occurs in younger patients and metastasizes more frequently than MFS.[10] In immunohistochemistry, MFS tumor cells are positive for vimentin. Muscle-specific actin (MSA), alpha-smooth muscle actin (α-SMA) can be focally positive, which indicates myofibroblast differentiation. CD31 is positive in tumor vasculature. S-100, desmin, caldesmon, keratin, and histiocyte markers (CD68, Mac387, and XIIIa) are negative. Ki-67 is

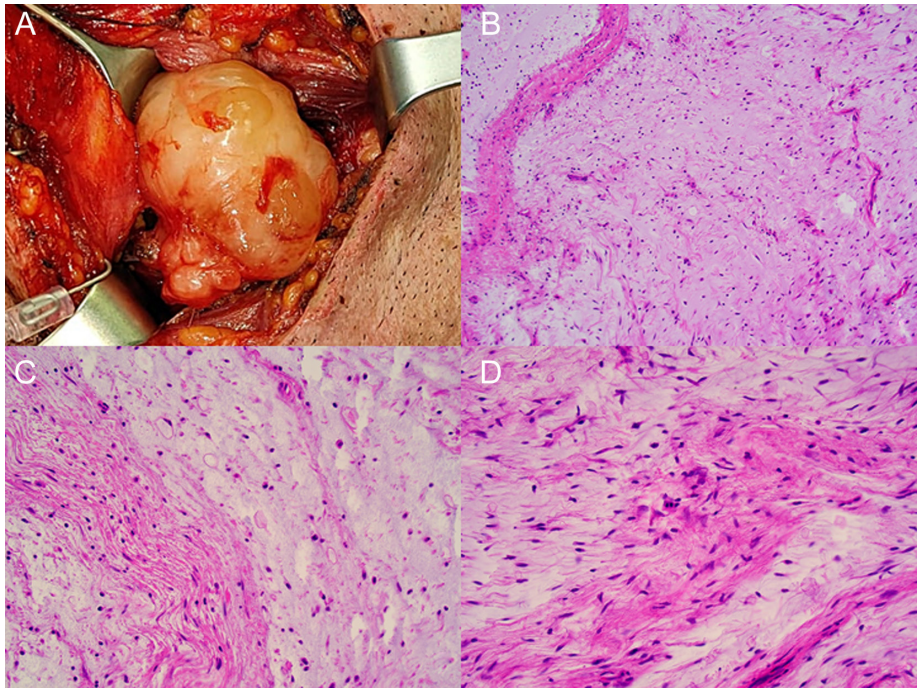

Figure 2. Surgical specimen: macroscopic image (A). Low-grade myxofibrosarcoma. Lobulated hypo-cellular tumor composed of scattered atypical cells with hyperchromatic nuclei set in abundant myxoid stroma containing curvilinear blood vessels (B). Single pseudo-lipoblasts were found (C). Rare mitotic figures were observed (D).

partially positive; Ki-67 has a positive correlation with tumor recurrence and may be used as an indicator of relapse risk.

Clinical Features and Behavior

Only 2 cases of MFS of the neck spaces have been previously reported,[6,7] including our patient, and the age ranged from 43 to 64 years. The lesions ranged from 1.5 cm to 8 cm in their maximum diameter. Both patients were surgically treated; histopathological examination revealed that they were LGMFS. Patients underwent close follow-up controls which showed no short- or medium-term relapses (12-27 months). These findings were not in agreement with Mentzel et al[9] conclusions in their analysis of 75 MFS of the trunk and limbs. These authors found that the incidence of metastases was higher in deep MFS and the disease-related mortality rate was twice that of superficial lesions because deep lesions were larger and higher-grade neoplasms. Unlike MFS of the deep neck spaces, those involving the head and upper aerodigestive tract seemed to have clinical and prognostic characteristics comparable to those of the trunk and extremities. Ke et al[5] recently reported 21 cases of head and neck MFS with highly variable clinical features. Patients showed varying degrees of MFS and were treated with neo-adjuvant or postoperative radiotherapy (RT), complete or partial surgery, and chemotherapy. The survival rate also extremely varied, from long-term survival to disease-related death after a few months. Two cases of MFS with simultaneous neck and trunk involvement have also been reported: a 64-year-old male with high-grade MFS (HGMFS) extending from the shoulder to the neck that was treated with chemotherapy and RT and a 48-year-old male with trunk HGMFS extended to the neck presented as a Pancoast's tumor that underwent radical excision, chemotherapy, and radiotherapy, local recurrence appeared unexpectedly after 7 years and the patient died of disease 99 months after the initial intervention.[11,12]

The clinical course of LGMFS is difficult to predict with a significant tendency of local recurrence and an infrequent metastatic spread.[13] The characteristic infiltrative pattern of MFS may at least in part explain why wide-margin excision is not associated with a low recurrence rate. Moreover, margins' status has been shown to be associated with overall survival in a series of 158 patients with MFS by Sanfilippo et al.[14] On the other hand, in that series, only 35 patients (22%) had an LGMFS; therefore, no conclusive evidence can be derived. It has been shown that tumor size smaller than 5 cm and the absence of tissue necrosis (as in the case herein reported) seem to be associated with better survival outcomes. The reported MFS local recurrence rate ranged from 32% to 60% for both LGMFS and HGMFS,[8] even in the case of wide excision. Low-grade myxofibrosarcoma has a high rate of cure, with about 85% of patients alive with no evidence of disease and distant metastases are infrequent. The behavior of LGMFS of deep neck spaces seems to be less aggressive than in other districts.

Treatment of Choice and Follow-Up

Based on the available literature, there has been no uniform conclusion on the treatment of MFS. Intact mass excision is definitely advised. Additionally, the value of pre- and postoperative adjuvant chemotherapy and RT is still being discussed.[5] In our case, complete surgical excision was performed. Considering the histological diagnosis of LGMFS, no postoperative adjuvant radiotherapy or chemotherapy was planned.

Though there is no universally acknowledged follow-up schedule for such malignancies, in LGMFS, a follow-up including (i) CEMRI of the neck every 4 months for the first year and every 6 months for the next 4 years and (ii) CECT of the chest and abdomen every 6 months for 5 years are highly suggested

to check for local and distant recurrence and progression of a high-grade neoplasm.

Informed Consent: Written informed consent was obtained from the patient who agreed to take part in the study.

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