Case Report

Soft-Tissue Sarcoma of the Arm—An Oncosurgical and Reconstructive Challenge: A Case Report

G Sepetys[1], N Jakutis[1,2]

[1]Faculty of Medicine, Vilnius University, Vilnius, [2]Clinic of Rheumatology, Orthopedics, Traumatology and Reconstructive Surgery, Vilnius University, Vilnius, Lithuania

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Abstract

Soft-tissue sarcoma (STS) is a rare tumor that may occur in the upper extremity. Its presentation is delayed by slow growth and lack of symptoms. Lesions are discovered via physical and radiologic examinations, and definitive diagnosis is conducted histopathologically. We present the case of a 63-year-old man with swelling of the dorsum of the arm,nocturnal hyperhidrosis, and weight loss. Radiologic examination revealed possible malignancy and metabolically active left axillary lymph nodes. The tumor was excised, and the defect was covered using a pedicled myocutaneous latissimus dorsi flap. The distal portion of the muscle was attached to the remnant tricep brachii tendon. Postoperative histopathology revealed a highly malignant STS. The patient remained relapse-free after a regimen for adjuvant chemotherapy. Satisfactory aesthetic results and modest elbow extension were evident during the 11-month follow-up. Properly managing upper extremity STS is crucial for preventing recurrence and metastasis.

Keywords: *Arm, latissimus dorsi muscle flap, reconstruction, soft-tissue sarcoma, surgery*

Introduction

Soft-tissue sarcoma (STS) is a type of tumor that originates from connective tissue. STSs comprise <1% of all malignant tumors[1] and arm lesions comprise as low as 2.9% of all STSs,[2,3] meaning that the literature on STS is limited. Arm STS presents a substantial challenge. Extremity STSs were commonly managed by amputation in up to 47% of all cases.[4] However, limb preservation is currently achievable in over 90% of patients without compromising local recurrence or survival rates.[5] We report the successful diagnosis and treatment of arm STS through the inventive application of functional muscle transfer.

Case History

The patient was a 63-year-old man with swelling of the dorsum of the left arm, nocturnal hyperhidrosis, and weight loss [Figure 1]. These were the only symptoms the patient mentioned. He noticed a mass in his arm 7 months before visiting our hospital. It was noticeable on physical examination, and a painless immobile subcutaneous mass could be palpated. There was no impairment of sensory or motor function or vascular insufficiency. No substantial changes in the blood test were observed. These findings were consistent with the results of arm ultrasonography and magnetic resonance imaging (MRI) with gadolinium-based contrast. A sizeable intracompartmental mass (70 mm × 47 mm × 128 mm) was observed in the middle to distal portions of the musculus tricep brachii. Enlarged regional lymph nodes (20 mm × 11 mm) were also observed. Neurovascular structures were not involved. The tumor's visual heterogeneity, haphazard contrast medium accumulation, and necrotic zones implied its malignant nature. To discover metastases, whole-body positron emission tomography (PET)was performed. High metabolic activity in the lesion and affected lymph nodes were revealed. Subsequent biopsy revealed epithelioid leiomyosarcoma. Thus, surgery

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Address for correspondence: Dr. N Jakutis, Clinic of Rheumatology, Orthopedics, Traumatology and Reconstructive Surgery, Vilnius University, M. K. Čiurlionio St., 21/27, Vilnius, LT03101 Lithuania.
E-mail: nerijus.jakutis@santa.lt

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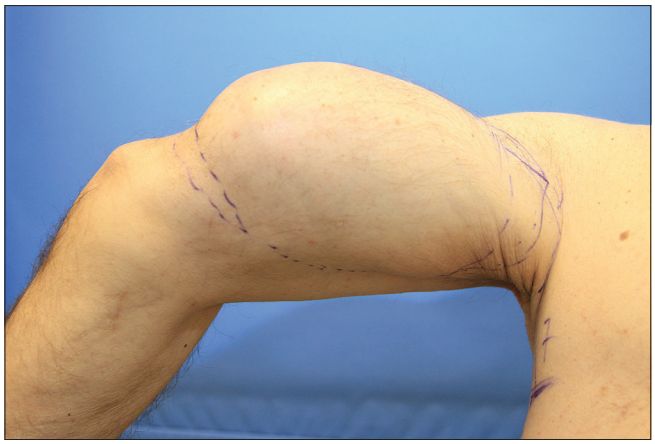

Figure 1: Patient's arm at the time of admission

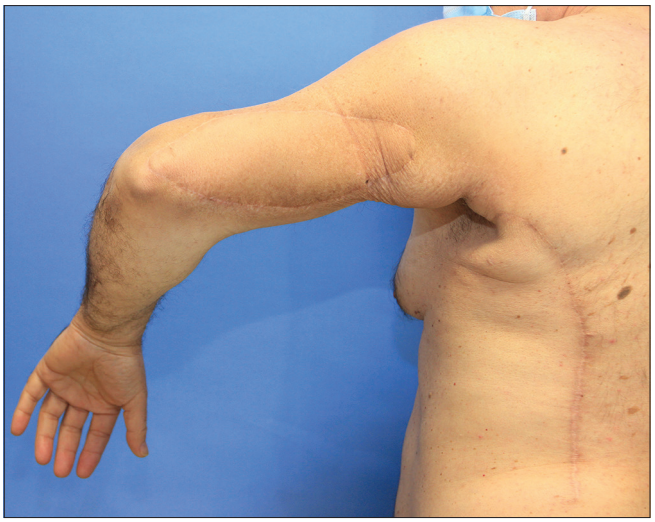

Figure 2: Postoperative results at the 11-month follow-up

was performed after obtaining informed consent. The tumor was excised en bloc while preserving the radial and ulnar nerves. The brachial vein, artery, and median nerve were not exposed. The left axillary nodes were subsequently removed through an S-shaped incision. The thoracodorsal artery and vein were prepared, and the soft tissue defect was covered using a pedicled myocutaneous latissimus dorsi (pLD) flap (220 mm × 80 mm). The distal portion of the muscle was attached to the remnant tricep brachii tendon to preserve extension function. Two surgical drains were inserted. Negative surgical margins and tumor malignancy were confirmed postoperatively via histological evaluation. The definitive pathological diagnosis was grade 3 dedifferentiated/pleomorphic epithelioid leiomyosarcoma without metastases to the regional lymph (pT4N0M0). The patient underwent adjuvant external beam radiation therapy at 50 and 10 Gy. Postoperative rehabilitation was performed, and a forearm–arm compression sleeve was used for lymphedema prophylaxis. MRI performed 9 months postoperatively showed no signs of local or distant recurrence. There were satisfactory esthetic results, no lymphedema, and modest elbow extension (Medical Research Council Muscle Power Scale grade 2 for tricep muscles) during an 11-month follow-up [Figure 2].

Discussion

STS is a heterogeneous tumor that arises from mesenchymal tissues such as muscle, fat, joints, peripheral nerves, and blood vessels.[6,7] There are very few cases of STS occurring in the arm.[8] STS is often diagnosed late due to its slow growth and lack of symptoms.[9] Diagnosis and complete clinical staging (e.g., tumor (T), nodes (N), and metastases (M)) must be established to create a definitive treatment plan. Ultrasonography has a limited role in sarcoma imaging. However, pathology can be revealed through reactive lymphadenopathy and detecting local recurrence. Contrast-enhanced MRI is used for diagnostic imaging and to plan the approach for biopsy and excision.[9] Although diagnostic CT scans are preferred in some clinics, they are more commonly used to detect abdominal or pulmonary metastases. Conversely, fluorodeoxyglucose PET can be used to detect metastases in the entire body. However, the final diagnosis of STS can only be established by histopathological examination, with samples taken from the most vascular, non-necrotic part of the lesion. Traditionally, closed biopsy methods, such as fine-needle aspiration or core-needle biopsy, have been employed. Surgery is the mainstay treatment for STS. Amputation is sometimes indicated. However, limb-sparing excision, such as in this case, is favored. The desired type of excision is termed as "wide excision," signifying that the tumor is removed within the healthy tissue. Inadequate primary excision and evidence on residual tumor require re-excision, which must include all previous incisions and drainage exit sites, as well as every anatomic compartment suspected of being contaminated.[8] Radiation or re-radiation may also be performed in selected cases. Over the past decades, neoadjuvant, intraoperative, and adjuvant radiotherapy have become crucial adjuncts to extremity-preserving surgery. However, limb-sparing techniques are not always preferred. Contraindications to limb-sparing procedures include underlying defects persisting through the entire extremity, the proximal location of the lesion, or complete resection inducing a useless limb. In these cases, amputation is the method of choice.[10] Ideally, reconstruction is performed when postoperative tissue defects are too large for conventional closure. It is important to strive for optimal functional and esthetic results. An anterolateral thigh, parascapular, thoracodorsal artery perforator, and musculocutaneous

latissimus dorsi flaps are the most popular options for larger defects.[8] In the case of sarcomas located in the arm, such as in our patient, a pLD flap can cover the soft-tissue defect while preserving the potential for motor function restoration. If reconstruction cannot be performed, vacuum-assisted closure may be beneficial. It is recommended that STS be treated in tumor centers.[8] Furthermore, a thorough treatment plan must be determined in an interdisciplinary tumor board setting and include oncosurgical, reconstructive, neoadjuvant, and adjuvant treatment options.[2,8,10] In conclusion, STS of the upper extremity is a threat to patients and a challenge to physicians due to its low incidence, closely situated anatomical structures, and aggressive growth. Prompt diagnosis is essential. Management should be centralized and discussed in a multidisciplinary setting. Surgery is the cornerstone of treatment, and limb-sparing procedures are preferred. However, few patients may require amputation. Reconstruction is an essential part of surgery. Any flap that satisfies the needs of the defect is suitable, given that reconstruction is properly executed, and the donor defect is not severe. Functional muscle transfer may also be considered. In most cases, surgical treatment is accompanied by radiotherapy.

Key messages

STS of the upper extremity is both threatening and challenging. Therefore, prompt diagnosis is essential.

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Conflicts of interest

There are no conflicts of interest.

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