

# Local Recurrence of Soft-tissue Sarcoma of the Shoulder with Scapular Involvement: A Case Report

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## ABSTRACT

Soft-Tissue Sarcomas (STS) are rare malignant mesenchymal tumours with a high tendency for local recurrence and distant metastasis. The authors report a 28-year-old male with a history of excision of a high-grade soft-tissue sarcoma of the right shoulder who presented within six months with a rapidly enlarging recurrent mass at the operative site. Contrast-enhanced Magnetic Resonance Imaging (MRI) demonstrated a large heterogeneous soft-tissue lesion in the posterior scapular region with internal necrosis, infiltration of adjacent periscapular muscles and periosteal reaction along the scapula, suggestive of local recurrence with early osseous involvement. Computed Tomography (CT) of the chest revealed multiple pulmonary nodules consistent with metastatic disease. In view of advanced recurrent disease, the patient was managed with Intensity-Modulated Radiotherapy (IMRT) using a dose of 30 Gy in 10 fractions, which resulted in reduction in tumour bulk with symptomatic improvement. The present case emphasises the importance of MRI in early detection, local staging and treatment planning in recurrent soft-tissue sarcoma.

**Keywords:** Axillary lymphadenopathy, Intensity-modulated radiation therapy, Local staging, Magnetic resonance imaging, Pulmonary metastasis

## CASE REPORT

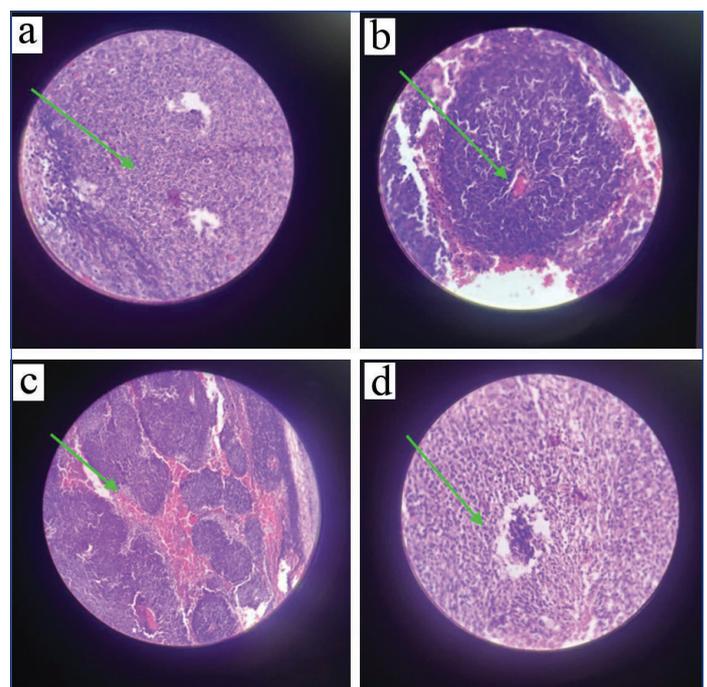
A 28-year-old male presented with a progressively enlarging, painful swelling over the posterior aspect of the right shoulder. He had undergone surgical excision of a soft-tissue mass at the same site six months earlier, which was reported as a high-grade biphasic soft-tissue sarcoma {French Federation of Cancer Centres Sarcoma Group (FNCLCC) Grade 3} on histopathological examination {Haematoxylin and Eosin stain (H&E)} [Table/Fig-1]. The patient noticed recurrence of the swelling approximately three months after surgery, with a rapid increase in size and associated restriction of shoulder movements. Following the initial surgical excision, the patient was counselled regarding the need for adjuvant therapy; however, he did not undergo further treatment and was subsequently lost to follow-up until presenting with rapid local recurrence.

On clinical examination, a large firm to hard, non mobile mass measuring approximately 16×20×10 cm was noted over the posterior scapular region, appearing fixed to underlying structures [Table/Fig-2]. A repeat biopsy of the recurrent mass was not performed, as the lesion showed imaging features consistent with recurrence at the previously operated site, the prior histopathology was available and the presence of metastatic disease meant that biopsy confirmation would not have altered management. Shoulder abduction and external rotation were markedly restricted due to pain and mechanical limitation. Right axillary lymphadenopathy was present. Distal neurovascular status of the right upper limb was preserved. No significant systemic abnormalities were noted.

Plain radiograph of the right shoulder demonstrated a large posterior soft-tissue shadow, without definitive cortical destruction, likely due to limited sensitivity for early osseous involvement [Table/Fig-3]. Ultrasonography revealed a heterogeneous predominantly solid mass with internal necrotic areas and increased vascularity, suggestive of an aggressive soft-tissue lesion.

Contrast-enhanced MRI of the right shoulder showed a large lobulated soft-tissue mass arising from the posterior scapular region, appearing hypointense to isointense on T1-weighted images

and heterogeneously hyperintense on T2-weighted and Short Tau Inversion Recovery (STIR) sequences, with internal non enhancing necrotic areas. Post-contrast images demonstrated heterogeneous enhancement. The lesion showed extensive infiltration of adjacent periscapular muscles with obliteration of intervening fat planes and periosteal reaction along the scapula, indicating early osseous involvement, better appreciated on MRI [Table/Fig-4].



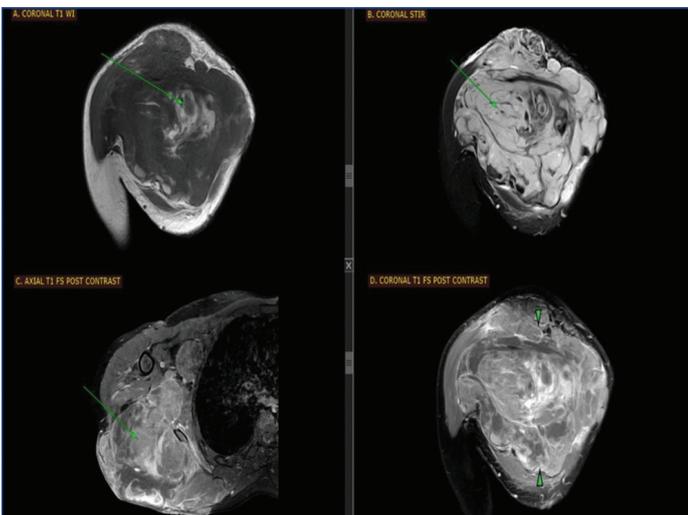
**[Table/Fig-1]:** Histopathological examination of the previously excised soft-tissue sarcoma specimen. (a) Round to oval tumour cells with inconspicuous nuclei (H&E stain, ×40) (arrow). (b) Tumour cells arranged in a perivascular pattern (H&E stain, ×40) (arrow). (c) Areas of haemorrhage within the tumour (H&E stain, ×10) (arrow). (d) Marked cellular pleomorphism with prominent nuclei and focal tumour degeneration (H&E stain, ×40) (arrow).



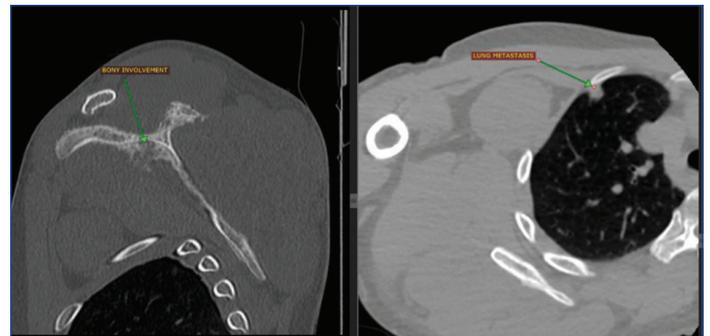
**[Table/Fig-2]:** Clinical photographs showing rapid postoperative recurrence of a large soft-tissue mass over the right scapular region within six months of initial surgical excision.



**[Table/Fig-3]:** Plain radiograph of the right shoulder showing large posterior soft-tissue mass.



**[Table/Fig-4]:** Magnetic Resonance Imaging (MRI) of the right scapular region showing a large heterogeneous soft-tissue mass. (a) Coronal T1-weighted image demonstrates a predominantly isointense lesion with areas of altered signal intensity. (arrow); (b) Coronal STIR image shows heterogeneous hyperintensity and surrounding soft-tissue oedema. (arrow); (c) Axial T1 fat-suppressed post-contrast image reveals heterogeneous enhancement with non enhancing necrotic areas. (arrow); (d) Coronal T1 fat-suppressed post-contrast image demonstrates the longitudinal extent of the lesion and enhancement pattern. (arrowheads).



**[Table/Fig-5]:** Computed Tomography images demonstrating metastatic disease. (a) Sagittal CT image in bone window shows cortical erosion and bony involvement of the right scapula (arrow); (b) Axial CT image in lung window reveals a pulmonary metastatic nodule in the right lung (arrow).

The case was discussed in a multidisciplinary tumour board involving radiology, surgical oncology, medical oncology and radiation oncology. In view of the advanced locally recurrent disease with extensive local invasion and synchronous pulmonary metastases, the consensus was to proceed with palliative radiotherapy.

The patient was treated with palliative external-beam radiotherapy using IMRT to the primary tumour region, receiving a total dose of 30 Gy in 10 fractions. The radiotherapy field encompassed the gross tumour volume with appropriate margins to account for local tumour extent while sparing adjacent critical structures. Surgical resection was not pursued due to extensive local invasion, large tumour burden and the presence of distant metastases. Systemic chemotherapy was deferred at this stage and radiotherapy was prioritised for symptomatic local control. The patient tolerated the treatment well, with subsequent clinical improvement.

Post-treatment assessment was performed after completion of the planned radiotherapy course (30 Gy in 10 fractions) which demonstrated reduction in tumour bulk with improvement in pain and shoulder mobility. Right axillary lymph nodes showed interval reduction in size, while pulmonary nodules remained stable. At the most recent follow-up, the disease was assessed as stable, with reduction in local tumour bulk and no progression of pulmonary metastases. The patient is on regular oncologic follow-up with planned interval imaging.

## DISCUSSION

The STS are a heterogeneous group of malignant mesenchymal tumours, accounting for less than 1% of adult malignancies, with over 70 histological subtypes described in the World Health Organisation (WHO) classification [2]. Tumour grade, size, anatomical location, histological subtype, adequacy of surgical margins and presence of metastatic disease are key determinants of clinical behaviour and prognosis [3].

Early local recurrence in STS is multifactorial and is commonly associated with high tumour grade, large tumour size, deep location and inadequate initial local control. In the present case, aggressive tumour biology reflected by FNCLCC Grade 3 histology, large tumour burden and periscapular location likely contributed to rapid postoperative recurrence [4]. In addition, omission of adjuvant therapy following initial surgical excision may have facilitated early local regrowth, particularly in an anatomically complex region where achieving wide surgical margins is challenging [3,5].

Sarcomas arising in the shoulder girdle and periscapular region pose distinct diagnostic and therapeutic challenges due to complex anatomy, proximity to critical neurovascular structures and limited scope for achieving adequate surgical margins. These factors increase the risk of incomplete excision and local recurrence compared to tumours at more surgically accessible sites [5]. Large outcome-based studies have shown that inadequate initial surgical management and positive margins

The CT of the chest revealed multiple pulmonary nodules (four in number), the largest measuring approximately 8×9 mm in the right lung, consistent with metastatic disease. Enlarged right axillary lymph nodes were also noted, with the largest node demonstrating a short-axis diameter of approximately 40 mm [Table/Fig-5].

Based on clinical and imaging findings, a diagnosis of recurrent high-grade soft-tissue sarcoma of the right scapular region with local invasion and pulmonary metastases was made. Based on the initial histopathology, the tumour was considered a high-grade biphasic soft-tissue sarcoma (FNCLCC Grade 3). Using available clinical, imaging and histopathological data, the disease was staged as cT4N1M1 (AJCC Stage IV) [1].

are strongly associated with higher recurrence rates and poorer outcomes, emphasising the importance of early referral to specialised oncologic centres [5].

The MRI is the modality of choice for local staging and evaluation of STS due to its superior soft-tissue contrast and multiplanar capability [6]. Typical MRI features of high-grade sarcomas include iso- to hypointense signal on T1-weighted images, heterogeneous hyperintensity on T2-weighted and STIR sequences, internal necrosis, heterogeneous enhancement and obliteration of normal fat planes, all of which were demonstrated in the present case. MRI is also valuable in assessing periosteal reaction and early osseous involvement in tumours abutting flat bones such as the scapula, which has important implications for staging and treatment planning [6].

The CT of the chest is essential for staging STS, as the lungs are the most common site of distant metastasis [3]. Detection of pulmonary metastases significantly worsens prognosis and alters therapeutic intent. In this patient, identification of multiple pulmonary nodules confirmed systemic disease and guided a palliative treatment approach.

Radiotherapy plays an important role in the management of recurrent or unresectable STS, particularly when surgery is not feasible due to extensive local invasion or metastatic disease. In the present patient, advanced local recurrence with nodal involvement and synchronous pulmonary metastases precluded curative surgical resection. Palliative radiotherapy was therefore chosen to achieve local disease control, alleviate pain and improve functional outcomes. The use of IMRT allowed adequate target coverage while minimising radiation exposure to adjacent critical structures in the shoulder girdle region [7,8].

Previous studies have reported high rates of recurrence in high-grade STS, especially following non radical excision or omission of adjuvant therapy. Brennan MF et al. and Zagars GK et al., demonstrated that inadequate initial local control significantly increases the risk of early recurrence and adversely affects outcomes [5,7]. Similar reports involving periscapular sarcomas highlight the frequent need for radiotherapy to achieve local control, particularly in advanced disease. In metastatic settings, palliative radiotherapy has been shown to provide effective symptom relief and local disease stabilisation, consistent with the response observed in the present case [8].

Histopathological grading remains a key prognostic factor in STS. The FNCLCC grading system, incorporating tumour differentiation, mitotic activity and necrosis, provides reliable prognostic stratification and correlates well with aggressive imaging features of the present case also with the grade 3 histology of tumour [4]. Overall, the present case highlights the importance of integrated imaging, histopathological assessment and multidisciplinary decision-making in the management of aggressive recurrent STS.

## CONCLUSION(S)

The STS involving the shoulder girdle present significant diagnostic and therapeutic challenges due to complex regional anatomy and aggressive tumour behaviour. The present case underscores the crucial role of MRI in accurately defining local tumour extent, detecting early osseous involvement of the scapula and identifying imaging features suggestive of high-grade disease, while chest CT remains indispensable for staging and detection of pulmonary metastases. Surgical resection was not feasible in this patient due to extensive local invasion, large tumour burden and the presence of synchronous pulmonary metastases. In such settings, advanced radiotherapy techniques such as intensity-modulated radiation therapy can provide effective local disease control and symptomatic relief.

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