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CLINICAL CASE REPORT

Challenges in management of giant lower back liposarcoma: A case report

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ABSTRACT

Soft tissue sarcomas, often characterized by slow growth and benign symptoms, can lead to delayed diagnosis, frequently resulting in large tumors that pose significant surgical challenges. This case report details the clinical course of a patient who presented with a chronic mass in the left lower back, ultimately diagnosed as liposarcoma. The presence of multiple comorbidities, including coronary artery disease, atrial fibrillation, chronic kidney disease, and diabetes mellitus, posed significant challenges in the surgical resection of the liposarcoma. Diagnosis was confirmed through Tru-cut biopsy and magnetic resonance imaging. Surgery remains the primary treatment for localized disease. In this case, the patient underwent an oncological en bloc wide local excision of the liposarcoma, followed by the transposition of a right 4th lumbar perforator flap to cover the defect. The postoperative period was complicated by substantial blood loss, wound dehiscence, poorly controlled glucose levels, infection, and patient compliance issues, all of which contributed to delayed wound healing. A vacuum assisted closure dressing was used to manage the defect until the flap cover was completed, and it was also employed to address complications such as flap dehiscence and wound infection. The patient's condition required intensive care unit admission for close monitoring. This case underscores the critical need for meticulous preoperative management of comorbidities, timely surgical intervention, and specialized multidisciplinary collaboration to optimize outcomes. It also highlights the paramount importance of multidisciplinary care involving an endocrinologist, cardiologist, infectious disease specialist, physiotherapist, and radiation oncologist.

KEYWORDS:
Liposarcoma, diabetes mellitus, co-morbidities, surgical complication, clinical compliance, clinical challenges

INTRODUCTION

Demographics:
A 65-year-old retired male from the Middle East. He is married with adult children and has a university degree.

Medical background:
The patient had a medical history of coronary artery disease, atrial fibrillation, chronic kidney disease, and diabetes mellitus with history of smoking (Shisha). His CHADSVASC score was 4, indicating a need for anticoagulation. However, it came to our attention that the patient had stopped taking his oral anticoagulant, apixaban. Currently, he is on aspirin therapy and had a history of non-ST elevation myocardial infarction (NSTEMI) post-percutaneous coronary intervention (PCI) in September 2022. He was taking Meformin and short and long-acting insulin for diabetes mellitus (DM).

Presentation:
The Patient had been experiencing a left lower back mass for the past 20 years. Initially, the mass was painless and small in size, and he chose to ignore it. However, it recently became painful and had significantly increased in size, thus affected his mobility.

Physical examination:
A large, palpable mass was noted in the left lumbar region. The mass measured approximately 22 x 14 cm. It was firm in consistency, non-tender to palpation, and appeared to be fixed to the underlying structures. The overlying skin showed no signs of discoloration, ulceration, or inflammation. There were no palpable lymph nodes in the surrounding areas. The patient did not report any significant pain associated with the mass, although a sense of fullness and mild discomfort was present due to its size. No other abnormalities were detected on the physical examination.

Preoperative evaluation:
The patient was referred from an affiliated hospital within our group. The diagnosis was made through a Tru-cut biopsy and MRI imaging, which revealed the need for excision (complex), frozen section control (pathology), and reconstruction with local flaps.

Blood tests:
Blood tests revealed random blood Glucose (19.1 mmol/L), Hemoglobin A1c was 11.1%, Creatinine (130 µmol/L), eGFR is 50.4 (CKD-EPI 2021 formula) INR 0.93, Platelet Count of 128 × 10^9/L. Liver function tests, electrolytes, lipid profile, hemoglobin, and total white blood cell count were within normal limits. Prostate specific antigen (PSA), carcinoembryonic antigen (CEA), and CA 19-9 levels were negative.

Images:
Ultrasound assessment showed a large solid heterogeneous mass lesion in the left lumbar/buttock region, necessitating further evaluation by MRI. The initial MRI revealed a large heterogeneous mass in the posterior paravertebral soft tissues on the left side, extending from T12 to S1 levels, measuring approximately 20 x 12 x 11 cm in maximal craniocaudal, transverse, and anteroposterior dimensions, respectively (Figure 1).

The mass was intramuscular cranially, lying within the left erector spinae muscle, and caudally broke through the fascia, reaching up to the subcutaneous tissues. Large non-enhancing cystic/necrotic areas were observed within the mass, which abutted the posterior elements of several lumbar vertebrae. However, no bone erosion/destruction or intraspinal or intra-abdominal extension was noted.

Diagnostic Assessment:
MRI findings were consistent with a soft tissue sarcoma, confirmed by biopsy. These findings were confirmed by an ultrasound-guided core needle biopsy of the left paravertebral mass. The core biopsy of the lower back soft tissue mass revealed myxoid spindle cell neoplasm, which favors myxoid liposarcoma. Frozen section analysis showed clear margins. Final histopathology revealed a large myxoid spindle cell sarcoma, grade II.

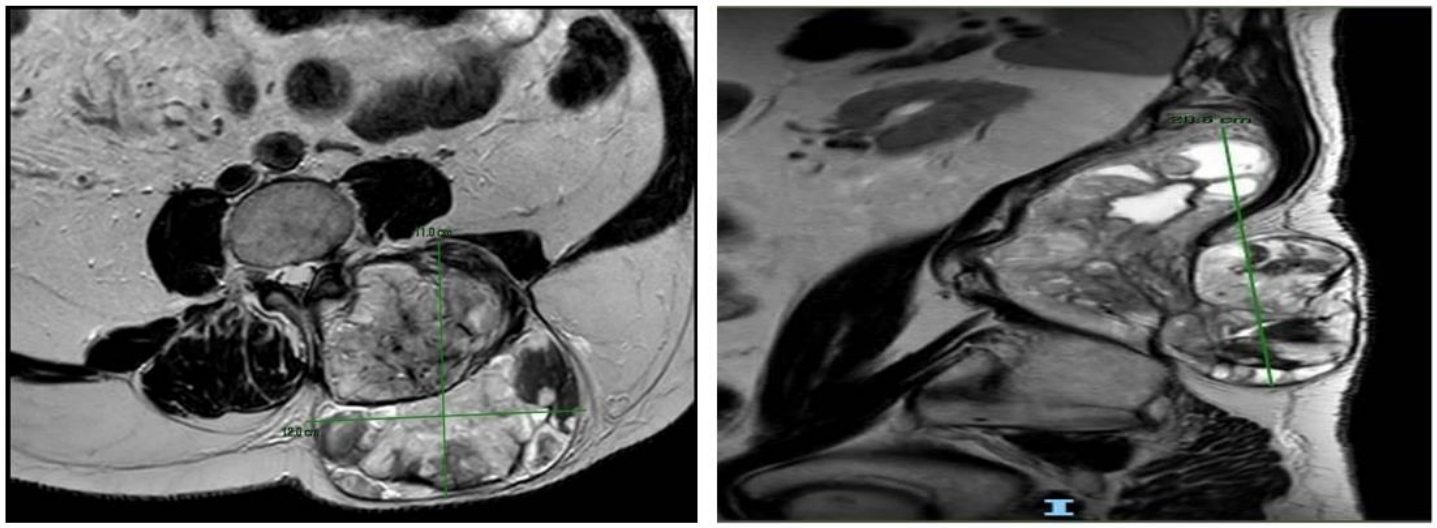

Figure1. MRI shows large heterogeneous mass in the posterior paravertebral soft tissues on the left side, extending from T12 to S1 levels, measuring approximately 20 x 12 x 11 cm in maximal craniocaudal, transverse, and anteroposterior dimensions, respectively

METHODS

The patient underwent two surgeries for tumor resection and flap cover under general anesthesia in a prone position.

Tumor Resection (first surgery):

The patient underwent an oncological en bloc wide local excision of the liposarcoma, which was complicated by significant blood loss, necessitating transfusion and transfer to the ICU for post-operative care.

Tumor Description:

The tumor measured approximately 12 x 12 cm and presented as a large, fixed, firm mass palpable in the left lumbar soft tissues. A deeper component was observed invading the erector spinae muscle on the left side, extending from T12 to L5 vertebrae and measuring approximately 18 x 12 cm (Figure 2).

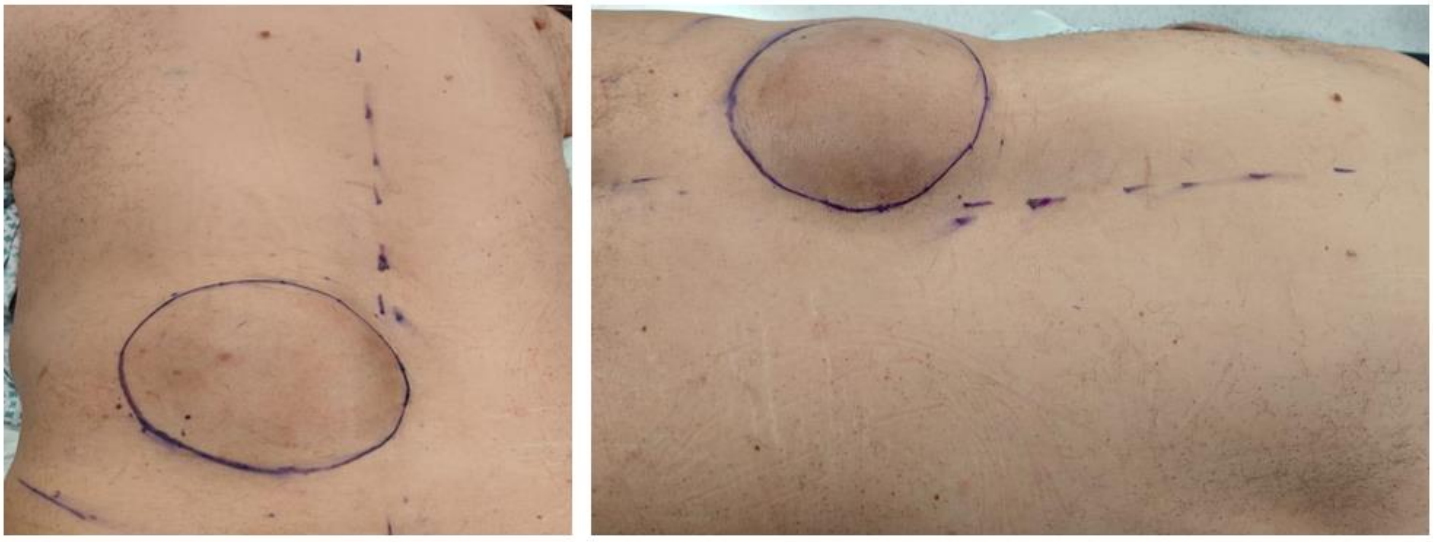

Figure 2. Tumor from AP and lateral views

Procedure Details:
The initial phase of the surgery involved creating a circular incision around the palpable soft tissue mass, resulting in a diameter of approximately 14 cm. Soft tissue dissection was then performed to establish a 2.0 cm margin around the tumor, with removal of the superficial component extending to the level of the deep fascia.

The subsequent stage of the procedure began upon the observation that the tumor was adherent to spinal elements (Figure 3). Working alongside an experienced spinal neurosurgeon, meticulous dissection of the tumor capsule from the spinous and transverse processes of vertebrae at levels L1-L5 was carried out. The deep-seated component of the tumor was completely excised (Figure 4). Hemostasis was successfully achieved, and a vacuum-assisted closure (VAC) dressing was applied.

Intra-operative Complications:
Upon reaching the interface between the superficial and deep tumor layers, significant bleeding exceeding 1 liter occurred, accompanied by oozing from the capsule and feeding vessels.

Reconstructive Procedure (second surgery):
The patient's flap cover procedure was initially scheduled but had to be postponed due to uncontrolled diabetes mellitus (DM). The endocrinologist managed his DM medications and closely monitored his blood sugar levels. During the waiting period for his second surgery, he underwent two reapplications of negative pressure dressing. After that, he underwent debridement of the left lower back wound and transposition of a right 4th lumbar perforator flap to cover the defect.

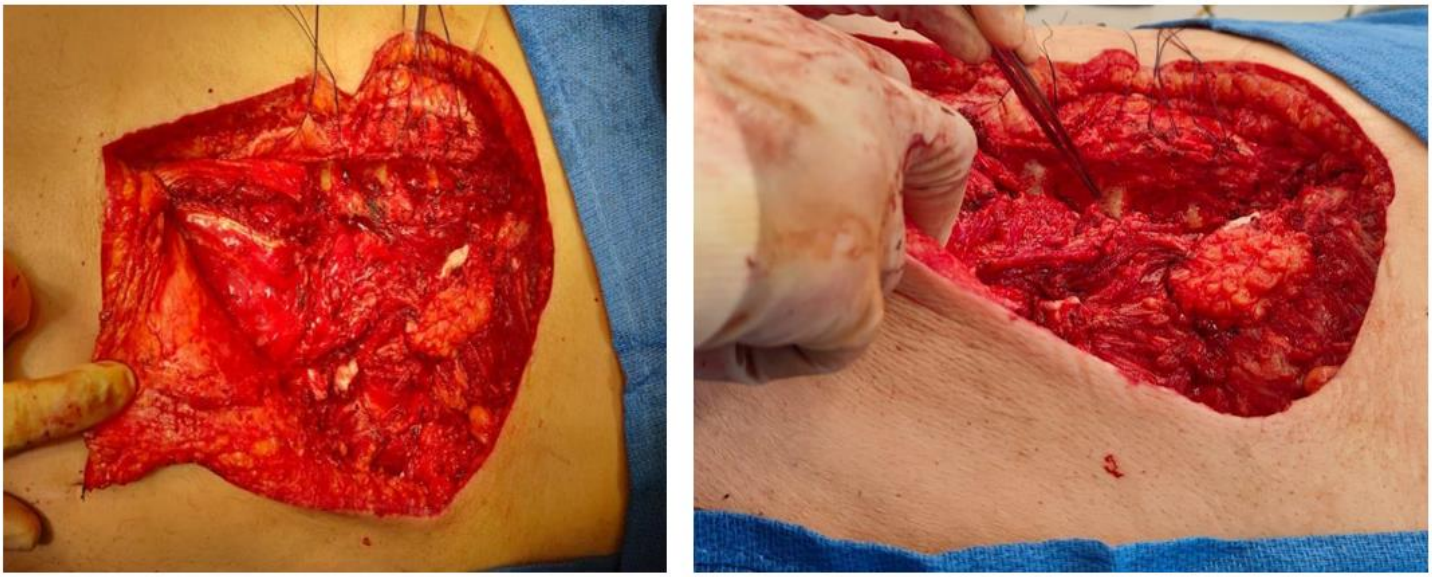

Figure 3. The tumor tethered to the spinal elements

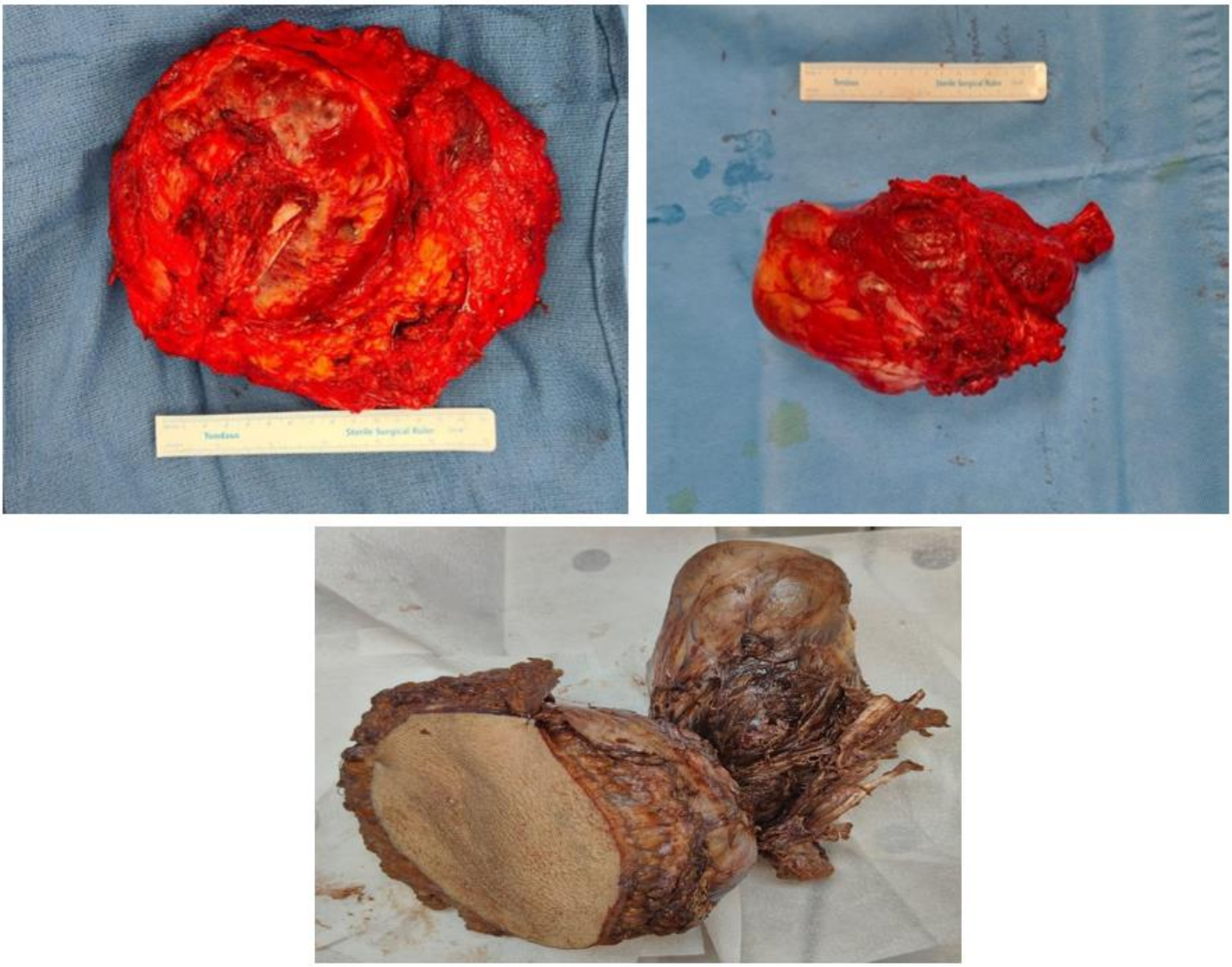

Figure 4. The resected mass

Description of the wound defect: The defect exhibited a sloughy mucoid film, characteristic of glycated features of a diabetic wound, measuring approximately 15x9 cm with a dead space of approximately 720 cm^3 (20x12x3 cm) (Figure 5).

Steps for flap procedure: Favorable perforator signals for the 4th Lumbar perforator (10 cm lateral from the midline and eight above PSIS) and SGAP were marked (Figure 6). A large transposition flap was designed based on the lumbar perforator, with approximately 3-5 cm border of underlying fat/fascia to fill the dead space. The flap was raised with underlying fascia and fat from the distal (gluteal region) to the proximal (right lumbar paraspinal) and transposed by dividing the skin between the flap and the defect in the midline.

Closure: The flap was inset, and the donor defect sites were closed with 2/0 PDS deep sutures and 3/0 Monocryl for dermal and subcutaneous layers. Two suction drains (19Fr) were placed on either side of the midline (Figure 7).

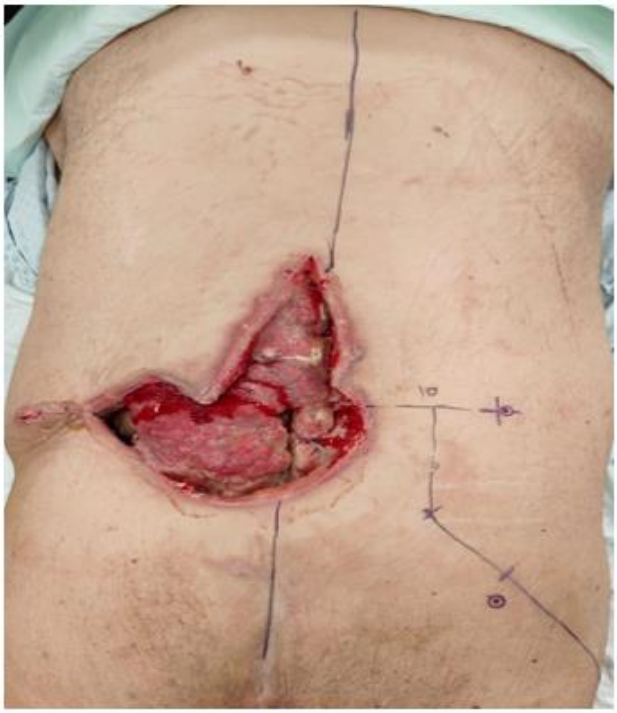

Figure 5. The defect covered with a sloughy mucoid film

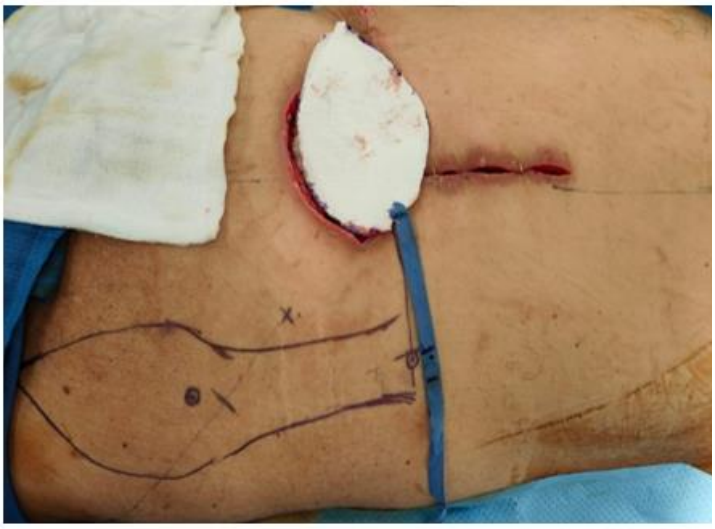

Figure 6. The mark for the 4th Lumbar perforator and SGAP flaps

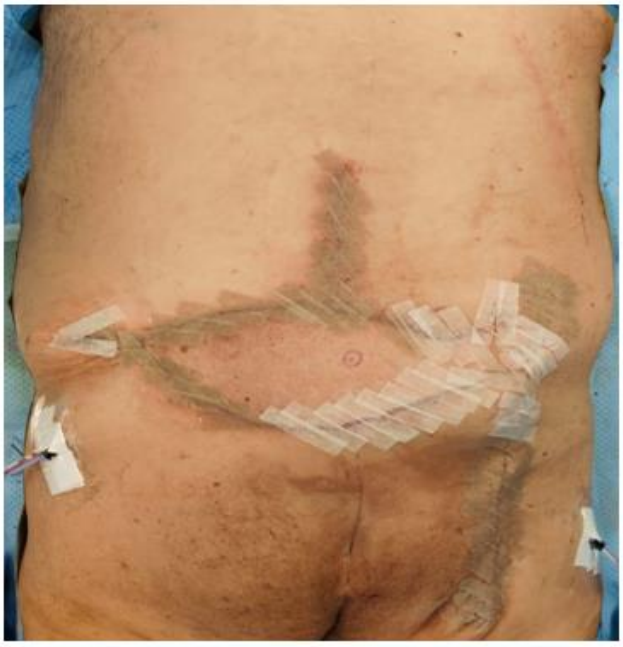

Figure 7. The wound after-closure

RESULTS

Unfortunately, the patient developed flap dehiscence (Figure 8), necessitating a return to the operating theater for reevaluation, debridement, and closure. A wound culture swab was taken, revealing Escherichia coli, which was sensitive to Piperacillin+Tazobactam. Additionally, daily dressing changes were performed at his surgical site.

Figure 8. Flap dehiscence

Despite encountered challenges, the patient maintained clinical stability. However, wound healing was impeded by uncontrolled diabetes mellitus and an E. coli infection. Additional management options, such

as hyperbaric oxygen therapy, were recommended but the patient did not complaint, with plans for radiation therapy post-complete wound closure.

Upon discharge, the patient was provided with a VAC machine for a partially healed wound, with scheduled weekly follow-ups for VAC dressing changes (Figure 9). However, ensuring the VAC dressing remained in place posed challenges due to difficulties in the patient's compliance with movement restrictions. After one month, the VAC machine was removed. Subsequently, the patient underwent dressing changes every two days for an additional month (Figure 10).

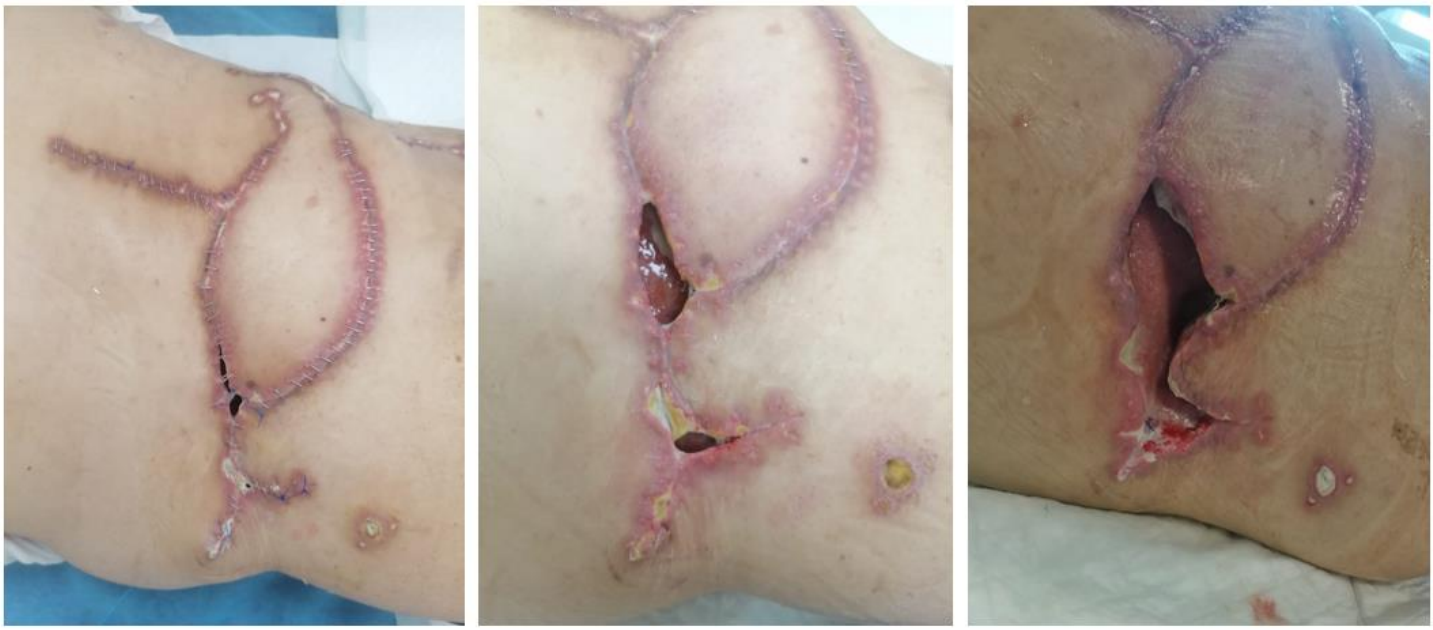

Figure 9. The progression of wound dehiscence, revealing the underlying defect

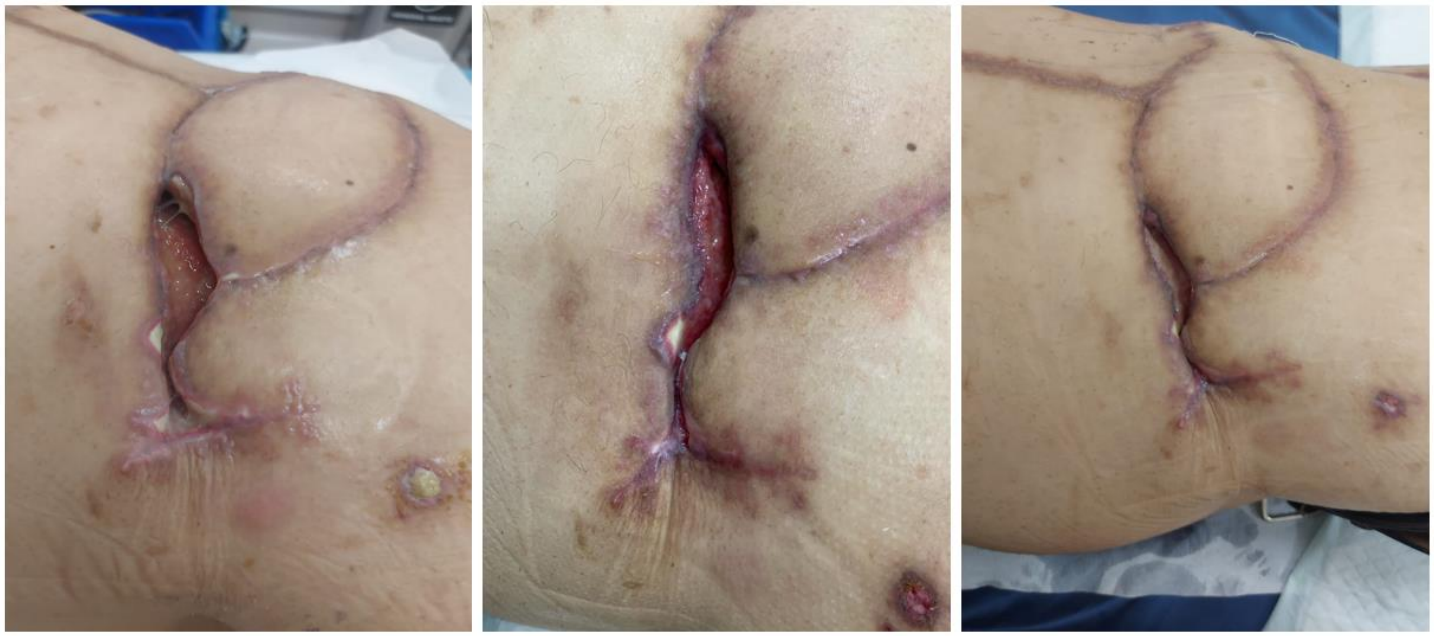

Figure 10. The process of healing and tissue formation to close the defect

DISCUSSION

Liposarcoma, a rare malignant tumor of soft tissue, predominantly manifests in the extremities and retroperitoneum[1]. The World Health Organization (WHO) has classified liposarcomas into five histological subtypes,[2] with well-differentiated being the most prevalent, followed by dedifferentiated, myxoid, and pleomorphic tumors.[1]

Patients with liposarcoma often face delayed diagnosis due to various factors, including the slow onset of benign symptoms, patients' delay in seeking medical attention, and physicians' reliance on imaging and histology. Early and accurate diagnosis is critical for optimizing patient outcomes, encompassing local disease control, overall survival, and health-related quality of life (HRQoL). However, the lack of a typical sarcoma presentation, limited public awareness, and healthcare professionals' limited experience with sarcomas contribute to prolonged diagnostic intervals and late referrals to specialist centers. The total interval from initial symptoms to histological diagnosis varies widely, ranging from 9 to 120.4 weeks for benign tumors and 4.3 to 614.9 weeks for soft tissue sarcomas.[3]

A study examining factors contributing to delayed diagnosis found that out of 100 patients, 47 experienced delays due to patient-related factors. The median delay among these patients was four months, ranging from 2 to 240 months. The primary cause of this delay was attributed to painless masses often being disregarded. Conversely, patients experiencing pain had shorter median delays. Additionally, 27 out of 100 patients encountered delays attributable to healthcare providers, with delays ranging from 2 to 79 months and a median delay of 6 months.[4] Another study concluded that factors indicative of low health engagement, such as diabetes and smoking, influence the delay in initial treatment.[5]

Preoperative imaging evaluation is crucial for determining tumor size, depth, site, resectability, and the presence of metastases. Magnetic resonance imaging with contrast is the preferred technique for tumors in the limbs, pelvis, and trunk, while computed tomography is utilized for retroperitoneal or intraabdominal soft tissue sarcomas and staging.[6] A core-needle biopsy is necessary for a definitive histological diagnosis and should ideally be performed by the surgeon who will also remove the tumor to minimize contamination of surrounding structures.[7] Core needle biopsy provides high diagnostic accuracy for adipocytic tumors, particularly for benign lipomatous tumors and higher grade liposarcomas.[18]

Surgery remains the primary treatment for localized disease, typically involving wide excision with negative margins (R0). The appropriate negative margins vary based on tumor location, histology, grade, or preoperative treatment, but a minimum of 1 cm or an intact anatomical barrier is generally recommended. Reconstructive surgery may aid in achieving R0 resection.[6] Various techniques, such as the latissimus dorsi free flap, dorsalis pedis free flap, scapular free flap, lateral arm free flap, and anterolateral thigh (ALT) free flap, have been employed to repair soft tissue defects post-resection. Free vascularized anterolateral thigh flap (FVALTP) has shown success in managing soft tissue defects after extremity sarcoma resection with a relatively low complication rate.[8] Reconstruction can be performed immediately or staged, with no significant difference in wound complication rates or oncologic outcomes.[9]

Additionally, other treatment modalities such as radiotherapy and chemotherapy are tailored based on histology, location, clinical behavior, and specific oncogenic drivers. Ongoing research is actively exploring novel therapies targeting various pathways and known pathogenic drivers.[10]

Despite advancements in soft tissue sarcoma (STS) treatment, postoperative wound complications remain a significant concern due to unique challenges such as large surgical wounds, tissue voids post-resection, thin skin flaps, and the use of adjuvant radiation.[11] Approximately 16-53% of soft tissue sarcoma resections encounter complications necessitating additional management.[12] These complications typically include infection, dehiscence/necrosis, and hematoma/seroma.

A study involving 61 patients from eleven institutes found that 84% of complications occurred within six weeks post-surgery.[12] Surgical site infection (SSI)

stands out as a primary post-operative complication. Literature identifies several risk factors and predictor scores associated with SSIs. In a study of 187 cases, 60 SSIs were observed. Univariate analysis revealed various factors significantly increasing SSI risk, such as diabetes, larger specimen diameter, American Society of Anesthesiology (ASA) grade 3, use of endoprosthetic replacement, blood loss exceeding 1 L, and tumor location at junctions. Furthermore, biomarkers like the Modified Glasgow Prognostic Score, C-reactive protein/albumin ratio, and neutrophil–platelet score (NPS) showed statistical correlation with SSI risk. Multivariate analysis identified ASA grade 3, junctional tumor location, and NPS as independent predictors of SSI risk.[13] Another study utilized the Geriatric Nutritional Risk Index to predict SSI risk.[14]

Diabetes Mellitus (DM) stands as an independent risk factor for various complications including wound infections, healing disorders, hematoma, and renal insufficiency. Neutrophilic dysfunction, tissue hypoxia, and increased blood viscosity induced by DM elevate the risk of infections. Moreover, DM impedes wound healing through reduced angiogenesis, dysregulation of multiple growth factors, and impaired macrophage function, contributing to postoperative complications.[16]

Numerous studies have explored strategies to mitigate surgical site infections (SSI) following soft tissue sarcoma resections. One study assessing the use of antibiotics with anaerobic coverage in addition to standard first-generation cephalosporin prophylaxis during soft tissue sarcoma resections concluded that after adjusting for confounding factors like neoadjuvant radiation, tumor size, anatomic location, and patient BMI, anaerobic coverage was associated with reduced odds of wound complications (OR 0.36 [95% confidence interval (CI) 0.18 to 0.68]; p = 0.003).[15]

Bisson-Patoué et al. conclude that smoking was associated with the occurrence of major complications after groin STS resection and there was a strong trend for obesity and surgical bone exposure. Major complications were associated with a delay in starting postoperative radiation therapy.[17]

CONCLUSION

Patient education plays a pivotal role in empowering individuals to prioritize their health and seek timely medical attention. This is especially crucial in cases of soft tissue sarcoma, where early intervention can significantly impact outcomes. Emphasizing the importance of adhering to medical advice, including limitations on physical activity to promote healing, is paramount, particularly in cases with extensive dead space post-surgery. Proactive management of these conditions not only enhances patient safety but also improves the efficacy of surgical interventions. Through comprehensive counseling and proactive management of comorbidities, healthcare providers can effectively support patients throughout their treatment journey, ultimately leading to better outcomes in soft tissue sarcoma cases. We recommend considering flap coverage after tumor resection for patients with factors known to contribute to complications. Addressing comorbidities prior to surgery is essential to reduce perioperative risks and optimize patient outcomes. Reducing the time between imaging, biopsy, and surgical intervention is also critical. Additionally, involving the corresponding specialty based on the location of the liposarcoma can further improve patient care and outcomes.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review.

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