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Sarcoma of the Semimembranosus Muscle in a 63-Year-Old Patient – A Case Report

Youness Mokhchani[1,3*], Bouchaib Chafry[2,3], Driss Benchebba[2,3], A.S. Bouabid[2,3], Mustapha Boussouga[2,3]

[1]Department of Orthopedic Surgery and Traumatology, Mohammed VI Military Hospital –Dakhla-Morocco
[2]Department of Orthopedic Surgery and Traumatology, Mohammed V Military Teaching Hospital
[3]Faculty of Medicine and Pharmacy, Mohammed V University -Rabat- 10000, Morocco

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***Corresponding author:** Youness Mokhchani
Department of Orthopedic Surgery and Traumatology, Mohammed VI Military Hospital –Dakhla-Morocco
Faculty of Medicine and Pharmacy, Mohammed V University -Rabat- 10000, Morocco

Abstract **Case Report**

We present a 63-year-old patient with a left posterior thigh mass that had been evolving for 6 months, causing sciatic nerve compression. MRI showed a large tumor centered on the semimembranosus muscle, displacing the sciatic nerve and popliteal artery. Biopsy concluded a grade III undifferentiated unclassifiable sarcoma. Given the patient's refusal of a hip disarticulation proposed by the multidisciplinary team meeting, embolization of the feeding arteries was performed, followed by palliative resection with nerve release. The postoperative course was uneventful; the patient then received chemotherapy and radiotherapy before being lost to follow-up.

Keywords: Soft Tissue Sarcoma, Semimembranosus, Preoperative Embolization, Palliative Surgery.

INTRODUCTION

Soft tissue sarcomas of the thigh are rare and aggressive tumors, whose diagnosis is often delayed [1]. Compression of the sciatic nerve by a large tumor in the posterior compartment can cause pain and motor deficit [2]. MRI and biopsy are essential for diagnosis and grading [3]. Preoperative embolization facilitates the resection of hypervascular tumors [4]. We report a case of a high-grade sarcoma of the semimembranosus muscle with refusal of hip disarticulation, treated by embolization and palliative surgery [5].

CASE REPORT

A 63-year-old, right-handed male, with no significant medical history, non-smoker, consulted for a mass on the posterior aspect of the left thigh. Symptoms had begun 6 months earlier as a small painless swelling, progressively increasing in size, becoming bothersome when sitting and walking (Figure 1). At the time of consultation, the mass was tense, firm, measuring approximately 15 cm in its long axis, and fixed to deep planes.

Clinical examination revealed a positive Lasegue sign at 60°, pain on palpation of the posterior thigh, paresthesia in the territory of the common peroneal nerve (anterolateral leg and dorsum of the foot), hypoesthesia of the third interdigital space, and an initial toe flexion deficit (left side strength 4/5). Achilles and patellar reflexes were normal. There were no local inflammatory signs or palpable inguinal lymph nodes.

Standard hip and femur X-ray was normal, with no bone abnormality or signs of invasion (Figure 2).

Doppler ultrasound was performed first: it showed a heterogeneous, well-defined soft tissue mass, measuring approximately 130 × 100 mm (Figure 3), with necrotic areas and hypervascularization on color Doppler (high systolic arterial flow).

Left thigh MRI (T1, T2 with fat saturation, and T1 after gadolinium injection) specified (Figure 4):

- Tumor process centered on the semimembranosus muscle, displacing the semitendinosus muscle medially and the biceps femoris laterally.
- Dimensions : 142 mm in anteroposterior diameter, 129 mm in transverse diameter, 243 mm in craniocaudal height.
- The tumor displaces the sciatic nerve anterolaterally with no sign of direct invasion (visible separation rim on T2 sequences).

- The popliteal pedicle (artery and vein) is displaced anteriorly, also separated by a clear rim.
- Heterogeneous contrast enhancement, with central necrotic areas.

Staging with thoraco-abdomino-pelvic computed tomography (CT) showed no distant suspicious lesions: no pulmonary, hepatic, or lymph node metastases. Only a few simple liver cysts were noted (Figure 5). Bone scintigraphy (technetium-99m) showed heterogeneous extra-osseous uptake at the medial aspect of the left thigh corresponding to the tumor mass, with no pathological bone hyperfixation (Figure 6).

A surgical biopsy was performed via a posterior midline approach, through a 2 cm incision. Pathological analysis concluded an undifferentiated malignant tumor process, rich in atypical spindle cells, with a high mitotic index (> 20 mitoses per field). Immunohistochemistry ruled out leiomyosarcoma, liposarcoma, or synovial sarcoma. The diagnosis retained was a high-grade unclassifiable sarcoma (undifferentiated pleomorphic sarcoma), grade III according to FNCLCC (score 3 for differentiation, 3 for mitotic index, 2 for necrosis, i.e., 3+3+2 = 8).

The case was presented at a multidisciplinary team meeting ; the team considered that the tumor was very large, in close contact with the sciatic nerve and popliteal artery, but that macroscopically complete resection (R0) would be difficult without sacrificing the nerve. The therapeutic proposal was a hip disarticulation, allowing wide excision. However, the patient refused this radical option after clear information about the alternatives. He expressed his wish to benefit from palliative decompression surgery, aiming to reduce tumor mass, relieve nerve compression, and preserve the limb, even at the cost of macroscopically incomplete resection (R2). The multidisciplinary team accepted this request and recommended preoperative embolization to limit intraoperative bleeding, given the tumor's hypervascularity and the non-healed biopsy tract.

Embolization of the feeding arteries was performed in interventional radiology after an initial CT angiography. Two arterial contingents supplying the tumor were identified: upper branches from the deep femoral artery (proximal perforators) and lower branches from the superficial femoral artery (Figure 7). A right femoral arterial approach was used. Ascending to the abdominal aorta allowed catheterization of the left common iliac artery, then the external iliac artery, and finally the common femoral artery. The feeding arteries of the tumor were selectively embolized using 200-300 µm polyvinyl alcohol (PVA) microparticles until complete stasis. Final angiographic control showed a marked decrease in tumor vascularization (Figure 8). No complications occurred.

Surgery took place 48 hours after embolization, under general anesthesia, in the prone position. The skin incision was vertical, midline, strictly posterior, centered on the mass. It included the biopsy tract in an orange peel fashion (Figure 9), (skin opening and infiltrated subcutaneous tissue). Skin flaps were widely dissected (Figure 10). Dissection was continued deeply, first to identify and protect the sciatic nerve. The nerve was displaced anterolaterally by the tumor, but a clear dissection plane existed. The nerve was freed along the entire height of the tumor, by cutting a few adherent fibrous bands. The popliteal vessels (artery and vein) were then identified, also displaced but free. The tumor was extremely vascularized despite embolization, but blood loss was limited (approximately 700 mL) thanks to careful hemostasis with bipolar forceps. The mass was resected en bloc, removing most of the infiltrated semimembranosus muscle. Complete freeing of the sciatic nerve and vessels allowed macroscopically complete tumor excision, even though the resection margin was microscopically positive (R2 resection, palliative). The residual cavity was thoroughly washed with saline (Figure 11), then two Redon drains (suction) were placed, one deep and one subcutaneous. Closure was performed in two layers: fascia and skin, with interrupted nylon sutures (Figure 12).

Immediate postoperative course was uneventful: no new postoperative neurological deficit, pain was controlled with step II analgesics. Drains were removed on day 3. Healing was satisfactory. The patient was able to walk with a cane from day 3, without worsening of paresthesias.

Adjuvant treatment was discussed: chemotherapy with doxorubicin and ifosfamide was started 6 weeks after surgery (2 planned cycles), followed by external radiotherapy to the tumor bed (50 Gy in 25 fractions). At 2 months postoperatively, the patient was in good general condition, pain had disappeared, and sciatic nerve function was stable. He was then lost to follow-up (moved out of region, unreachable).

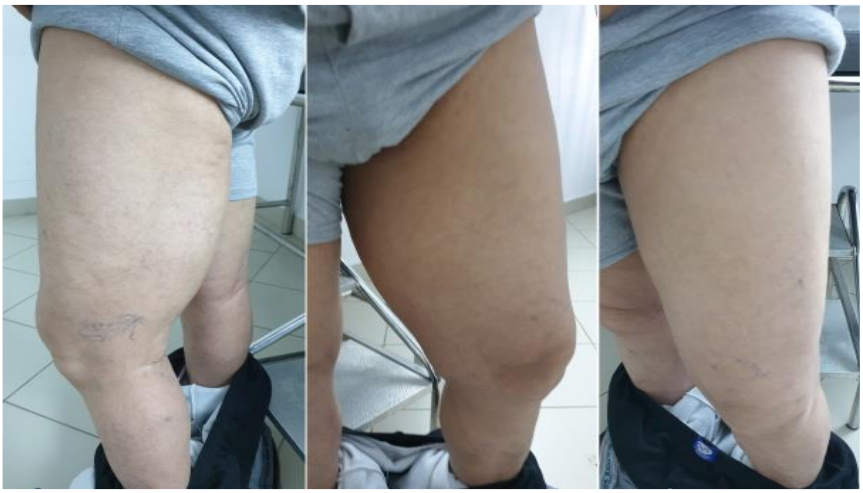

Figure 1: Showing clinical appearance of the left thigh

Figure 2: X-ray of the hip and femur

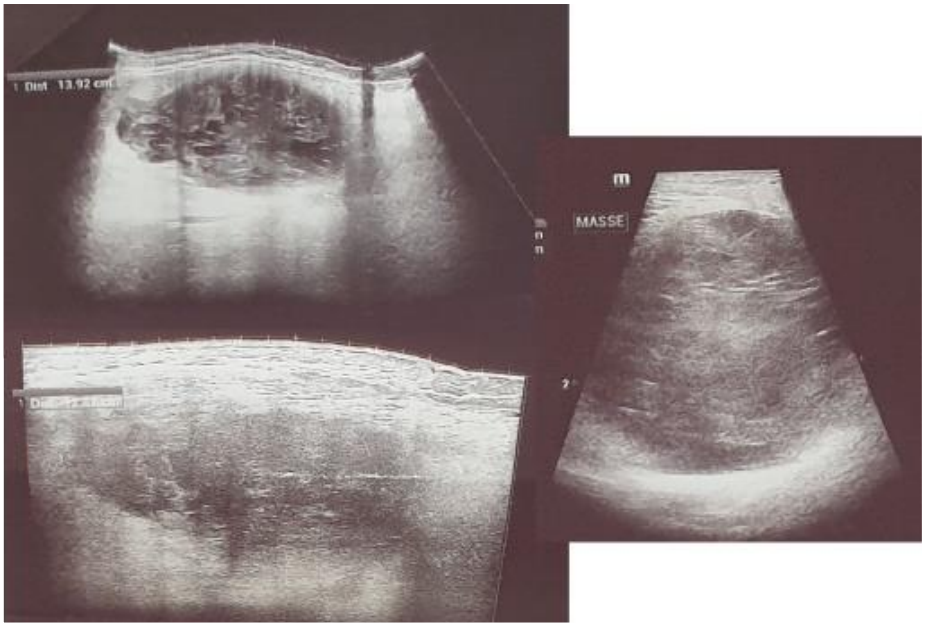

Figure 3: Ultrasound apparence of the tumor

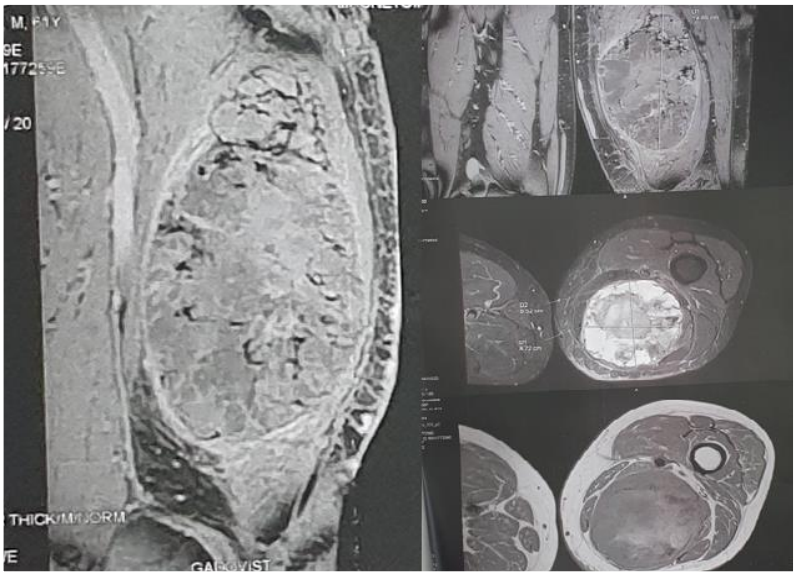

Figure 4: MRI of the thigh showing the large tumor and its contact with the sciatic nerve and the femoral pedicle

Figure 5: CT scan of the chest, abdomen, and pelvis showing no abnormalities

Figure 6: Bone scintigraphy: showing extraosseous uptake in the inner part of the left thigh

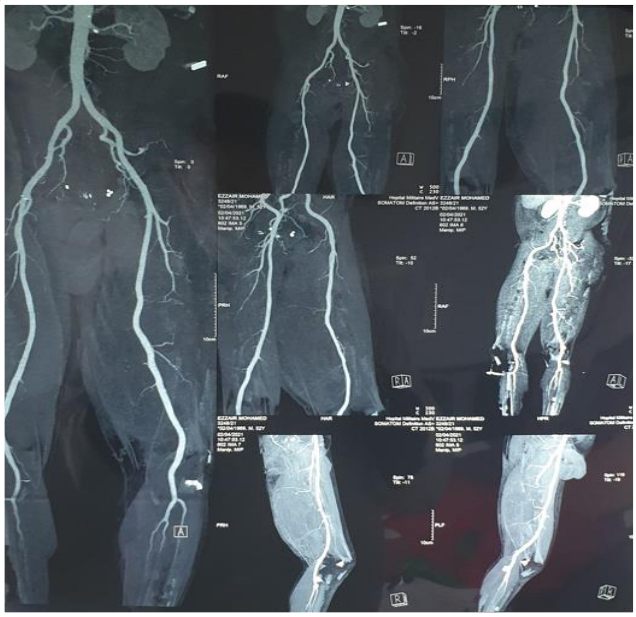

Figure 7: CT angiography showing tumor vasularization

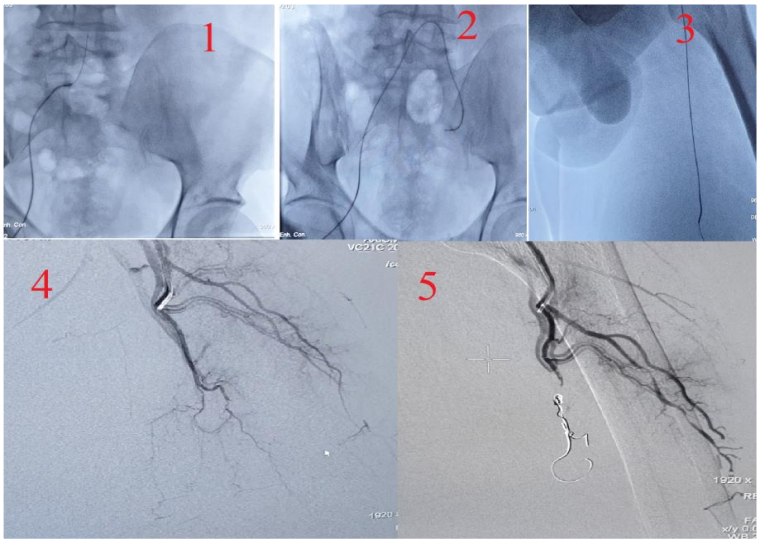

Figure 8: Showing the different stages of embolization of the arteries supplying the tumor

Figure 9: Showing the patient's positioning and the ‘’segmental incision resembling orange quarter’’ carrying the biopsy access route

Figure 10: Showing intraoperative images before tumor resection

Figure 11: Intraoperative images showing the clean and hemostatic tumor resection bed, with the sciatic nerve preserved and intact

Figure 12: The tumor mass after resection

DISCUSSION

Undifferentiated unclassifiable sarcomas (formerly malignant fibrous histiocytomas) account for about 5 to 10% of adult soft tissue sarcomas, with a peak incidence between 60 and 70 years [1]. The deep thigh location is the most common and can reach large sizes before becoming symptomatic, explaining the 6-month diagnostic delay in our case [2]. Sciatic nerve compression manifests as radicular pain, paresthesia, and distal motor deficit, which should suggest a malignant tumor as a primary diagnosis when facing a posterior thigh mass [3]. MRI is the reference exam to characterize the tumor, its limits, and its relationship with neurovascular structures ; the presence of a separation rim is a good sign allowing surgical dissection [4]. Grade III according to FNCLCC (high grade) is associated with a high metastatic risk (30 to 50% at 5 years) and justifies aggressive management [5].

Standard management of localized high-grade limb sarcomas is wide resection (negative margins) combined with adjuvant radiotherapy, and sometimes neoadjuvant or adjuvant chemotherapy [6]. When the tumor is in close contact with the sciatic nerve and the popliteal axis, conservative surgery with nerve preservation is possible if a dissection plane exists; otherwise, amputation or disarticulation may be proposed [7]. In our case, the multidisciplinary team proposed hip disarticulation given the size, high grade, and anatomical relationships. However, the patient refused this radical option and chose palliative decompression surgery. This decision, although non-standard, is sometimes accepted in cases of formal patient opposition after informed consent [8].

Preoperative embolization of hypervascular tumors (sarcomas, renal metastases, bone tumors) reduces intraoperative bleeding, facilitates resection, and improves visualization of the surgical field [9]. Our patient presented significant hypervascularity, confirmed by Doppler ultrasound and MRI, and a non-healed biopsy incision (a hemorrhagic risk factor). Embolization by angio-CT with selective catheterization allowed devascularization of the tumor without complication, and intraoperative bleeding was moderate (700 mL).

The surgical approach was a vertical posterior midline incision, resecting the biopsy tract in an "orange peel" fashion (oncological principle: removing the biopsy site to avoid local dissemination) [10]. Dissection of the sciatic nerve and popliteal vessels was performed meticulously, allowing complete tumor release without nerve injury. Resection was macroscopically complete but microscopically incomplete (R2), which is insufficient for curative treatment but acceptable for a palliative goal [11].

Adjuvant chemotherapy (doxorubicin-ifosfamide) is justified in high-grade sarcomas at high metastatic risk, even after R2 resection, with an improvement in recurrence-free survival [12]. Postoperative radiotherapy reduces the risk of local recurrence [13]. The patient was able to receive the first cycles before being lost to follow-up, which limits the analysis of long-term outcomes.

CONCLUSION

The management of a high-grade thigh sarcoma in an elderly patient must be multidisciplinary. Preoperative embolization is useful for hypervascular tumors and reduces hemorrhagic morbidity. Patient refusal of hip disarticulation may lead to palliative decompression surgery, which relieves nerve compression and preserves the limb, even if the oncological prognosis remains poor. Rapid loss to follow-up prevents concluding on the long-term efficacy of this strategy.

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