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CASE REPORT

Large Atypical Lipomatous Tumours of the Limbs: A Report of Three Cases

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Abstract

Atypical lipomatous tumours (ALT) are rare adipocytic neoplasms classified under well-differentiated liposarcomas. Although they have low metastatic potential, their progressive growth and anatomical location can lead to significant functional impairments. Complete surgical excision remains the primary treatment; however, challenges arise when these tumours are located near critical neurovascular structures. This study presents three clinical cases of large ALT in the limbs, analysing the diagnostic, surgical and prognostic aspects. This study reports on three patients (ages 64, 70 and 69) who presented with large, slowly growing lipomatous masses in the limbs, evolving over several years. The tumours, ranging from 25 to 60 cm in size, were assessed using imaging techniques, including MRI and CT scans. Surgical excision was performed in all cases, ensuring complete tumour resection while preserving adjacent neurovascular structures. Histopathological analysis confirmed the diagnosis of ALT. Postoperative functional recovery and recurrence were monitored over a follow-up period of 24 months. All patients experienced significant clinical improvement, with full restoration of joint mobility and resolution of sensory disturbances. No local tumour recurrence was observed. Postoperative imaging demonstrated effective tissue regeneration without excessive fibrosis or adhesions. The quality-of-life assessment using the Toronto Extremity Salvage Score (TESS) indicated a marked improvement in motor function and autonomy. ALT, despite being a low-grade tumour, requires a multidisciplinary approach for optimal management. Complete surgical excision ensures excellent long-term outcomes, but extended clinical and radiological surveillance remains crucial. Advancements in molecular pathology and imaging techniques may further refine treatment strategies and enhance patient prognosis.

Key words: Liposarcoma, atypical; Well-differentiated liposarcoma; Surgical procedures, operative; Prognosis; Recurrence.

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Introduction

Atypical lipomatous tumours (ALT) are malignant adipocytic neoplasms. They can arise in various anatomical locations and are also referred to as well-differentiated liposarcomas. These tumours are characterised by slow growth and a low risk of metastasis.[1, 2]

ALT represents a rare entity among soft tissue sarcomas, with an estimated incidence of approximately 1.8 cases per million people per year.[3] While they can develop in different regions of the body, they have a particular predilection for the limbs.[4] As well-differentiated liposarcomas, ALT

maintains a low metastatic potential but exhibits a high tendency for local recurrence and can reach considerable sizes at the time of diagnosis.[5, 6]

Despite their indolent nature, ALT presents a significant clinical challenge due to their propensity for recurrence and their frequent proximity to critical neurovascular structures.[1, 7] The primary treatment modality is complete surgical excision, which remains the most important prognostic factor.[6] However, surgical management can be particularly complex when tumours are located near major neurovascular bundles, requiring meticulous dissection to ensure complete resection while preserving function.[8, 9]

Recent advances in molecular pathology, including MDM2 gene amplification detection, have significantly improved diagnostic accuracy, differentiating ALT from benign lipomas.[10] Additionally, emerging therapeutic options such as targeted therapies and radiation therapy are being investigated to optimise local control in selected cases.[1, 11] Studies also suggest that advanced imaging techniques, such as diffusion-weighted MRI and PET scans, enhance tumour characterisation and improve preoperative planning.[2]

Furthermore, multidisciplinary management is increasingly emphasised, integrating expertise from surgical oncology, radiology and pathology to refine treatment strategies.[12] The use of adjuvant therapies, including radiotherapy in cases where complete excision is challenging, is gaining attention as a means to reduce recurrence risk.[9, 11]

The objective of this study was to describe three cases of large ALT of the limbs treated surgically, with a focus on diagnostic challenges and therapeutic strategies. This analysis aimed to contribute to the existing literature on ALT and provide further insights into the clinical and surgical particularities of these rare tumours.

Case 1 history

A 64-year-old female patient, with no significant medical history, presented with a large, slowly growing mass evolving over a period of five years. The mass was well-defined, with a vertical long axis measuring approximately 60 cm and was located on the posteromedial aspect of the right thigh, extending to the knee (Figure 1).

Over time, the mass progressively increased in size, leading to paraesthesia, sciatica-like pain and significant functional limitation of the hip and knee. Magnetic resonance imaging (MRI) revealed a lesion encapsulating the posterior compartment muscles and involving the sciatic nerve, with a maximum diameter of 46 cm (Figure 1).

A meticulous surgical excision was performed, achieving complete tumour resection while preserving adjacent neurovascular structures (Figures 2 and 3).

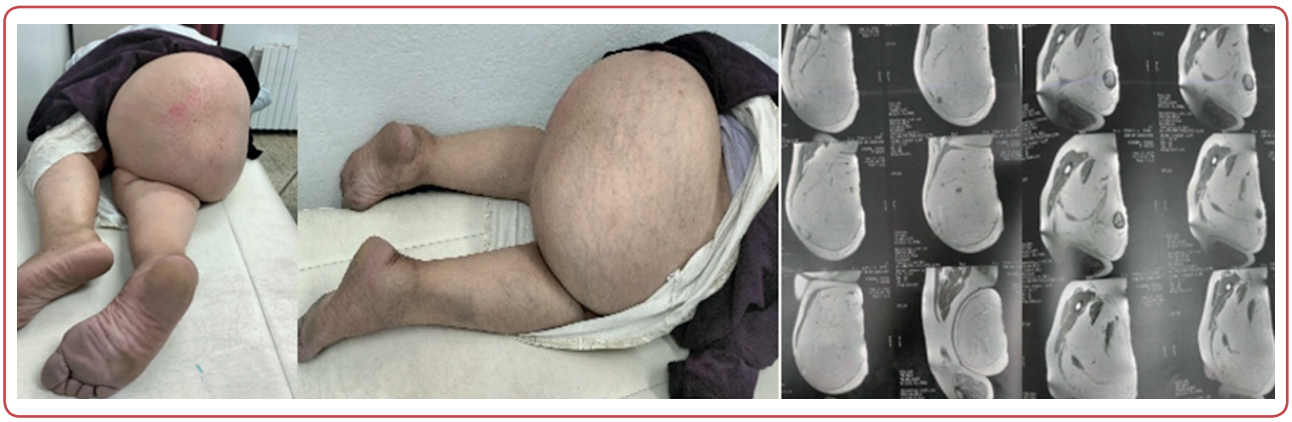

Figure 1: Clinical presentation and preoperative magnetic resonance imaging (MRI) slices

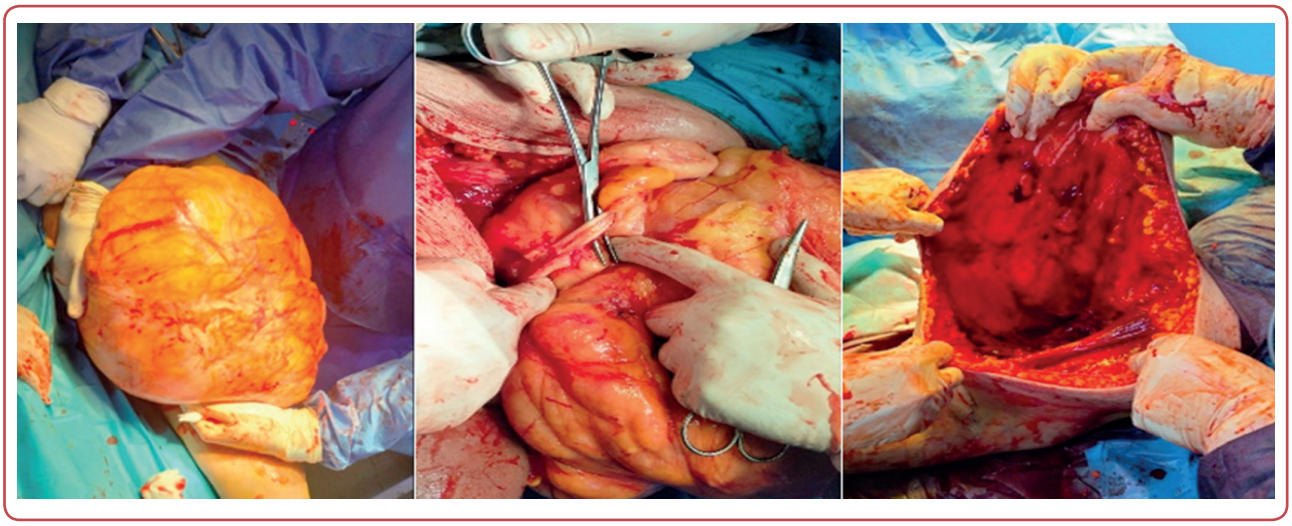

Figure 2: *Intraoperative exploration of the tumour*

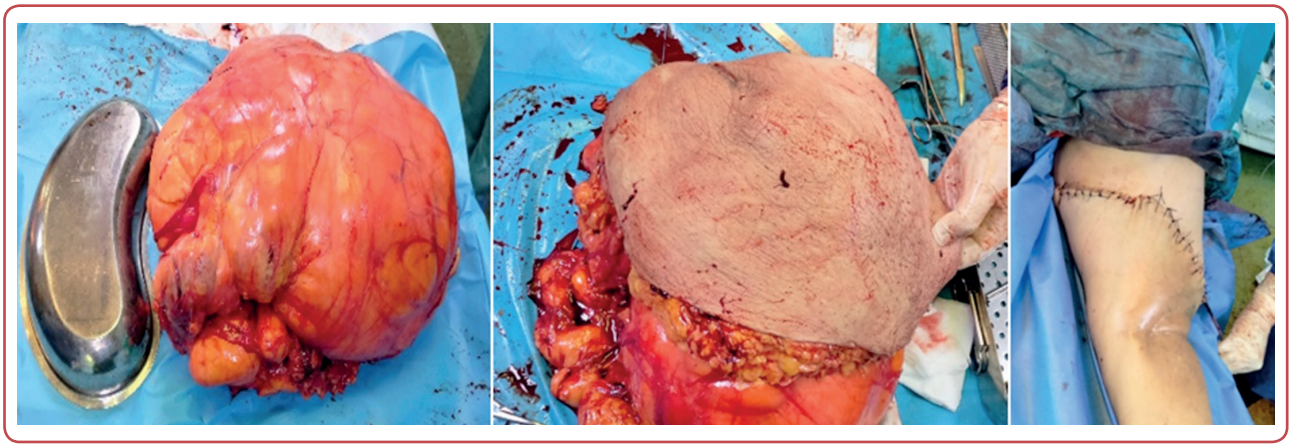

Figure 3: *Tumour resection and post-excision wound appearance*

Case 2 history

A 70-year-old male patient, with no prior medical history, presented with a slowly growing ovoid mass evolving over four years. The mass was located on the medial aspect of the left thigh, extending from the proximal region to the lower third of the thigh (Figure 4).

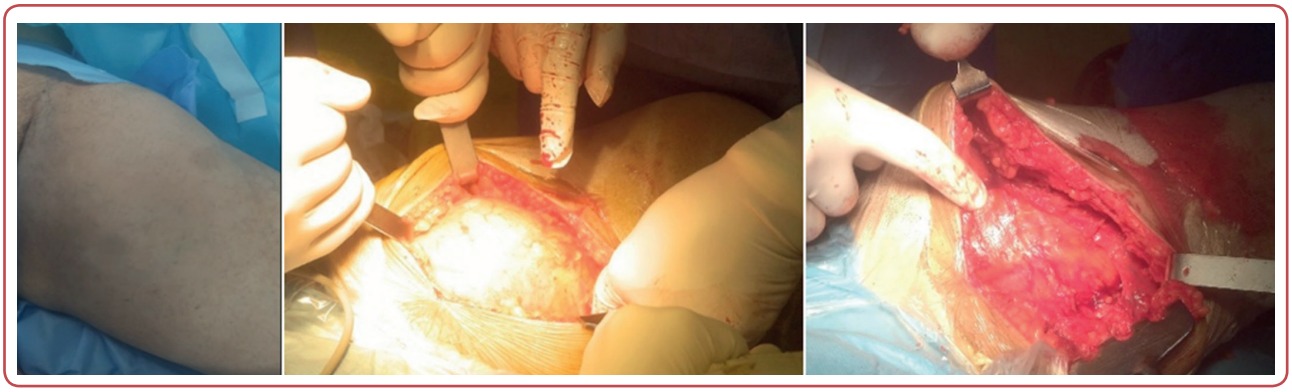

Figure 4: *Clinical appearance of the tumour and intraoperative exploration*

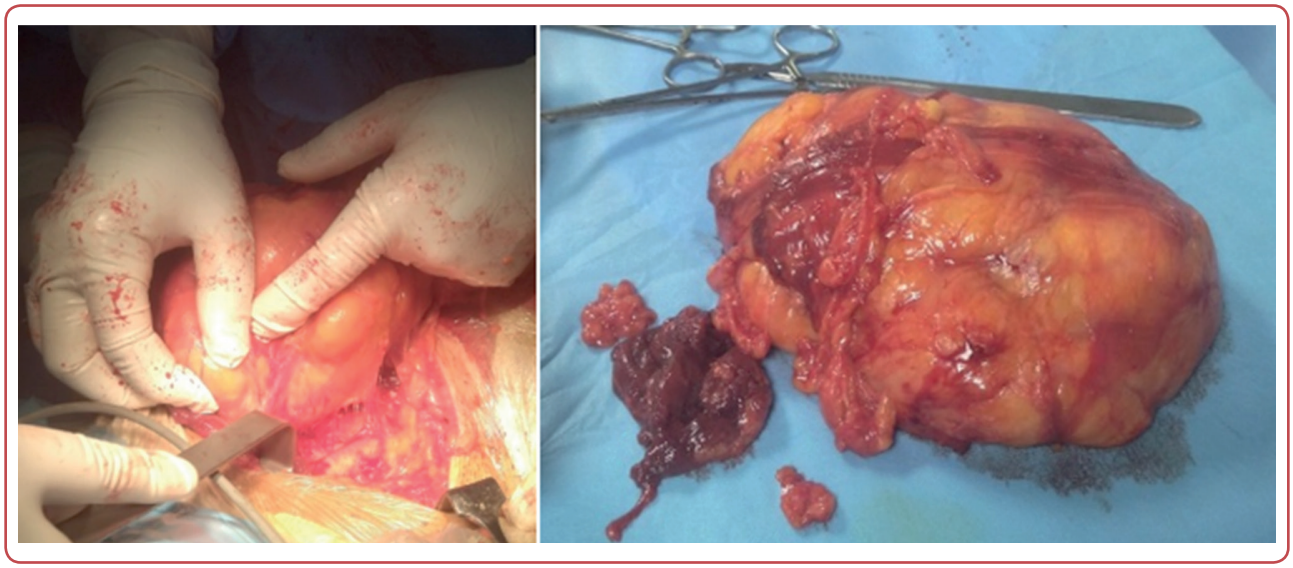

Figure 5: Complete tumour resection

Ultrasound examination revealed a well-defined, homogeneous, hypo-echoic lesion measuring 25 cm in its longest axis. Due to its proximity to the femoral neurovascular bundle, a surgical excision was performed, achieving complete resection of the lesion (Figure 5). The procedure and postoperative course were uneventful, with no complications.

Case 3 history

A 69-year-old male patient, with no prior medical history, presented with a slowly growing ovoid mass evolving over eight years. The mass measured 30 cm in its longest axis and was located at the proximal region and lower third of the left arm (Figure 6). It was bilobed, firm, well-defined and painless.

MRI revealed a mass encapsulating the anteromedial muscles of the arm, in close contact with the vascular axis, with a maximum diameter of 26 cm (Figure 6). Given its proximity to major vascular structures, surgical excision was performed with caution. The postoperative course was uneventful (Figure 7). Histopathological examination of all three cases confirmed the atypical lipomatous nature of the lesions.

All three patients underwent complete surgical resection without major complications. Histo-

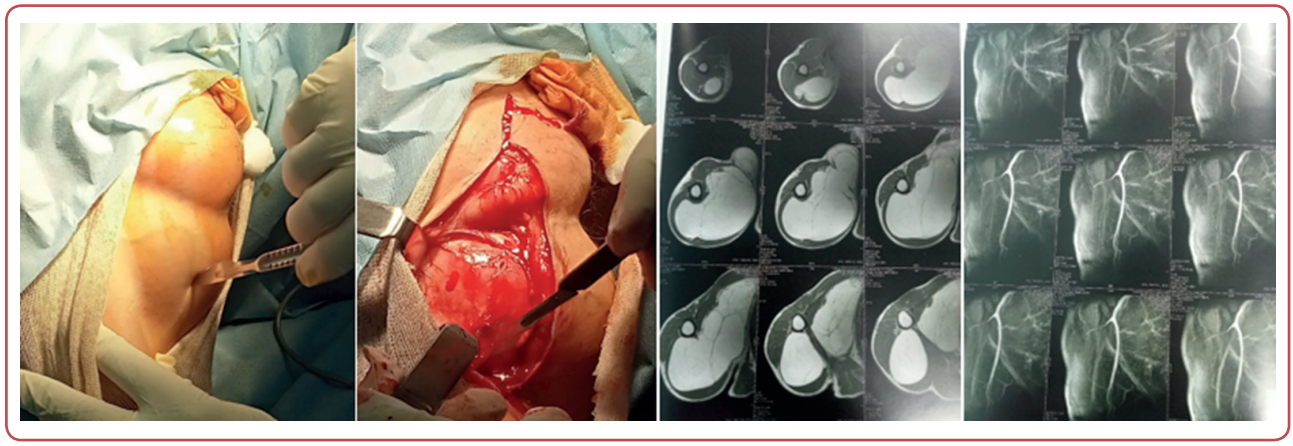

Figure 6: Clinical appearance and preoperative MRI slices

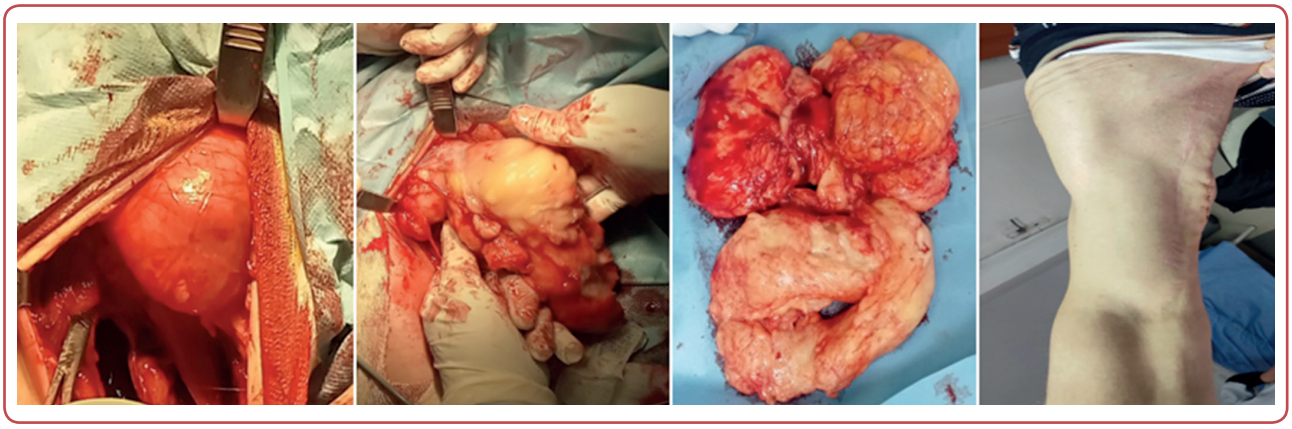

Figure 7: Intraoperative tumour appearance and post-resection scar

pathological examination confirmed the diagnosis of ALT in each case. At an average follow-up of 24 months, no tumour recurrence was observed in any of the patients.

All patients demonstrated significant clinical improvement, with full recovery of joint mobility and resolution of initial paraesthesia and sciatica-like symptoms. They regained functional autonomy with no major limitations in their daily activities.

Postoperative radiological evaluation showed no evidence of local recurrence and satisfactory tissue regeneration, with no secondary complications such as excessive fibrosis or adhesions impairing mobility. Wound healing was considered optimal, as confirmed by follow-up ultrasound and MRI scans at 6, 12 and 24 months.

Postoperative quality of life assessment, based on validated scales such as the Toronto Extremity Salvage Score (TESS), revealed a marked improvement in motor function, with a progressive return to daily and professional activities. No residual neurological deficits or significant functional impairments were noted.

Discussion

ALT pose both diagnostic and therapeutic challenges due to their large size and frequent proximity to major neurovascular structures. Complete surgical resection remains the primary prognostic factor, significantly reducing the risk of tumour recurrence.

Presented findings align with the existing literature, which reports a low local recurrence rate of 5 % to 10 % following complete excision in recent studies. In this cohort, no recurrence was observed at 24 months of follow-up, reinforcing the effectiveness of a rigorous surgical approach.

Histological examination ruled out dedifferentiation into high-grade liposarcoma, a progression occasionally reported in the absence of long-term surveillance. The well-differentiated nature of these lesions and the absence of proliferative atypical cells confirm the favourable prognosis for these patients.

Recent advances in medical imaging, particularly MRI and CT scanning, have improved preoperative characterisation of ALT, aiding in surgical planning. In presented cases, imaging played a critical role in identifying tumour relationships with surrounding structures, ensuring precise and safe dissection. Preoperative mapping of neurovascular structures allowed for optimised surgical planning, reducing intraoperative complications.

The impact of surgical management on locomotor function is a key aspect in treating these patients. Results demonstrate complete and rapid functional recovery, facilitated by a structured postoperative rehabilitation protocol, including physiotherapy and specialised follow-up. The absence of major post-surgical functional limitations further supports the importance of achieving complete excision with clear margins.

Although surgery remains the gold-standard treatment, postoperative surveillance remains crucial. Several studies recommend long-term

clinical and radiological follow-up, with more frequent monitoring during the initial years post-excision. Presented patients will continue to be monitored to detect any late recurrence and assess long-term functional stability.

Conclusion

These clinical observations highlight the importance of rigorous surgical management of ALT of the limbs. Although these tumours generally have a favourable prognosis, their size and anatomical location can lead to significant functional complications. Regular postoperative surveillance remains essential to detect potential long-term recurrences.

Despite being classified as low-grade tumours, ALT requires careful management due to its propensity for local recurrence and functional impact. Complete surgical excision remains the gold-standard treatment, ensuring optimal local disease control and minimising the risk of progression to dedifferentiated liposarcoma.

These three cases emphasise the importance of early diagnosis and multidisciplinary management, involving surgeons, radiologists and pathologists. Imaging plays a critical role in preoperative assessment, particularly in identifying the relationship between the tumour and adjacent neurovascular structures. Achieving complete excision with clear margins is essential to reduce recurrence risk.

The satisfactory functional recovery and absence of recurrence observed over the medium-term follow-up confirm the effectiveness of surgical intervention. However, long-term clinical and radiological monitoring remains crucial, considering the potential for late recurrence.

In the future, advancements in imaging and molecular biology could further improve ALT characterisation, facilitating better treatment strategies and the development of complementary therapeutic approaches, particularly in cases of recurrence or tumour progression. The integration of adjuvant therapies, such as radiotherapy in high-risk cases, could also be considered to enhance long-term outcomes.

A personalised approach to ALT management, combining optimal surgical intervention and extended follow-up, is essential to ensure an excellent prognosis and maintain optimal quality of life for affected patients.

Ethics

Our institution does not require ethics approval for reporting individual cases or case series. A written informed consent for anonymised patient information to be published in this article was obtained from the patient.

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Conflicts of interest

The authors declare that there is no conflict of interest.

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Data access

The data that support the findings of this study are available from the corresponding author upon reasonable individual request.

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