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Histopathological approach for diagnosis of intravascular leiomyosarcoma of the femoral vein

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ABSTRACT

Malignant tumors arising from venous walls in the lower extremities are uncommon and intravascular leiomyosarcoma represents only a small proportion and rare of soft tissue leiomyosarcoma. All publications in the literature are of small clinical series or case reports. We present a case of primary leiomyosarcoma of the femoral vein in a 40 year old man; which is a rare lesion with less than 40 cases reported. The patient presented with swelling and localized leg pain. The diagnosis was made histopathologically, the tumor was resected, vascular reconstruction was performed, and for postoperative radiation therapy and chemotherapy patient was referred to the oncologist. Primary leiomyosarcoma of a major peripheral artery is extremely rare, and this report share the clinical presentation, histopathological findings, treatment, and prognosis in these patients.

Keywords: *Femoral Vein; Leiomyosarcoma, Synovial Sarcoma.*

INTRODUCTION

Leiomyosarcoma only account for a small proportion of malignant soft tissue tumours in adults. References in the current literature vary between 5–10%. [1-2] Four main locations for tumour origin of leiomyosarcoma can be distinguished: 1. Intraabdominal/retroperitoneal 2. cutaneous 3. subcutaneous and 4. Vascular. [2] Among vascular leiomyosarcomas; veins are involved more frequently than arteries, and the femoral vein is infrequently involved vein. [1-6] Leiomyosarcomas usually arise from the muscular layers of the uterus or from the gastrointestinal tract. It is an uncommon occurrence for them to arise from the blood vessels. On reviewing the literature fewer than 40 cases have been reported so far wherein the tumor arose from the femoral vein. The prognosis is uncertain and currently the majority of cases are treated like a sarcoma. [7] We reported a case of leiomyosarcoma arising from the wall of the femoral vein in a 40 year old man.

CASE REPORT

A 40-year-old male presented with the complaints of swelling on the right upper thigh which he noticed two weeks ago. The swelling was associated with localized pain. There was no history of peripheral edema. Initial radiological evaluation was suggestive of tumor arising in the vicinity of blood vessels. Doppler venous scan done for the status of deep veins was suggestive of chronic deep venous thrombosis (DVT) of the popliteal and proximal superficial veins. Further evaluation with MRI indicated the possibility of leiomyosarcoma. There were no palpable lymph nodes and no evidence of a tumor in any other part of the limb or elsewhere.

During surgery the mass was found to be arising from the superficial femoral vein (SFV) from just where it drains into the common femoral vein (CFV) involving almost 10 cms of the venous segment (fig 1). It was closely adherent to the femoral artery which was excised along with vein for wider surgical clearance. The femoral artery was reconstructed with expanded polytetrafluoroethylene (ePTFE) graft. SFV was not reconstructed because of the presence of chronic changes.

The postoperative course was uneventful. The patient was doing well and was referred to the medical oncologist for chemotherapy/ radiation therapy since these tumors are known to metastasize to lung, liver and scalp.

Histopathological findings

The surgical specimen was a soft tissue biopsy comprising of 3 greyish brown fleshy soft tissue pieces. The outer surface was congested and they were together measuring 9.5x 8x 4 cms. On cutting tumor was fleshy homogenous with foci of hemorrhage. On serial section a thick walled vessel was identified (fig.1a &1b).

Light microscopy examination of paraffin wax embedded sections showed tumor to be composed predominantly of spindle cells disposed in interlacing fascicles and sheets. The tumor cells had oblong blunt end nucleus and abundant pink cytoplasm (fig.2a &2b). Mitosis at places was 5-6/10HPF. Areas of hemorrhage was seen without any necrosis. Diagnosis made was malignant mesenchymal tumor with possibility of leiomyosarcoma. Immunohistochemistry (Vimentin, CK, SMA, Desmin, CD-99, EMA,S-100) was advised for the confirmation.

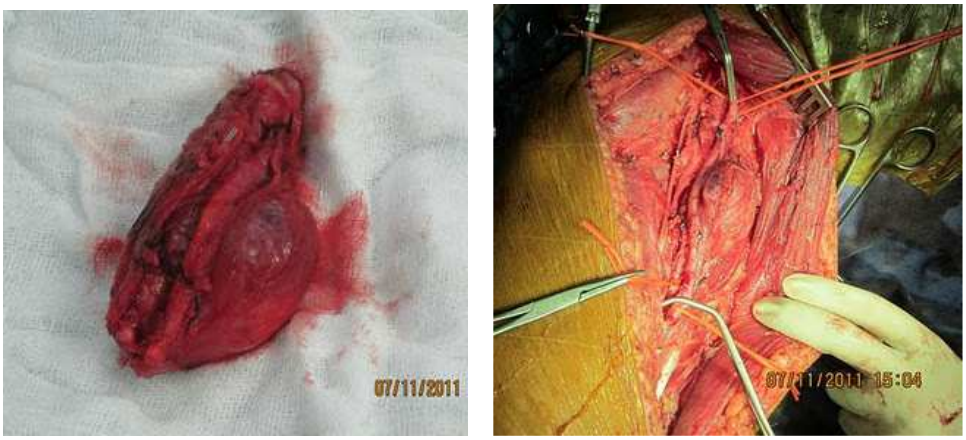

Fig 1a&1b. Mass arising from the SFV from where it drains into the CFV involving almost 10 cms of the venous segment

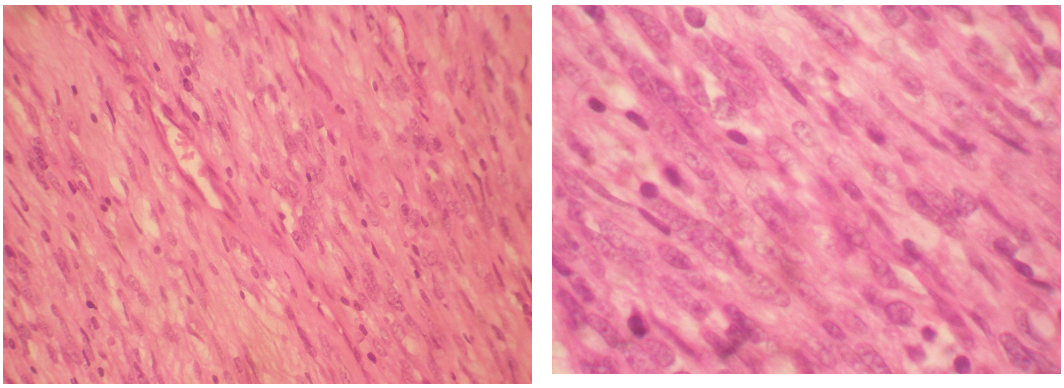

Fig 2 a. Hematoxylin and Eosin (10x) **Fig 2b. Hematoxylin and Eosin (40x)**

Immunohistochemistry revealed Bcl2 is immunoreactive (score 1+; fig 3a&3b), CD99 (MIC 2)-immunoreactive (score 2+; fig4a &4b) in tumor cells; Cytokeratin-non immunoreactive (score 0; fig5) in tumor cells, Desmin-non-immunoreactive (score 0; fig 6) in tumor cells; Epithelial Membrane Antigen-immunoreactive (score 2+; fig 7a

&7b) in tumor cells; S 100-non-immunoreactive (score 0; fig 8) in tumor cells; Smooth Muscle actin-Immunoreactive (score 1+; fig 9) in tumor cells; Vimentin-immunoreactive (score 4+; fig 10) in tumor cells. Since Bcl2 had immunoreactive (score 1+) hence the final diagnosis made was leiomyosarcoma.

Tumor composed predominantly of spindle cells disposed in interlacing fascicles and sheets. The tumor cells had oblong blunt end nucleus and abdundant pink cytoplasm

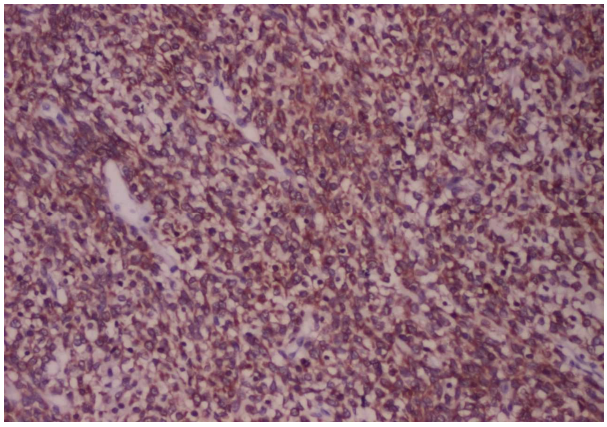

Fig3a. Immunohistochemistry-bcl 2 (10x)

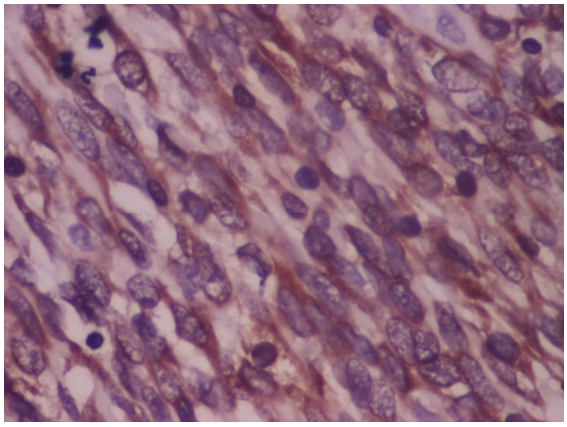

Fig3b. Immunohistochemistry-bcl 2 (40x)

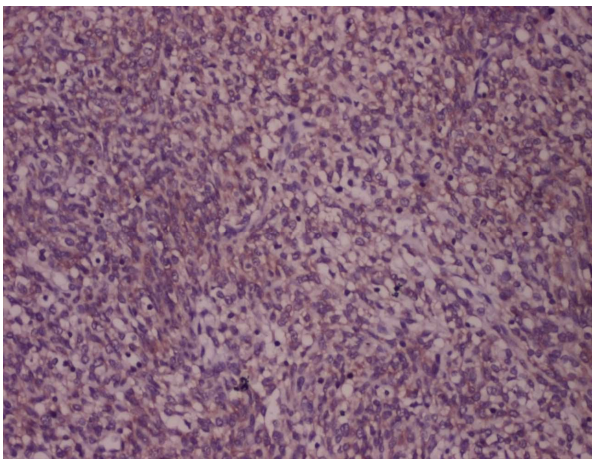

Fig4a. Immunohistochemistry-CD99 (10x)

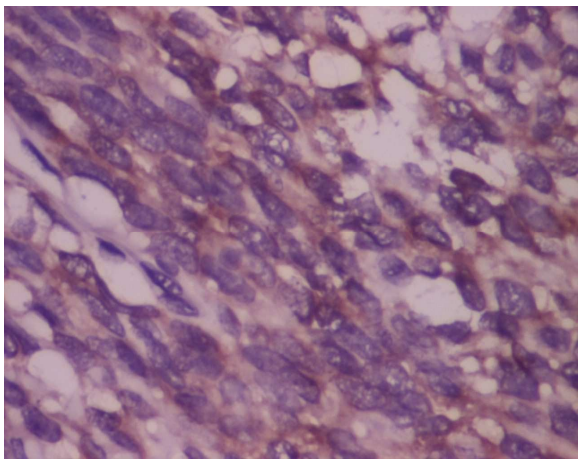

Fig4b. Immunohistochemistry-CD99 (40x)

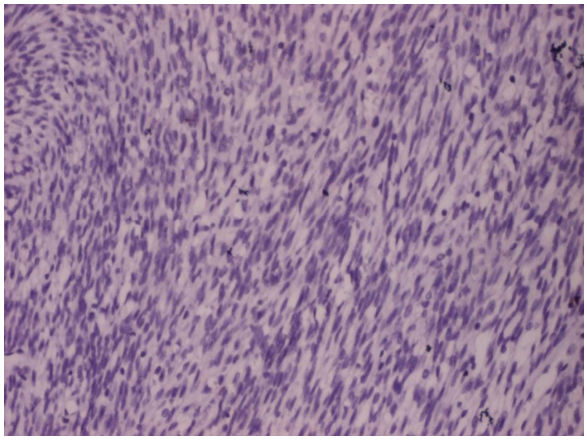

Fig5. Immunohistochemistry-CK (10x)

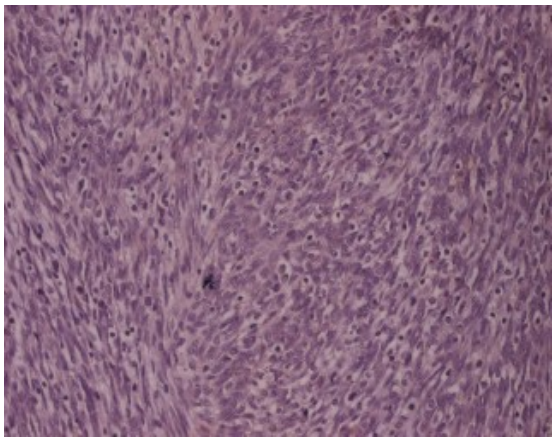

Fig6. Immunohistochemistry-Desmin(10x)

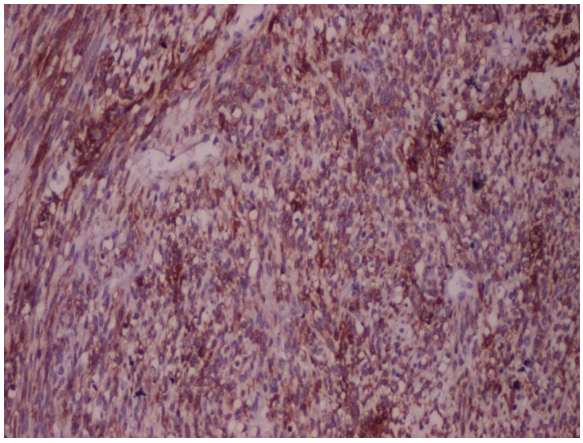

Fig7a. Immunohistochemistry-EMA (10x)

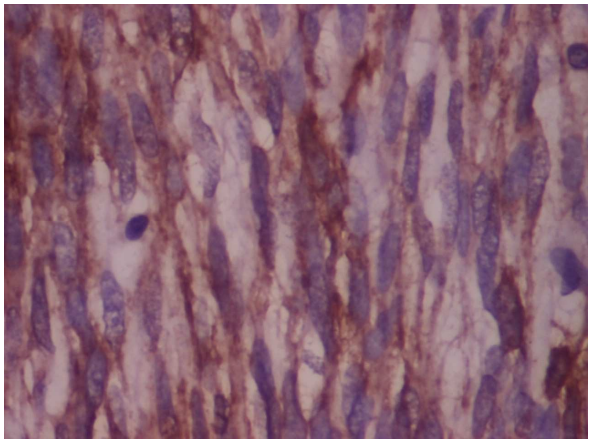

Fig7b. Immunohistochemistry-EMA (40x)

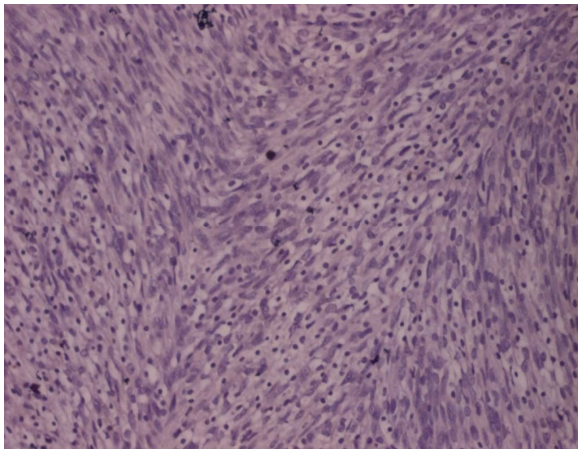

Fig8. Immunohistochemistry-S100 (10x)

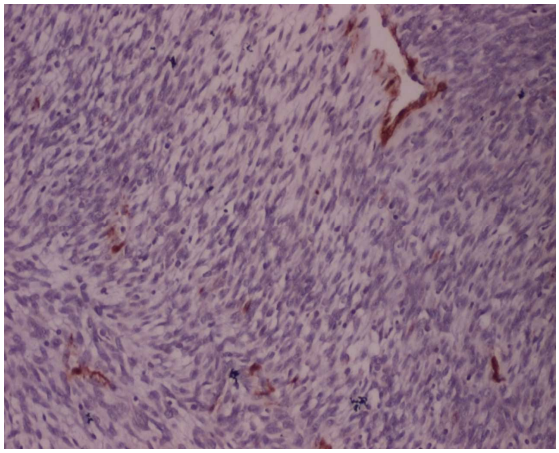

Fig9. Immunohistochemistry-SMA (10X)

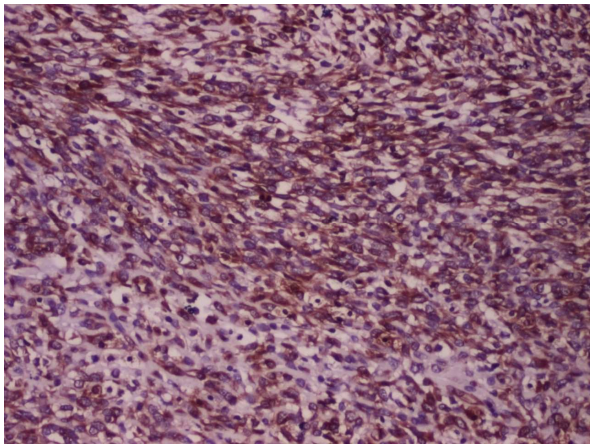

Fig10a. Immunohistochemistry-Vimentin (10x)

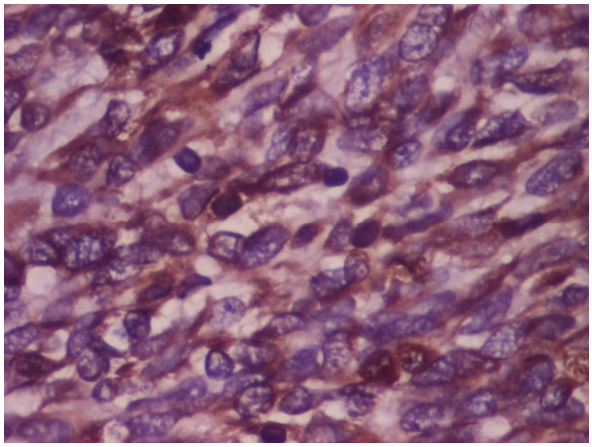

Fig10b. Immunohistochemistry-Vimentin (40x)

DISCUSSION

Vascular smooth muscle tumors, benign or malignant, are rare and encompass a variety of neoplastic lesions characterized histologically by their similarity to adult smooth muscle tissue. [8] However, vascular leiomyosarcoma represents only a small proportion of soft tissue leiomyosarcomata. All publications in the literature are of small clinical series or case reports. [9]

Leiomyomatosis, a benign neoplasm, primarily arising from within the uterine and extrauterine venous systems, and leiomyosarcoma, a malignant neoplasm arising predominantly in larger veins, while relatively rare, are nevertheless a cause of significant morbidity and mortality.[8] These tumors mainly originate from the media of venous vessel walls, with rare exceptions in which they derive from the arterial vessel structures.[10] The tumor is encountered in the retroperitoneal course of the inferior vena cava in 75% of all intravascular leiomyosarcomata [9, 11]. Vascular smooth muscle tumors that extend through or directly involve the vasculature are rare and difficult to diagnose and manage. Surgical resection remains the most effective treatment, although chemotherapy in isolated cases has been shown to have a positive effect. Appropriate interpretation and diagnosis are crucial for effective management.

Malignant tumors arising from venous walls in the lower extremity are uncommon and venous branches of the lower extremity have been described as unusual sites of manifestation of intravascular leiomyosarcoma in literatures.[9, 12]

The clinical manifestations of intravascular leiomyosarcomas of the femoral vein are similar to those of other locations; peripheral edema and/or local pain. In the initial clinical and radiologic evaluation, the tumor is often misdiagnosed as a deep vein thrombosis, similar to what occurred in our case. Clinical presentation depends on the extraluminal/intraluminal growth of the tumour mass. If extraluminal it can result in nerve compression causing pain and if intraluminal it can mimic the symptoms of deep venous thrombosis (DVT). In our case it was surprising that the patient never had any symptoms of DVT like limb edema etc.

The definitive diagnosis of intravascular leiomyosarcoma is performed by histological examination and immunohistochemistry techniques.[5-9] Macroscopic appearance or gross aspect of the tumor, it usually attains large size with rubbery consistency and may shows hemorrhage and bigger tumors often showed cystic structures and myxoid degeneration.[15] The histological examination of a typical leiomyosarcoma is similar at any location, [16] and will usually reveal a fascicular growth pattern of spindle cells and merging of tumor cells with the blood vessel walls. In contrast to other leiomyosarcomas, intravascular leiomyosarcoma usually do not exhibit hemorrhage or necrosis. [13] However, our case exhibited hemorrhage without necrosis. The more aggressive behaviour and worse prognosis associated with intravascular leiomyosarcomas, when compared to soft tissue counterparts, could be due to direct attack of the vascular system [13, 17]. Immunohistochemical staining is helpful for definitive diagnosis, and usually positive immunoreactivity to leiomyosarcoma, vimentin, desmin, calponin, and smooth muscle myosin heavy chains. They also reveal negative immunoreaction for S-100, alfa-inhibin, and CD117. [15]

The differential diagnoses of vascular leiomyosarcoma including other sarcomas composed by spindle cells fascicles: fibrosarcoma, synovial sarcoma, rhabdomyosarcoma, inflammatory pseudotumor, neurofibroma and hemangiopericytoma. However, based on the tumor site and size, the prognosis and possible treatments varies. The prognosis factor of patient with vascular leiomyosarcoma depends on patient age, size, histologic grade, mitotic activity, and stage of the tumor. [15]

Management of such cases are challenging because of very low incidence with most of the data available in literature being single reports. The treatment of choice for venous leiomyosarcoma of the lower extremities is complete surgical resection of the tumor, along with the surrounding fat and lymphatics. Radiation therapy and/or adjuvant chemotherapy may be required, as well. The definitive effect of adjuvant therapy has not yet been demonstrated. [13, 18] However, the prognosis of this tumor is expected to be poor due to early occurrence of metastasis. [17] Doppler ultrasound and MRI are useful to establish early diagnosis at the nontumoral stage. Improvement in the prognosis of leiomyosarcoma may justify perioperative chemotherapy before and after radical surgical excision. [13, 17]

Intravascular leiomyosarcomas mainly cause metastases in the lung and liver. [7] The poorer prognosis of these tumours compared to those of soft tissue could be because these tumours generally have direct access to the venous system, involving the lumina, and tend to have early blood-borne metastases. [19]

This report describes the removal of a leiyomyosarcoma arising from the femoral vein necessitating removal of the femoral venous and arterial circulations. Femoral vein leiyomyosarcoma is especially challenging to manage in the proximal location. Successful outcome is predicated on revascularization with autologous vein and on a multidisciplinary approach using various soft tissue coverage strategies and wound management adjuncts.

CONCLUSION

We report a case of intravascular leiomyosarcoma originated from the femoral vein, this tumor is very rare and therefore requires extreme degree of careful clinical examination, high accuracy of imaging studies and special histopathological approach examination. Management of venous leiomyosarcomas of the lower limb is difficult to evaluate because the incidence is low and most reports have been single cases.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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