Case Report
Running Title: Rare Metastasis of Thigh Myxoid Liposarcoma: A Report of Two Cases
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Rare Extrapulmonary Metastases from Thigh Myxoid Liposarcoma: Two Case Reports and Literature Review

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Abstract
Liposarcoma (LPS) is one of the most common extremity soft tissue sarcoma types arising from adipose tissue. About one-third of patients with primary localized extremity soft tissue sarcomas will develop metastatic disease during follow-up, most frequently in the lungs. Myxoid LPS (MLS) roughly represents 20%-30% of all LPSs. Unfortunately, about 10% of patients with MLS present with metastasis of the tumor in unusual sites, such as the thorax and retroperitoneum.
In the present case report, we present two cases with thigh soft tissue sarcomas metastasizing to rare sites; one to the breast and the other to the soft tissue of the neck. Their clinical presentation, radiologic, and histopathologic evaluation, in addition to their management plans, are reported in detail.
Extrapulmonary metastasis from MLS represents a diagnostic dilemma. Although multimodality approaches, including surgery, radiotherapy, and chemotherapy, are used for managing MLS, a case-by-case approach is still recommended to achieve the most favorable outcomes.

Keywords: Sarcoma, Neoplasm, Metastasis, Surgery, Case report

Introduction

Soft tissue sarcomas are rare malignant tumors. They account for 0.7–1% of all adult malignant tumors.[1] The incidence of extremity soft tissue sarcomas (eSTS) in Europe is estimated to be approximately 4-5 per 100,000 persons per year.[2] About one-third of patients with primary localized eSTS will develop metastatic disease during follow-up, most frequently in the lungs.[3] Liposarcoma (LPS) is one of the most common eSTS types arising from the adipose tissue. Myxoid LPS (MLS) roughly represents 20%-30% of all LPSs. It is characterized by lipomatous differentiation with myxoid stroma and mainly occurs in the lower extremities, followed by the retroperitoneum and trunk. Unfortunately, about 10% of patients with MLS present with metastasis of the tumor in unusual sites, such as the thorax and retroperitoneum.[4] In this article, we present two cases with eSTS metastasizing to rare sites; one to the breast and the other to the soft tissue of the neck.

Case 1 Presentation

History and clinical examination

A 40-year-old female patient was referred to our surgical department with swelling in the posterior aspect of the left thigh. The patient had no significant medical or surgical history or family history. The physical examination revealed a palpable mass at the left popliteal fossa, 8 × 12 cm, firm, mobile, non-tender, without palpable inguinal lymph nodes on either side.

Radiological evaluation

Left thigh post-contrast magnetic resonance imaging (MRI) showed a large heterogeneous soft tissue mass in the posterolateral aspect of the left thigh with heterogeneous enhancement about 7.5 × 10 × 16 cm and intramuscular extent with clear surrounding fat plaques, suggesting soft tissue sarcoma. Computed tomography (CT) chest revealed no metastatic pulmonary nodules.

Treatment

The patient was planned for wide local excision (WLE) of the mass in September 2020, where histopathology revealed low-grade MLS. All surgical margins were negative. The patient was planned for post-operative radiotherapy; (60 GY /30 FX) and finished it in January 2021. She lost follow-up as she became pregnant.

Surveillance and diagnosis of recurrence

On surveillance by post-contrast CT abdomen after her baby aged 4 months old (20 months after 1ry surgery for left thigh), it showed a well-defined soft tissue lesion in the right lumbar region abutting the segment VI of liver and the right kidney with no fat planes in between measuring 10.8 × 8.8 × 10.2 cm, and another similar lesion in the left iliac region measuring 4.8 × 3.7 cm (Figure 1A and 1B). Core needle biopsy (CNB) from the largest mass revealed MLS.

Post-contrast MRI of the left thigh revealed no detected enhanced tumor residue or recurrence. The scanned part of the chest showed a well-defined left breast retroareolar mass cystic lesion. When further evaluated by sonomammography, a defined oval-shaped radio-opaque hypoechoic mass was revealed in the upper outer quadrant of the left breast with internal vascularity on Doppler study, measuring 6 × 4 cm BIRADS 4a **(**Figure 2A and 2B)).

Management plan after recurrence

The case was discussed at the sarcoma multidisciplinary tumor board, and the decision was surgical resection after radiological review confirmed resectable disease.

The patient underwent laparoscopic assessment, followed by exploratory laparotomy with resection of right lumbar retroperitoneal sarcoma with right nephrectomy and resection of left iliac preperitoneal mass in September 2022. The

microscopic appearance of both masses revealed low-grade MLS.

Upon sarcoma multidisciplinary team (MDT) decision, CNB from the suspicious left breast mass was taken and revealed MLS. Additionally, post-contrast CT chest, triphasic abdomen, and pelvis was done and revealed a well-defined left iliac lesion measuring about 3.8 × 6.9 cm suggesting recurrence.

The patient underwent WLE of the left breast mass and excision of the left lumbar mass en block with sigmoid colectomy and colorectal anastomosis in June 2023. Pathological examination of the breast lumpectomy specimen showed a low-grade MLS with free all sent margins (Figure 3), and of the abdominal mass en block with sigmoid colon infiltration of the colonic wall from outside up to the muscle layer by low-grade MLS with free both surgical cut margins. Surveillance postoperative CT scan of the neck, chest, abdomen, and pelvis was negative for any tumor residue.

The case was discussed again in the sarcoma MDT. The panel agreed to administer Votrient 800 mg oral daily systemic therapy. She started treatment in July 2023 till July 2024, when a CT with intravenous contrast study revealed a recurrent right lumbar retroperitoneal mass that was confirmed to be recurrent MLS by core biopsy.

The case was rediscussed in the sarcoma multidisciplinary tumor board. The panel agreed to administer single-agent Adriamycin for 8 cycles, as the role of surgical resection was deemed of limited value due to multiple recurrences and disseminated intrabdominal metastasis. The patient was maintained on follow-up with the clinical oncology department with stable disease till the date of writing this article.

Case 2 Presentation

History and clinical examination

A 47-year-old male was referred to our center complaining of a mass on the right side of the back of his neck in June 2023. He had a history of WLE of MLS at the back of his right thigh with free all safety margins in 2014 outside our center, followed by 30 sessions of radiation therapy. The physical examination revealed a palpable mass on the right side of the back of the neck, firm to hard in consistency and measuring about 5 × 7 cm.

Radiological evaluation

Post contrast CT scan of the neck and chest revealed a soft tissue mass at the right side of the back of the neck and upper chest extending from the level 4th cervical (C4) to the second thoracic vertebrae (T2) creeping at the space between right splenius capitis and semispinalis capitis measuring 3 × 4 × 8 cm with smooth outline, turbid contents inside, no neurovascular relations and preserved surrounding fat planes. Positron emission tomographic CT (PET-CT) scan revealed a right para-spinal cervical mass with mild tracer uptake (SUV max 3) about 4.2 × 5.1 × 10.5 cm extending opposite C4 to T2 vertebrae. No other suspicious metastatic lesion was detected. Pathological diagnosis by CNB showed a malignant spindle cell tumor with myxoid changes consistent with metastatic MLS.

Management plan

The case was discussed in the sarcoma MDT, and the panelists agreed on surgical resection of the recurrent mass. WLE of the mass in the nape was done in July 2023, and histopathology revealed low-grade MLS with no round cell component and free all safety margins.

Surveillance and management of recurrence

The patient was maintained on strict follow-up with clinical and radiological evaluation till January 2025, when MRI and PET-CT revealed 3 recurrent intramuscular

masses in the neck that were biopsied to reveal MLS. The case was discussed again in the sarcoma multidisciplinary board, and the decision was to receive neoadjuvant chemoradiation. The patient finished the proposed treatment, and the case was re-discussed in the tumor board, and the board's decision was surgical resection. He is being prepared for surgical resection of the recurrent masses in the surgical oncology department.

Ethics approval

This report is approved by Mansoura Faculty of Medicine Institution Review Board under the code R.26.06.3756.

Discussion

LPS is reported to be the second most common pathological type of soft-tissue sarcoma; it accounts for 15%-20% of all soft-tissue sarcomas, with peak incidence between 40 and 50 years old. There are five subtypes of LPS according to the World health organization (WHO)'s latest update of LPS classification published in 2020: well-differentiated LPS, dedifferentiated LPS, MLS, pleomorphic LPS, and myxoid pleomorphic LPS.[5] The most common type is well-differentiated LPS, followed by MLS, which accounts for 20%-30% of all LPSs.[5, 6]

MLS usually presents as a large, slowly growing, painless, deeply seated mass in young adults with a peak age between 30 and 50 years. The most common site is the lower limbs, particularly in the thigh.[7] Most types of LPS tend to metastasize to the lungs. Unlikely, MLS tends to recur locally and metastasize to extrapulmonary sites. The retroperitoneum and spine are the most common metastatic sites.[8] Previous studies reported a favorable prognosis of MLS patients with extrapulmonary than pulmonary metastasis, where longer disease-free survival was reported in patients with extrapulmonary metastasis.[9]

Data from the literature suggest that larger tumor volume and low pathological grade are more associated with extrapulmonary metastasis from MLS.[10] The reason for the tendency of MLS to metastasize spread in extrapulmonary sites is not clear. It may be attributed to the abundance of fat tissue in metastatic sites, such as the subcutaneous tissue, retroperitoneum, bone marrow, and epidural space might favor the metastatic seeding.[11] The expression of high levels of adipophilin and chemokine could explain this pattern of metastasis due to adipolysis.[12]

Solitary breast metastasis from extremity soft tissue MLS has been rarely reported in the literature. Moreover, there are other reports of MLS with metastasis to the breast and other sites. To the best of our knowledge, solitary breast metastasis from eSTS was reported previously in three cases, while breast metastasis as a part of disseminated metastasis from extremity MLS was reported in several cases. Breast metastasis from MLS mostly presents with features mimicking benign breast lesions, either clinically or radiologically. Due to the rarity of this condition, thorough history taking, physical examination, radiological evaluation, and histopathological confirmation are crucial to reach an appropriate diagnosis and treatment plan. In our report, the patient had synchronous breast and disseminated abdominal metastasis from thigh MLS.[13, 14]

In their review of the literature, Homsy et al. examined the pattern of metastasis of MLS. They reported a 32% prevalence of soft tissue metastasis, followed by intra-abdominal metastasis in 26%, intrathoracic metastasis in 24%, and bone metastasis in 17% of the cases.[9] In their report, Mouden et al. reported a case of a 19-year-old female with an isolated

subcutaneous metastasis in the neck from thigh MLS after 2 years of management of the primary tumor. In our report, a 47-year-old male patient developed isolated soft tissue metastasis in the neck 7 years after the management of thigh MLS.[15]

The diagnosis of extrapulmonary metastasis from sarcomas was previously highlighted in some case reports. In their report, Ahmadi et al. reported a case with Ewing sarcoma of the mandible that developed local recurrence and soft tissue infiltration of the temporal bone.[16] The crucial role of multidisciplinary team discussion, involving surgical, medical, clinical oncologists, radiologists, and histopathologists, is clearly evident in defining the best plan of management for high-grade sarcomas and sarcomas with multiple recurrences.[17] This might indicate the adoption of a different systemic treatment approach using total neoadjuvant therapy instead of a perioperative regimen aiming at better control of aggressive sarcoma cases.[18]

Pazopanib is a multitarget tyrosine kinase inhibitor. It was proven by recent trials to offer better progression-free survival in patients with metastatic soft tissue sarcomas.[19, 20]

Extrapulmonary metastasis from MLS represents a diagnostic challenge. These atypical metastatic patterns not only represent a dilemma in diagnosis but also in management. Multidisciplinary team discussion is crucial in managing these cases. Histopathological interpretation and the use of immunohistochemical stain could help reach the diagnosis. Multimodality approaches, including surgery, radiotherapy, and chemotherapy, are used for managing MLS; however, a case-by-case-based multidisciplinary approach is still recommended to achieve the most favorable outcomes.

Informed Consent
A written informed consent was signed by the patients.

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Authors' Contributions
EE: Drafting and writing the manuscript, KA: Writing the case presentation and reformatting the manuscript, AH: writing the case presentation and reformatting the manuscript, AS: Writing the case presentation and manuscript reformatting, SY: Histopathological interpretation and manuscript writing and formatting, ME: Radiological interpretation, manuscript drafting and writing, SA: Manuscript design, formatting, revision and final approval, MZ: Writing the case presentation, discussion and manuscript revision. All authors read and approved the manuscript.

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Conflict of Interest
None declared.

References

1. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2022. *CA Cancer J Clin.* 2022;72(1):7-33. doi: 10.3322/caac.21708. PMID: 35020204.
2. Smolle MA, Leithner A, Bernhardt GA. Abdominal metastases of primary extremity soft tissue sarcoma: A systematic review. *World J Clin Oncol.* 2020;11(2):74-82. doi: 10.5306/wjco.v11.i2.74. PMID: 32133276; PMCID: PMC7046921.
3. Posch F, Leitner L, Bergovec M, Bezan A, Stotz M, Gerger A, et al. Can multistate modeling of local

recurrence, distant metastasis, and death improve the prediction of outcome in patients with soft tissue sarcomas? *Clin Orthop Relat Res*. 2017;475(5):1427-35. doi: 10.1007/s11999-017-5232-x. PMID: 28083752; PMCID: PMC5384928.

4. Kim DW, Jee YS. Solitary metastasis of myxoid liposarcoma from the thigh to intraperitoneum: a case report. *World J Surg Oncol*. 2019;17(1):172. doi: 10.1186/s12957-019-1724-3. PMID: 31660994; PMCID: PMC6819342.
5. Sbaraglia M, Bellan E, Dei Tos AP. The 2020 WHO classification of soft tissue tumours: news and perspectives. *Pathologica*. 2020;113(2):70. doi: 10.32074/1591-951x-213. PMCID: PMC8167394.
6. Tfayli Y, Baydoun A, Naja AS, Saghieh S. Management of myxoid liposarcoma of the extremity. *Oncol Lett*. 2021;22(2):596. doi: 10.3892/ol.2021.12857. PMID: 34188698; PMCID: PMC8228380.
7. Saifuddin A, Andrei V, Rajakulasingam R, Oliveira I, Seddon B. Magnetic resonance imaging of trunk and extremity myxoid liposarcoma: diagnosis, staging, and response to treatment. *Skeletal Radiol*. 2021;50(10):1963-80. doi: 10.1007/s00256-021-03769-w. PMID: 33792747.
8. Muhsen BA, Ghzawi A, Fares AS, Al-Hussaini M, Salah S. Metastatic myxoid liposarcoma of the brain: a case report and review of the literature. *Future Sci OA*. 2021;7(10):FSO756. doi: 10.2144/fsoa-2021-0077. PMID: 34840813; PMCID: PMC8610000.
9. Homsy P, Böhling T, Seitsonen A, Sampo M, Tukiainen E, Blomqvist C. Patterns of metastatic recurrence of genetically confirmed myxoid liposarcoma. *Ann Surg Oncol*. 2023;30(7):4489-97. doi: 10.1245/s10434-023-13312-x. PMID: 36907960.
10. Shinoda Y, Kobayashi E, Kobayashi H, Mori T, Asano N, Nakayama R, et al. Prognostic factors of metastatic myxoid liposarcoma. *BMC Cancer*. 2020;20(1):883. doi: 10.1186/s12885-020-07384-1. PMID: 32928160; PMCID: PMC7491192.
11. Muratori F, Bettini L, Frenos F, Mondanelli N, Greto D, Livi L, et al. Myxoid liposarcoma: prognostic factors and metastatic pattern in a series of 148 patients treated at a single institution. *Int J Surg Oncol*. 2018;2018(1):8928706. doi: 10.1155/2018/8928706. PMID: 29977616.
12. Dürr HR, Rauh J, Baur-Melnyk A, Knösel T, Lindner L, Roeder F, et al. Myxoid liposarcoma: local relapse and metastatic pattern in 43 patients. *BMC Cancer*. 2018;18(1):304. doi: 10.1186/s12885-018-4226-8. PMID: 29558901.
13. Tran TL, Tsai I, Choi HW. Solitary metastasis to the breast from thigh myxoid liposarcoma. *Cureus*. 2023;15(9):e45559. doi: 10.7759/cureus.45559. PMID: 37868406; PMCID: PMC10586712.
14. Lee SJ, Ryu JK, Won KY, Han SA. Myxoid liposarcoma of the breast mimicking phyllodes tumor: A case report. *J Korean Soc Radiol*. 2023;84(4):952-7. doi: 10.3348/jksr.2022.0146. PMID: 37559820; PMCID: PMC10407076.
15. Mouden K, Souadka A, Khmou M, Semmar A, Kacemi HE. Isolated Subcutaneous Metastasis of Myxoid Liposarcoma: A Case Report. *J Clin*

Case Rep. 2016;6(894):2. doi: 10.4172/2165-7920.1000894.

16. Ahmadi MS, Sheida F, Ameri A, Javadinia SA, Farahani F, Soltaninia O, et al. Ewing's sarcoma of mandible: Practical approach to a challenging case. *Case Rep Oncol.* 2022;15(3):927-35. doi: 10.1159/000525608. PMID: 36636676; PMCID: PMC9830304.
17. Ariamanesh M, Tafrishi R, Dehghani M, Bakhshai M, Javadinia SA, Hosseini SM, et al. Ten years of battle with multiple recurrences of pediatric skull base chondrosarcoma: A case report. *Clin Case Rep.* 2021;9(10):e04904. doi: 10.1002/ccr3.4904. PMID: 34631087; PMCID: PMC8489503.
18. Foroughi A, Arefpour AM, Nikoofar A, Sanei M, Mahdavi SH, Javadinia SA. Total neoadjuvant vs. standard perioperative cisplatin/ doxorubicin chemotherapy in patients with extremities osteosarcoma: A multi-center cohort study. *Asian Pac J Cancer Prev.* 2023;24(7):2369-74. doi: 10.31557/APJCP.2023.24.7.2369. PMID: 37505768; PMCID: PMC10676487.
19. Coelho PB, Costa PA, Espejo Freire AP, Kwon D, Jonczak E, D'Amato GZ, et al. Outcomes of metastatic synovial sarcoma with doxorubicin, pazopanib, and ifosfamide therapy. *J Clin Oncol.* 2021;39(15_suppl):e23552. doi: 10.1200/JCO.2021.39.15_suppl.e23552.
20. Vincenzi B, Olimpieri PP, Celant S, Mazzocca A, Cortellini A, Comandone A, et al. Pazopanib in the real-world setting in soft tissue sarcomas: data from the Italian national registry. *ESMO Open.* 2024;9(12):103995. doi: 10.1016/j.esmoop.2024.103995. PMID: 39608303; PMCID: PMC11635658.

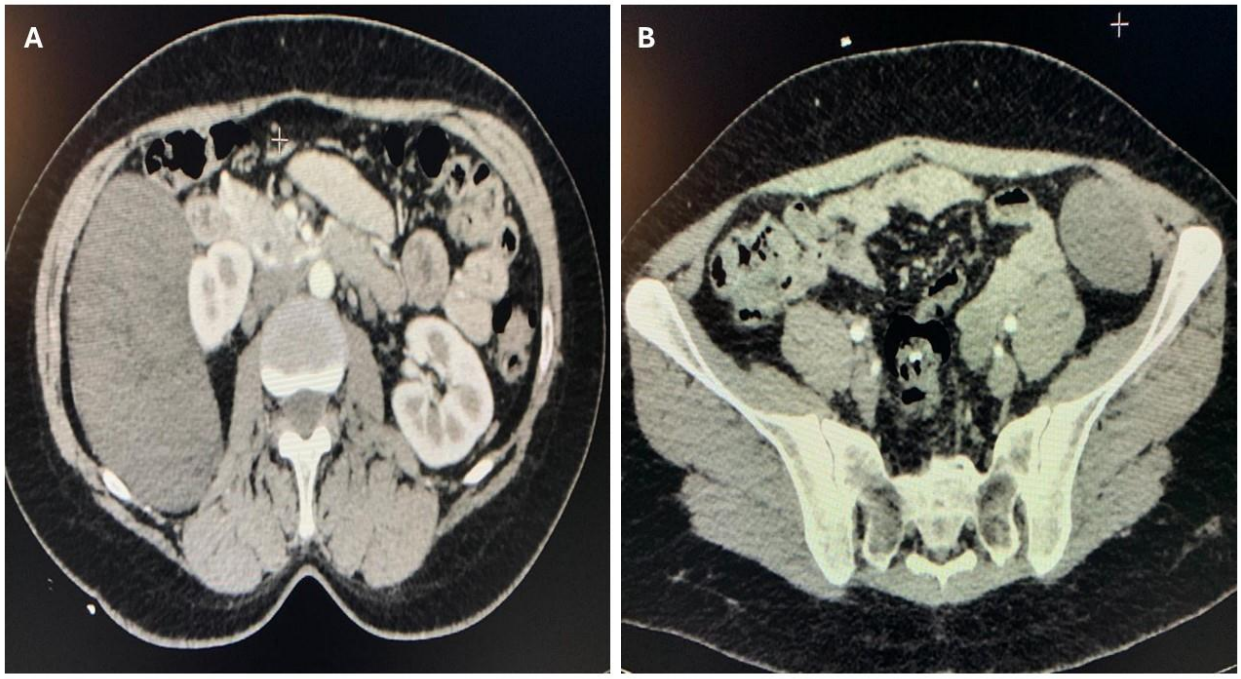

Figure 1. (A) Contrast-enhanced CT abdomen axial cut showing a large well-defined, faintly enhancing soft tissue mass is seen at the right side of the retroperitoneal space, postero-lateral to the right kidney. It is seen displacing and contacting the right kidney antromedially, contacting the posterior aspect of the abdominal wall laterally, and the psoas muscle posteriorly. (B): Contrast-enhanced CT abdomen axial cut showing a smaller, similar lesion is seen at the left iliac fossa, contacting the descending colon, and the abdominal wall is also noted.
CT: Computed tomography

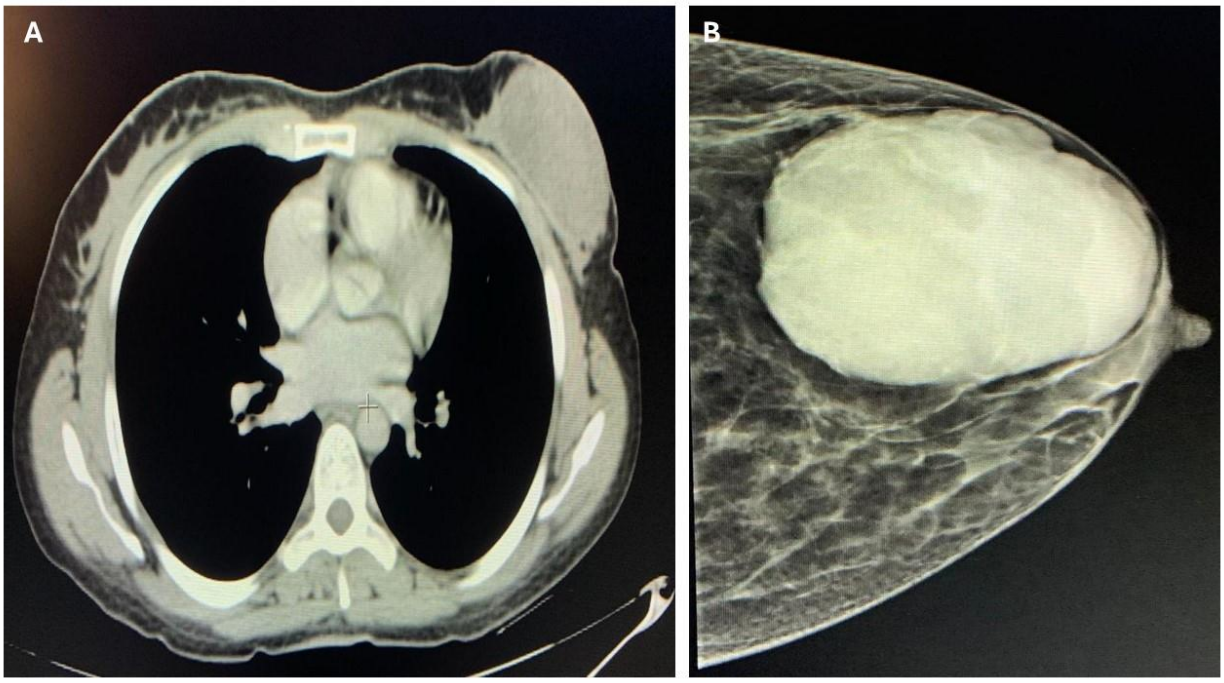

Figure 2. (A) Post-contrast CT study of the chest axial cut revealing a well-defined, faintly enhancing left breast soft tissue mass contacting underlying muscle, no intrathoracic extension. (B) Mammography mediolateral oblique view revealing a well-defined radioopaque opacity with a lobulated wall, no skin involvement, and no suspicious calcifications.
CT: Computed tomography

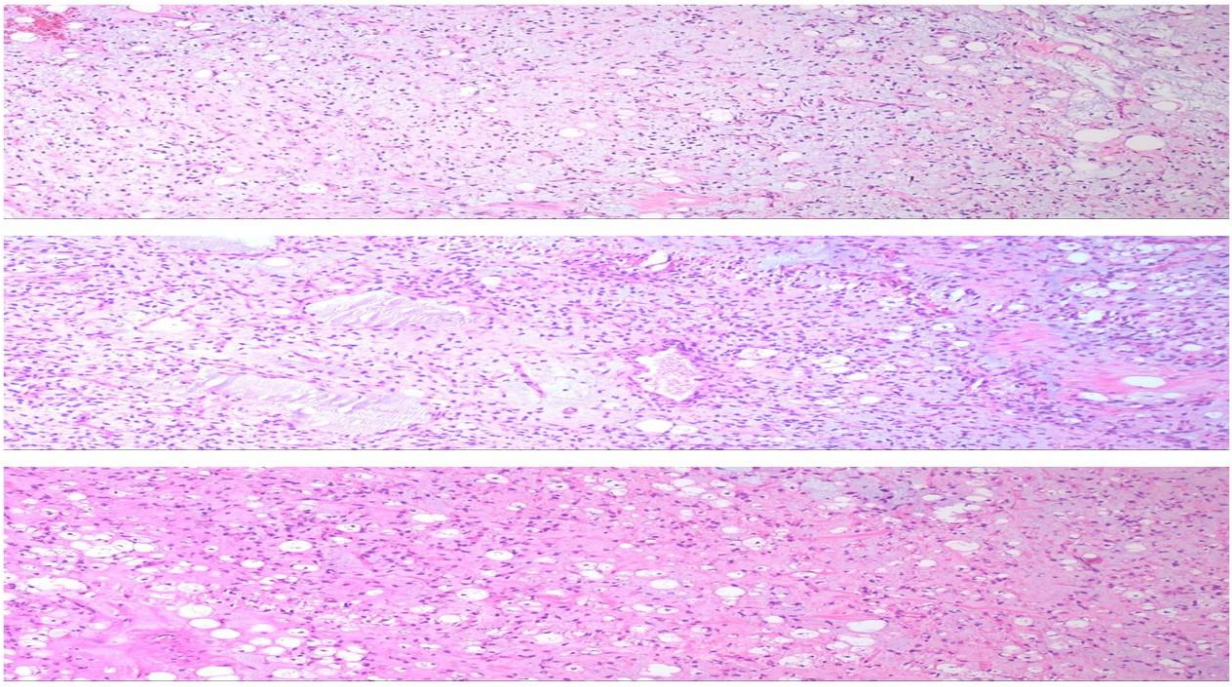

Figure 3. Histopathological examination of left breast lumpectomy showing a paucicellular tumor formed of monomorphic stellate cells without atypia or pleomorphism. The stroma shows a dominant mucoid matrix with a prominent curvilinear arborizing vascular network (chicken wire pattern). No detected high-grade component (H&E, ×200).