ISSN 2664-8075 (Print) & ISSN 2706-5774 (Online)
South Asian Research Journal of Applied Medical Sciences
Abbreviated Key Title: South Asian Res J App Med Sci

| Volume-7 | Issue-4 | Jul-Aug- 2025 | **DOI: https://doi.org/10.36346/sarjams.2025.v07i04.002**

Case Report

A Challenging Course of Recurrent Undifferentiated Pleomorphic Sarcoma with Metastasis, Pneumothorax, and Tumor-Associated Sepsis

Grecia Chávez-Chavira[1*], Laura Patricia Camacho-Cedeño[1], Sharon Danaí Rolon-Aguilera[1], Vianca Andrea Ramírez-Hernández[1], Luis Enrique David-Hernández[1], Eliezer Conde Vázquez[2]

[1]Internal Medicine Department, Hospital Regional de Alta Especialidad "Bicentenario de la Independencia", Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, State of Mexico
[2]Pathology Department, Hospital Regional de Alta Especialidad "Bicentenario de la Independencia", Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, State of Mexico

***Corresponding Author:** Grecia Chávez-Chavira
Internal Medicine Department, Hospital Regional de Alta Especialidad "Bicentenario de la Independencia", Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, State of Mexico

Article History
Received: 23.05.2025
Accepted: 30.06.2025
Published: 07.07.2025

Abstract: Undifferentiated pleomorphic sarcoma (UPS) is a high-grade subtype of soft tissue sarcoma (STS) characterized by its aggressive clinical behavior. It typically presents as a rapidly enlarging, asymptomatic subcutaneous mass with minimal or no overlying cutaneous changes. Definitive diagnosis relies on histopathological examination and immunohistochemical analysis. Once confirmed, comprehensive staging—encompassing assessment of the primary lesion, regional lymph nodes, and potential metastatic spread—is essential. Management is generally guided by tumor staging and typically involves en-bloc surgical resection, followed by histopathological review and multidisciplinary consideration of adjuvant therapies, including radiotherapy or chemotherapy. In this report, we present the case of a 78-year-old patient with a previous diagnostic of UPS on the right pectoral area that relapsed accompanied by massive spontaneous pneumothorax and further sepsis.

Keywords: Dermatology, Oncology, Sarcoma, Mesoderm, Soft Tissue Sarcoma.

INTRODUCTION

Sarcomas are malignant tumors of tissues, they involve oncogenic transformation of mesenchymal stem cells and are derived from mesoderm [1], they are divided on two principal types including bone and STS. STS compromises approximately 1% of all adult malignancies, and subdivide into over 50 histological subtypes [2], they manifest as deep lesions but they may affect the subcutaneous tissue and even the skin [3]. UPS, once termed as malignant fibrous histiocytoma, is an aggressive subtype of STS [3-5]. Usually presents as an asymptomatic subcutaneous nodule of rapid growth [3]. UPS occurs more frequently in white males, incidence increases with advanced age, with highest risk after the sixth decade of life [6]. Surgery remains the mainstay of treatment for patients with localized UPS followed by radiotherapy and neoadjuvant/adjuvant chemotherapy [4].

CASE PRESENTATION

A 78-year-old male with previous history of sarcoma diagnosed in December 2024 with a biopsy of the tumor reporting mesenchymal malignant neoplasm with bizarre, pleomorphic cells, diffuse chromatin, and prominent nucleoli consistent with undifferentiated pleomorphic sarcoma (Figure 1). He was treated with surgery with wide resection of pectoralis minor, subsequently 27 sessions of radiotherapy and then 4 cycles of chemotherapy with doxorubicin. On February 2025 he performed a PET-CT due to a new rapidly growing mass located in the right pectoral region with the appearance of protruding from subcutaneous cellular tissue, maximum diameter of 8 centimeters, yellowish, of indurated

consistency, with well-defined edges, smooth surface, the surrounding skin having an erythematous appearance (Figure 2 and 3), the PET-CT showed increased metabolism in soft tissue lesions in the right pectoral region and bilateral pulmonary nodules and ganglionar recurrence, changing regimen of chemotherapy to gemcitabine and docetaxel during 4 cycles. He presented in May 2025 at the emergency room with sudden dyspnea mMRC 4 and diaphoresis. A chest CT scan revealed multiple pulmonary nodules suggestive of metastasis, as well as a massive left spontanous pneumothorax (Figure 4). An endopleural tube was placed and admitted to the Internal Medicine Department, where he had a good evolution and an adequate pulmonary reexpansion (Figure 5 and 6) later, he was discharged due to improvement.

One month later, he returned to the Emergency room due to a soft tissue infection of the tumor with asthenia, adynamia, alterations in alertness, dyspnea, diaphoresis, hypotension, purulent discharge from soft tissue sarcoma, he was admitted in the Internal Medicine department under the context of soft tissue septic shock, he received therapy with piperacillin tazobactam, and double catecholamines (norepinephrine and vasopressin), and steroid hydrocortisone without response to septic shock presenting multiple organic failure (renal, neurologic, respiratory systems) and died during this hospitalization.

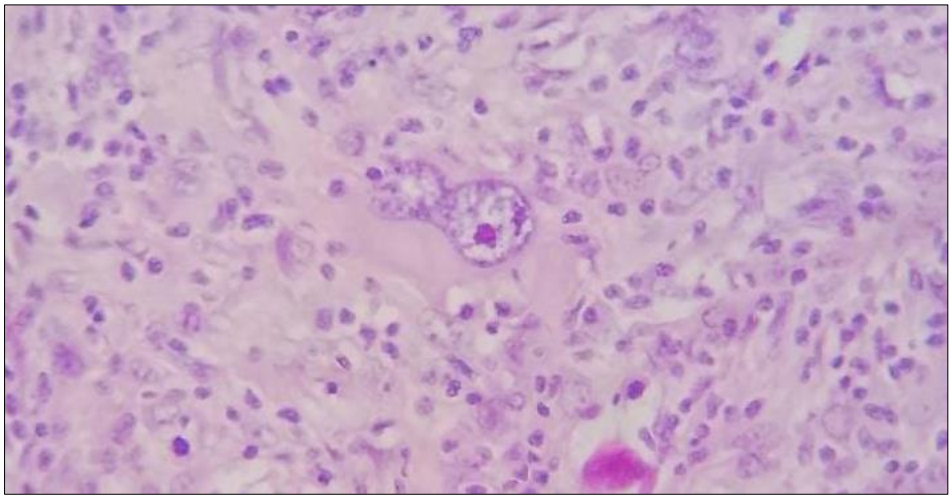

Figure 1: Histopathological features of tumor cell patterns in undifferentiated pleomorphic sarcoma: A malignant mesenchymal neoplasm with bizarre, pleomorphic cells and diffuse chromatin with prominent nucleoli (pleomorphic component with a storiform-pleomorphic pattern) (Hematoxylin & eosin 40x)

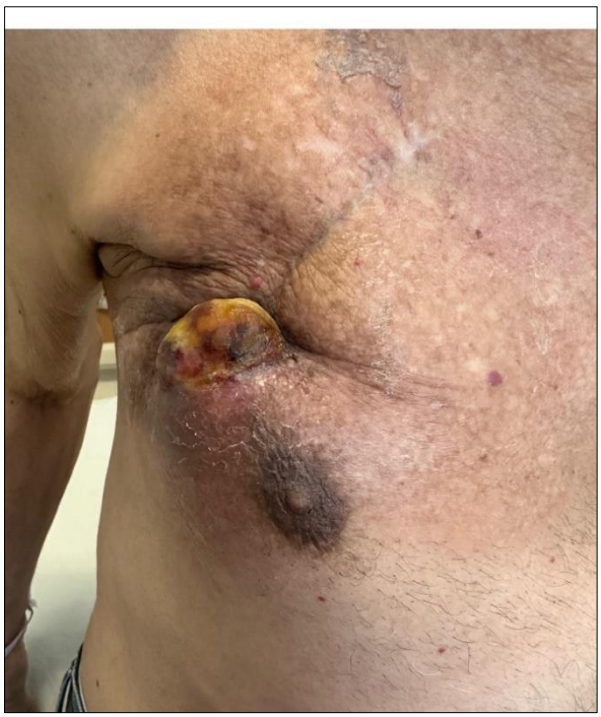

Figure 2: Clinical image of the right pectoral protruding mass

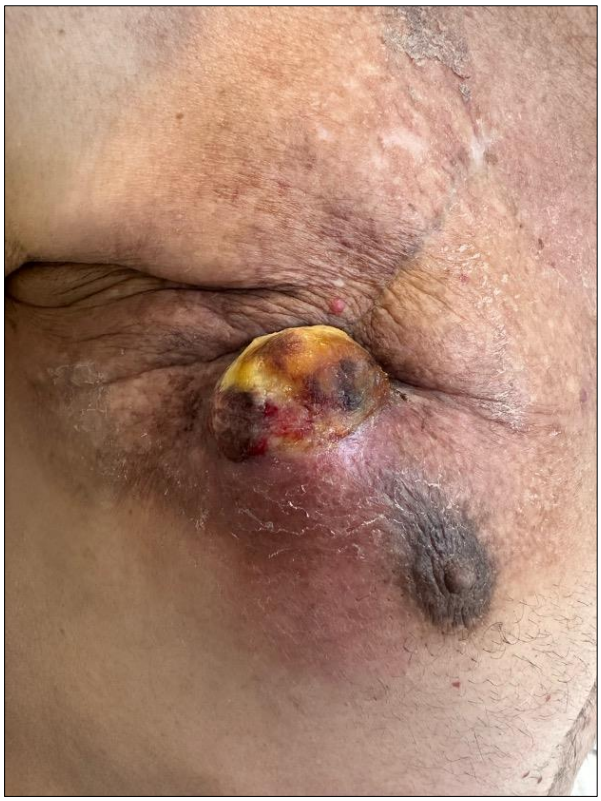

Figure 3: Clinical image of the right pectoral showing protruding mass, erythematous perilesional

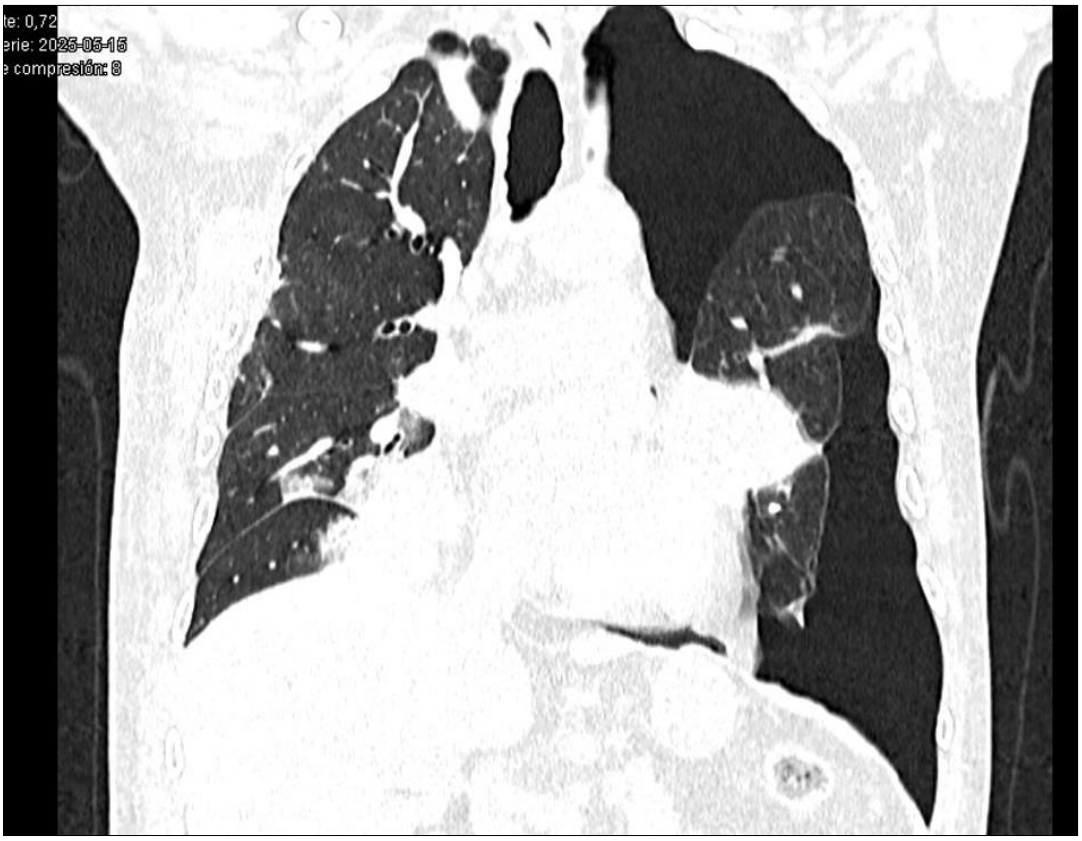

Figure 4: Coronal section of chest CT (lung window) showing a massive left pneumothorax

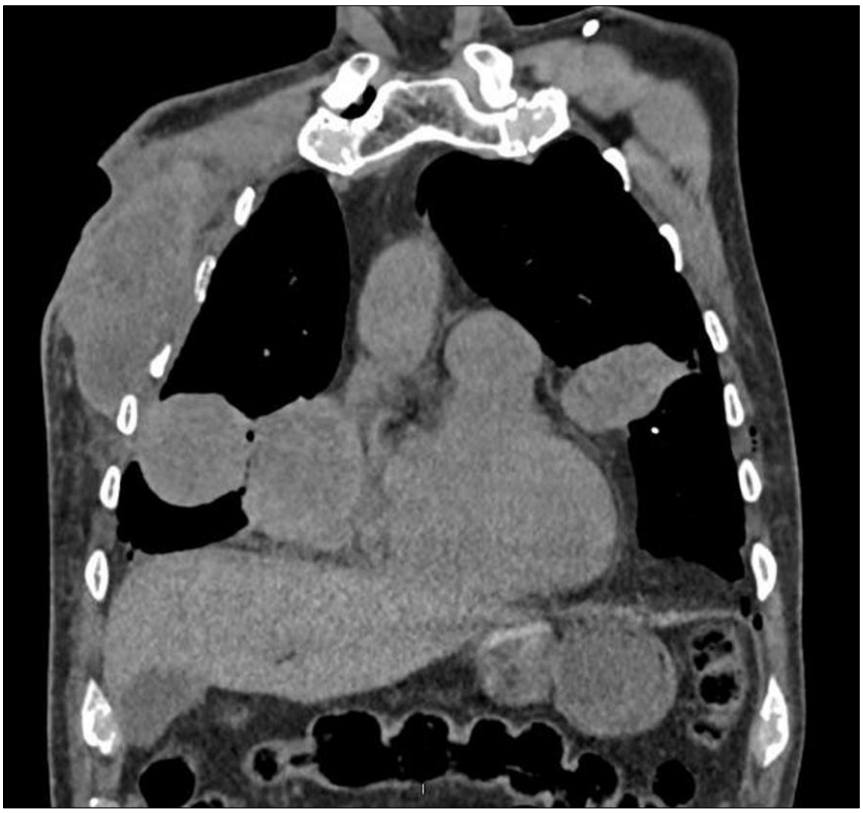

Figure 5: Simple chest CT scan, coronal section, in a soft tissue window; showing in soft tissue an increased volume in the right up hemithorax, lung parenchyma with pulmonary nodules suggestive of metastases in both hemithoraxes

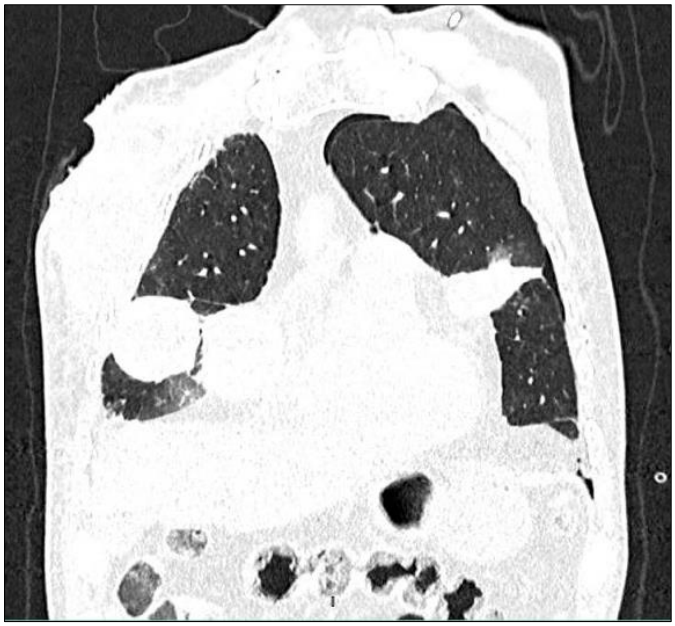

Figure 6: Control simple CT scan of the chest, coronal section, in the lung window, showing correct lung re-expansion, as well as pulmonary nodules suggestive of metastasis

DISCUSSION

UPS is one of the most aggressive and poorly differentiated subtypes of STS, it represents about 5 to 20% of all STS and is characterized by a high degree of cellular pleomorphism with no distinct line of differentiation [2, 3]. The incidence increases with age, it is estimated that UPS encompass approximately 1% of all malignancies and an overall incidence of 3 per 100,000 [3], predominantly affects males, and a slight ethnic predisposition affecting white persons [4]. Exposure to radiation (especially as part of prior cancer treatments) increases the likelihood of developing UPS, often in

the irradiated area years later; as in this case, additionally, certain genetic conditions, such as Li-Fraumeni syndrome, Neurofibromatosis type 1, and Retinoblastoma, predispose individuals to sarcomas, including UPS, due to inherited gene mutations [2]. The exact aetiology and pathogenesis of undifferentiated pleomorphic sarcomas remain undetermined [7].

UPS clinically presents as a rapidly growing, painless skin-colored nodule [8], since these tumors most of the time are asymptomatic, they can go unnoticed, as in this case, delaying the diagnosis; signs of malignancy include deep tumor localization, dimension exceeding five centimeters, a recent increase in size and pain [9, 10]. UPS can affect any soft tissue, most frequently seen in limbs, retroperitoneum, less frequently in the head and neck [1, 2]. The diagnostic approach begins with imaging tools, to determine the extent of the tumor, or as in this case metastasis; magnetic resonance imaging for diagnosis and local staging, complemented with conventional X-rays and other techniques such as a computed tomography [10]. For diagnosis, histopathology studies associated with immunohistochemistry are necessary [1], due to the non-specific nature of UPS, making a definitive pathological diagnosis requires multiple immunohistochemical stains, as it is largely a diagnosis of exclusion [11].

Definitive treatment of UPS depends on disease stage and resectability. For localized, resectable UPS, wide surgical excision with negative margins is the mainstay of therapy, often combined with radiotherapy to reduce local recurrence risk, particularly for high grade or large tumors [1-13]. Adjuvant chemotherapy may be considered, in cases where tumors are >5 cm, with greater benefit observed in tumors 10-15 cm in size, anthracycline-based regimens (e.g., doxorubicin with or without ifosfamide) are most commonly used [12, 13]. For advanced, unresectable, or metastatic UPS, systemic therapy is indicated. First-line chemotherapy typically involves doxorubicin, either as monotherapy or in combination with ifosfamide (AIM regimen: doxorubicin/ifosfamide/mesna), which has the highest response rates in unselected soft tissue sarcoma populations [14]. For unresectable or metastatic disease, radiotherapy may be used for local control or palliation, and surgery may be considered for symptom control or in cases where systemic therapy renders disease resectable [12-15].

UPS has been associated with an increased risk of secondary spontaneous pneumothorax, particularly in the context of pulmonary metastases [16, 17]. The most frequently proposed mechanism involves the rupture of subpleural or cavitated metastatic lung nodules into the pleural space, it may also be precipitated or unmasked by systemic therapies, although the risk is more closely linked to the presence of cavitary or pleural-based metastases. Additionally, the administration of targeted therapies, such as pazopanib, has been linked to tumor cavitation and subsequent pneumothorax. However, current evidence suggests that these events are more strongly associated with the intrinsic characteristics of the metastatic lesions than with the pharmacologic effects of the therapy itself [16].

CONCLUSIONS

Undifferentiated pleomorphic sarcoma is a fast-growing, aggressive tumor. We must educate patients to seek prompt medical attention in order to provide the best treatment. There are multiple treatment options, depending on the stage and resectability. Multidisciplinary management is essential, and treatment should be individualized based on tumor characteristics, patient comorbidities, and response to therapy.

Conflict of Interest: The authors declare that there are no conflicts of interest at the time of publication of this article.

REFERENCES

1. Paiva ACG, Abreu MAMM, Souza MP. Undifferentiated pleomorphic sarcoma. An Bras Dermatol. 2018 Jan-Feb;93(1):154-155. doi: 10.1590/abd1806-4841.20186613. PMID: 29641724; PMCID: PMC5871389.
2. Munuswamy N, Sundar M, Krishnan K, Chandran M, R K K. Undifferentiated Pleomorphic Sarcoma: A Case Report. Cureus. 2024 Nov 11;16(11):e73422. doi: 10.7759/cureus.73422. PMID: 39664140; PMCID: PMC11632629.
3. Prakash S, Luis Rayas J, Rojas Murguia A, Lingireddy A, Hassan M, Alhariri S, Hakim MN, Dihowm F, Maharaj S. Undifferentiated Pleomorphic Sarcoma Presenting with Cardiac Tamponade: A Case Report and Review. J Investig Med High Impact Case Rep. 2022 Jan-Dec;10:23247096221141190. doi: 10.1177/23247096221141190. PMID: 36458807; PMCID: PMC9720795.
4. Sun, Haitao et al. "Current research and management of undifferentiated pleomorphic sarcoma/myofibrosarcoma." Frontiers in genetics vol. 14 1109491. 16 Feb. 2023, doi:10.3389/fgene.2023.1109491
5. Liang Z, Han J, Tuo H, Xue D, Yu H, Peng Y. Undifferentiated pleomorphic sarcoma of the pancreas: a rare case report and literature review. World J Surg Oncol. 2022 Feb 27;20(1):55. doi: 10.1186/s12957-022-02525-1. PMID: 35220968; PMCID: PMC8883712.
6. Mathew R, Sethi A, Flint AT, Omman R, House J. A Case of Undifferentiated Pleomorphic Sarcoma. Cureus. 2022 Jun 21;14(6):e26153. doi: 10.7759/cureus.26153. PMID: 35747109; PMCID: PMC9211378.

7. Sun H, Liu J, Hu F, Xu M, Leng A, Jiang F, Chen K. Current research and management of undifferentiated pleomorphic sarcoma/myofibrosarcoma. Front Genet. 2023 Feb 16;14:1109491. doi: 10.3389/fgene.2023.1109491. PMID: 36873946; PMCID: PMC9978151.
8. Park SW, Kim HJ, Lee JH, Ko YH. Malignant fibrous histiocytoma of the head and neck: CT and MR imaging findings. AJNR Am J Neuroradiol. 2009 Jan;30(1):71-6. doi: 10.3174/ajnr.A1317. Epub 2008 Oct 8. PMID: 18842757; PMCID: PMC7051724.
9. Danieli, Maria, and Alessandro Gronchi. "Staging Systems and Nomograms for Soft Tissue Sarcoma." *Current oncology (Toronto, Ont.)* vol. 30,4 3648-3671. 26 Mar. 2023, doi:10.3390/curroncol30040278
10. Wallander, Karin et al. "Sarcoma care in the era of precision medicine." *Journal of internal medicine* vol. 294,6 (2023): 690-707. doi:10.1111/joim.13717
11. Widemann BC, Italiano A. Biology and Management of Undifferentiated Pleomorphic Sarcoma, Myxofibrosarcoma, and Malignant Peripheral Nerve Sheath Tumors: State of the Art and Perspectives. J Clin Oncol. 2018 Jan 10;36(2):160-167. doi: 10.1200/JCO.2017.75.3467. Epub 2017 Dec 8. PMID: 29220302; PMCID: PMC5759316.
12. Crago, Aimee M et al. "Management of Myxofibrosarcoma and Undifferentiated Pleomorphic Sarcoma." *Surgical oncology clinics of North America* vol. 31,3 (2022): 419-430. doi: 10.1016/j.soc.2022.03.006
13. Kobayashi, Hiroshi et al. "Role of adjuvant chemotherapy in patients with localized, undifferentiated pleomorphic sarcoma of soft tissue: a population-based cohort study." *International journal of clinical oncology* vol. 27,4 (2022): 802-810. doi:10.1007/s10147-021-02102-8
14. Miwa, Shinji et al. "Current and emerging systemic treatment options for malignant fibrous histiocytoma/undifferentiated pleomorphic sarcoma." *International journal of clinical oncology*, 10.1007/s10147-025-02712-6. 14 May. 2025, doi:10.1007/s10147-025-02712-6
15. Von Mehren, Margaret et al. "Soft Tissue Sarcoma, Version 2.2022, NCCN Clinical Practice Guidelines in Oncology." *Journal of the National Comprehensive Cancer Network: JNCCN* vol. 20,7 (2022): 815-833. doi:10.6004/jnccn.2022.0035
16. Aiba, H., Kimura, H., Yamada, S., Okamoto, H., Hayashi, K., Miwa, S., Kawaguchi, Y., Saito, S., Sakai, T., Tatematsu, T., Nakanishi, R., & Murakami, H. (2021). Different patterns of pneumothorax in patients with soft tissue tumors treated with pazopanib: A case series analysis. *PloS One*, *16*(7), e0254866. https://doi.org/10.1371/journal.pone.0254866
17. Hoag, Jeffrey B et al. "A comprehensive review of spontaneous pneumothorax complicating sarcoma." *Chest* vol. 138,3 (2010): 510-8. doi:10.1378/chest.09-2292.