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**Anatomy**

# Giant Solitary Fibrous Tumor of the Breast: Clinicopathological Features and Review of the Literature

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**Abstract** **Case Report**

Solitary fibrous tumor is a rare mesenchymal neoplasm. Its occurrence in the breast may pose diagnostic challenges, particularly when it presents as a spindle cell lesion or a mass suggestive of a phyllodes tumor. We report the case of a 48-year-old woman who presented with a left breast mass that had increased relatively rapidly in size, causing breast deformity. Imaging findings suggested a phyllodes tumor. Biopsy revealed a spindle cell proliferation of uncertain nature. Staging investigations showed a well-circumscribed, lobulated mass measuring 12 × 10 cm, with no reported invasion of adjacent tissues or evidence of metastasis. Breast-conserving surgery was performed without axillary lymph node dissection. Examination of the surgical specimen revealed a spindle cell proliferation with a hemangiopericytoma-like vascular pattern. The mitotic count was fewer than 2 mitoses per 25 mm², with no marked cytological atypia or tumor necrosis. Immunohistochemistry showed diffuse CD34 expression and nuclear STAT6 expression. A diagnosis of solitary fibrous tumor of the breast was made. Surgical margins were negative. No local recurrence or metastasis had been reported after 14 months of follow-up. Breast solitary fibrous tumors may mimic other breast lesions on imaging and limited biopsy samples. Diagnosis relies on the correlation of morphological and immunohistochemical findings. Tumor size contributes to prognostic assessment but does not, on its own, determine biological behavior. This case highlights the importance of complete excision, careful histological assessment, and prolonged follow-up.

**Keywords:** Solitary fibrous tumor; breast; giant breast tumor; spindle cell tumor; STAT6; breast-conserving surgery.

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## INTRODUCTION

Solitary fibrous tumor (SFT) is a mesenchymal neoplasm with fibroblastic differentiation that can arise at many anatomical sites. Its occurrence in the breast is rare and may present a diagnostic challenge because of its resemblance to other spindle cell lesions of the breast [1,2]. In a systematic review published in 2026, Cheung and colleagues identified 62 reported cases, including two new cases, illustrating the limited number of published observations [1]. Diagnosis relies on the correlation of morphological and immunohistochemical findings. In the appropriate morphological setting, nuclear STAT6 expression is a major diagnostic finding and generally reflects the characteristic *NAB2::STAT6* fusion [3–5]. Following excision, tumor size, mitotic activity, and the presence of necrosis contribute to risk assessment [6,7]. We report the case of a 48-year-old woman with a large left breast SFT initially suspected to be a phyllodes tumor on imaging. She underwent breast-conserving surgery, and no recurrence or metastasis had been reported after 14 months of follow-up. The case is discussed in the context of the literature on breast SFT and prognostic studies of SFTs arising at other sites.

## CASE REPORT

A 48-year-old woman presented with a left breast mass that had increased relatively rapidly in size, causing breast deformity and a subcutaneous bulge. Her family history included breast cancer in two maternal aunts. Mammography and breast ultrasonography revealed a mass suggestive of a phyllodes tumor. A biopsy was performed to establish the nature of the lesion. Initial histological examination showed a spindle cell proliferation, raising a differential diagnosis that included phyllodes tumor, mammary myofibroma, desmoid-type fibromatosis, and metaplastic breast carcinoma with a predominant spindle cell component. Staging investigations demonstrated a well-

circumscribed, lobulated breast mass measuring 12 × 10 cm, without invasion of adjacent tissues or reported evidence of lymph node or visceral metastasis. Following multidisciplinary discussion, breast-conserving surgery was performed without axillary lymph node dissection, taking into account the well-circumscribed appearance of the mass on imaging and the absence of evidence of lymph node involvement. The pathology department received a nodular, lobulated, partially encapsulated mass with a homogeneous tissue-like appearance and hemorrhagic changes (Figure 1). Following exhaustive sampling of the surgical specimen, histological examination showed a spindle cell proliferation with a hemangiopericytoma-like vascular pattern (Figure 2). The mitotic count was fewer than 2 mitoses per 25 mm². No marked cytological atypia or tumor necrosis was observed. At the periphery, the proliferation appeared well circumscribed by a fibrous capsule. Immunohistochemistry showed nuclear STAT6 expression (Figure 3) and diffuse CD34 expression (Figure 4). The tumor cells were negative for smooth muscle actin (Figure 5), TLE1, hormone receptors, β-catenin, CD117, and cytokeratins AE1/AE3. The combined morphological and immunohistochemical findings supported a diagnosis of SFT of the breast. Surgical margins were negative, with no residual tumor identified. The patient underwent postoperative surveillance. At the last assessment, after 14 months of follow-up, no local recurrence or metastasis had been reported.

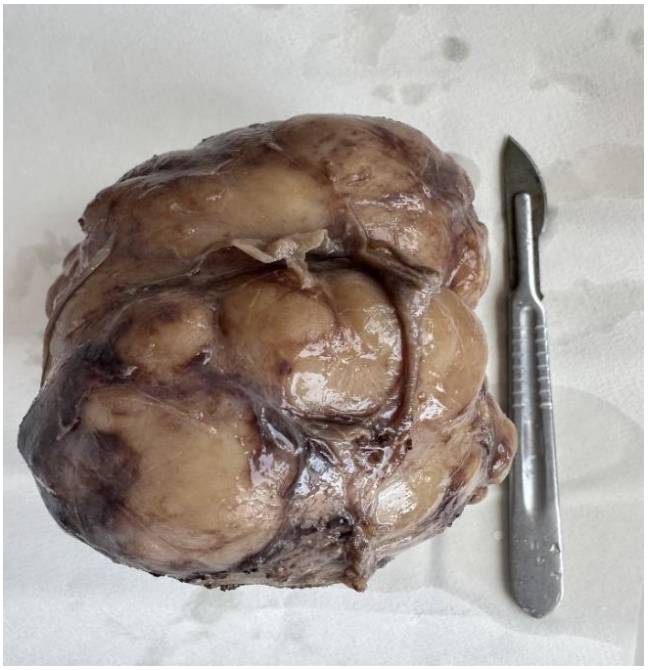


**Figure 1: Gross appearance of the resection specimen showing a lobulated mass. Surgical margins were negative on pathological examination**

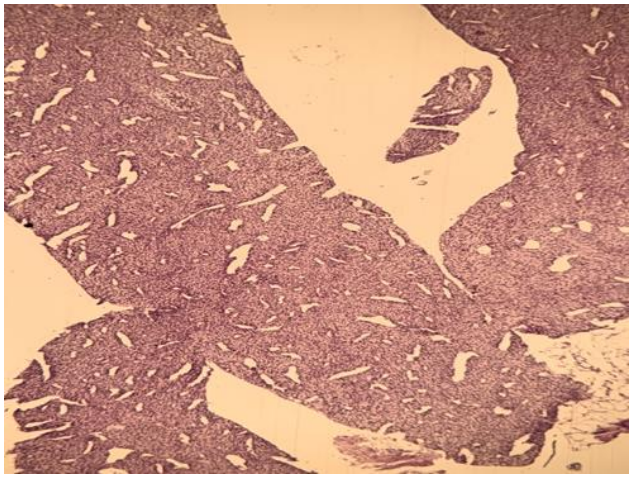


**Figure 2: Spindle cell tumor with a hemangiopericytoma-like vascular pattern. Hematoxylin and eosin stain, original magnification × 20**

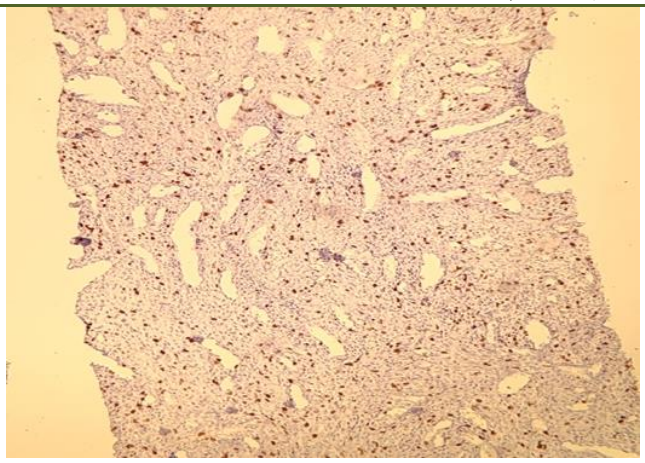


**Figure 3: Nuclear STAT6 expression in tumor cells. STAT6 immunohistochemistry**

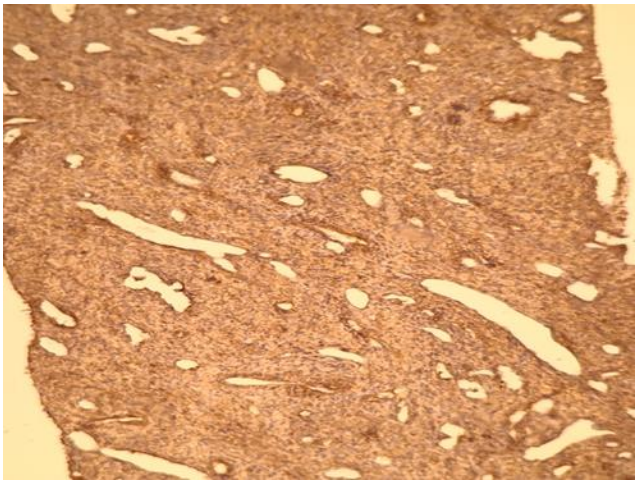


**Figure 4. Diffuse CD34 expression in tumor cells. CD34 immunohistochemistry.**

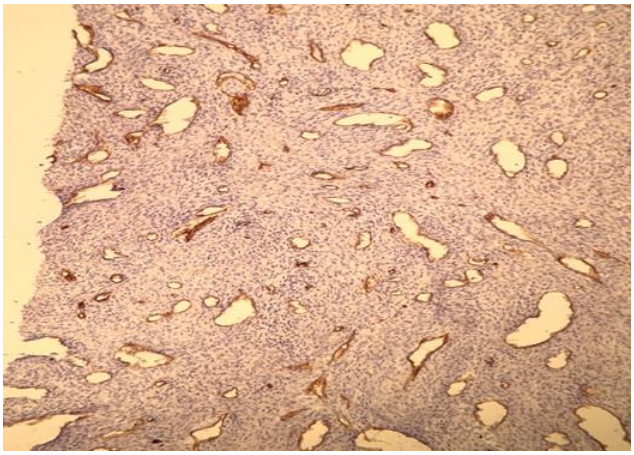


**Figure 5. Immunohistochemical staining for smooth muscle actin is negative in the tumor cells.**

## DISCUSSION

Breast SFTs have been described mainly in individual case reports and small series. They can occur in both women and men, as illustrated by the case reported by Rovera and colleagues [8]. The review by Cheung and colleagues summarized 62 reported cases; however, the rarity of the tumor and the heterogeneity of available data limit prognostic conclusions [1]. Patients generally present with a palpable mass without specific clinical features. In our patient, the relatively rapid increase in size and resulting breast deformity prompted breast imaging. The observed subcutaneous bulge does not, on its own, establish skin infiltration. Similarly, the family history of breast cancer is part of the clinical history but does not establish a causal relationship with the SFT. Imaging cannot establish the diagnosis definitively. Tsai and colleagues described a breast SFT resembling a fibroadenoma, with internal vascularity on

Doppler imaging [9]. In the present case, the main radiological consideration was a phyllodes tumor. Biopsy identified a spindle cell lesion, but examination of the surgical specimen was needed to characterize its architecture, establish the diagnosis, and assess the margins. SFT typically consists of spindle or oval cells, variable cellularity, collagen deposition, and branching vessels. The vessels may form a hemangiopericytoma-like pattern. Areas of differing cellularity, and occasionally anaplastic areas, may coexist within a tumor, supporting the need for representative sampling [10]. In our case, the spindle cell morphology and hemangiopericytoma-like vasculature helped guide the diagnosis. CD34 expression provided additional support, although this marker is also expressed by other breast lesions. Nuclear STAT6 expression strengthened the diagnosis of SFT in the appropriate morphological context [3,4]. The *NAB2::STAT6* fusion is a characteristic molecular alteration of SFT [5]. Molecular testing may be considered when diagnostic uncertainty persists, but no molecular result was available for our patient. The morphological spectrum also includes fat-forming variants, such as the breast SFT reported by Ben Ghashir and colleagues [11]. A phyllodes tumor was the main initial radiological diagnosis. On a limited biopsy, its epithelial component may be underrepresented when the sample contains predominantly stroma. Examination of the surgical specimen allows a broader assessment of the lesion's architecture. Mammary myofibroblastoma may share spindle cell morphology and CD34 expression with SFT. Magro and colleagues examined several breast stromal lesions with overlapping features [12]. Morphology and an appropriate immunohistochemical panel, including STAT6 and desmin when indicated, help distinguish these entities [3,13]. In our case, the absence of cytokeratin AE1/AE3 and β-catenin expression contributed to the differential diagnostic assessment of spindle cell metaplastic carcinoma and desmoid-type fibromatosis, respectively. These findings must nevertheless be interpreted alongside the morphology and the full immunohistochemical panel. Dermatofibrosarcoma protuberans may also be considered depending on the site and architecture of the lesion, as illustrated by the case reported by Hirose and colleagues [14]. Large size and clinical growth alone do not establish the biological behavior of an SFT. Increased mitotic activity, necrosis, marked atypia, and an anaplastic component are among the features considered in histological assessment. Breast SFTs with anaplastic areas or malignant features have been reported [10,15,16], as have large breast lesions [17]. The Demicco model was developed and subsequently refined to estimate metastatic risk using patient age, tumor size, and mitotic activity; the modified model also incorporates necrosis [6,7]. Our patient was 48 years old, the tumor measured 12 cm in greatest dimension, the mitotic count was fewer than 2 mitoses per 25 mm², and no necrosis was observed. The lesion was well circumscribed, and surgical margins were negative. These findings contribute to prognostic assessment but do not establish that the risk of recurrence is absent or very low. Formal application of a risk model should be checked against the original pathology report, particularly the unit used for mitotic counting. The limited validation data specific to breast SFT should also be considered. Complete surgical excision is the main treatment for localized breast SFT. In the review by Cheung and colleagues, local excision or lumpectomy was performed in 45 of the 59 cases for which the surgical procedure was reported [1]. The choice of surgery depends in part on tumor size, breast volume, and the ability to obtain negative margins. Despite the size of the lesion, breast-conserving surgery was possible in our patient. Margins were negative, and the outcome was favorable at the last assessment. The decision not to perform axillary lymph node dissection should be interpreted in the context of the preoperative assessment and multidisciplinary discussion. Evidence concerning additional treatments is derived mainly from SFTs at other sites. In a multicenter retrospective study, Haas and colleagues found an association between perioperative radiotherapy and improved local control after adjustment, without a demonstrated overall survival benefit [18]. These findings do not support routine radiotherapy after excision of every localized breast SFT. For advanced disease, pazopanib has been evaluated in a phase II trial [19]. Those findings concern advanced SFT and should not be interpreted as an indication for adjuvant treatment in our patient. Prolonged surveillance is important because SFT recurrence may occur late [20]. In the present case, the absence of recurrence or metastasis at 14 months is encouraging, although follow-up remains limited.

## CONCLUSION

Breast SFT should be considered in the differential diagnosis of a spindle cell breast lesion, particularly when a hemangiopericytoma-like vascular pattern is present. The combination of morphological and immunohistochemical findings, especially nuclear STAT6 expression, helps establish the diagnosis. In this case, a 12 × 10 cm tumor initially suspected to be a phyllodes tumor was treated by breast-conserving surgery with negative margins. The absence of recurrence or metastasis at 14 months represents a favorable short-term outcome. The tumor's size nevertheless warrants careful prognostic assessment and prolonged follow-up.

## DECLARATIONS

**Ethics Approval and Consent to Participate:** This work has respected all the rools of medical ethics and has been elaborated by all the authors.

**Availability of Material and Data:** All data is available in the Moulay Ismail Military Hospital, Meknès Morocco

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**Consent to Publish:** As the main author and the names of all authors I allow you to publish this article in your review

**Competing Interests:** The authors do not declare any conflict of interest.

**Author's Contributions:** All the authors contributed to the writing of this work.

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