Malignant Solitary Fibrous Tumour of the Breast Mimicking a Benign Tumor

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ABSTRACT: Solitary fibrous tumour (SFT) of the breast is exceedingly uncommon. Radiological assessment usually shows benign features. We report on a case of malignant SFT of the breast, while emphasizing the need for additional immunostains to reach a definitive diagnosis. Standard treatment consists of lesion removal with adequate margins.

KEYWORDS: Solitary fibrous tumours, breast, diagnosis, pathology, surgical, diagnostic imaging

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Introduction

Solitary fibrous tumour (SFT) is an uncommon mesenchymal neoplasm, most often found in the pleura. Other ubiquitous sites have also been reported, although extra-thoracic lesions seem scarce. Breast SFT seems even more uncommon, with just a few cases reported in the literature.

Age at presentation is variable, with a range between 49 and 81 years. It usually presents as a single, large, painless, slow-growing lump. Radiological features resemble those of benign lesions. Specimens from core-needle biopsy often are inconclusive, showing pathologic features that overlap with other mesenchymal lesions, such as myofibroblastoma (MFB). A definitive diagnosis can be better reached after complete lesion removal. Solitary fibrous tumour occurring in the breast is usually benign. We report on a case of malignant SFT of the breast and emphasize the need for additional immunostains to get a definitive diagnosis (STAT6).

Case Report

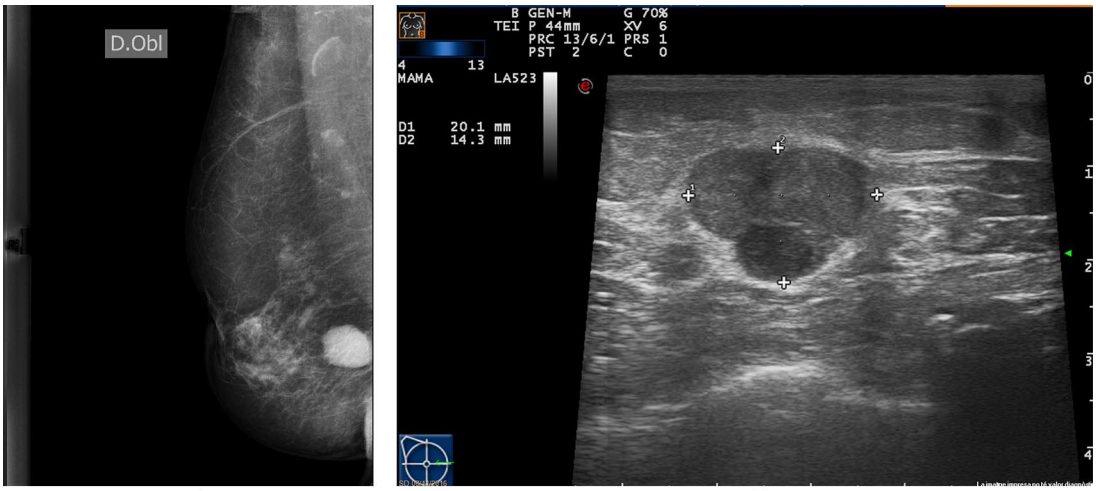
A 72-year-old woman attended our outpatient clinic after noticing a lump in her right breast for about 2 months, which had been growing steadily. She had had a previous surgery for fibroadenoma removal in the same breast 30 years ago. Also, she had gone through a total hysterectomy for multiple fibroids at the age of 48.

Upon examination, a palpable lump of 2-3 cm located at the inner quadrants of her right breast was found, associated to mild skin retraction. No pain, nipple discharge, or enlarged regional lymph nodes were present. Mammography and ultrasound showed a 27 mm ×13 mm, well-defined lobulated nodule causing skin retraction (BiRads 4C) (Figure 1A and B).

Core-needle biopsy showed a hypercellular spindle-cell tumour with epithelioid cells, overall low cytological atypia, and 1 mitosis per 10 high-power field (HPF). The following immunophenotype was disclosed: positive for vimentin and CD34; negative for desmin, beta-catenin, P63, keratins, and breast hormone receptors. Proliferative marker Ki67 was 10%. Such description was consistent with a mesenchymal epithelioid and fusocellular lesion lacking enough features of malignancy. Myofibroblastoma was the initial diagnosis. Nevertheless, whole lesion removal was suggested to reach a definite histologic assessment.

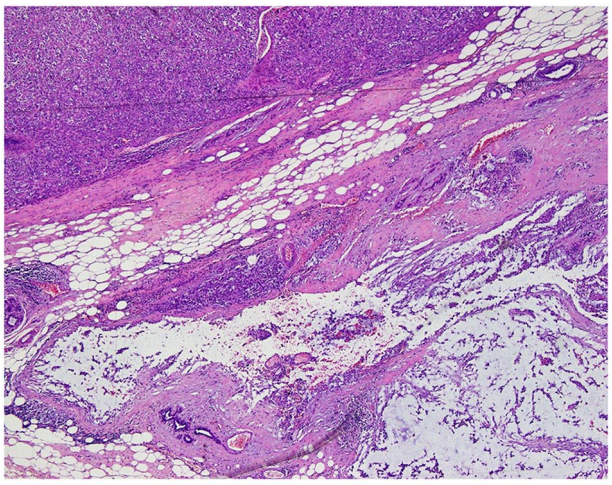
The surgical specimen consisted of a well-defined mass showing a fine fibrous capsule with focally infiltrative margins. Microscopic assessment showed a hypercellular lesion with focal deposition of dense hyaline bands, myxoid change, and focal necrosis (10%). Uniform, round epithelioid spindle cells with scant cytoplasm were seen displaying an alveolar-like growth pattern, with nuclear pleomorphism, a mitotic index of 15/10 HPF, along with giant multinucleated stromal cells and thick-walled vessels arranged in a 'stag horn' pattern (Figure 2A and B). Immunophenotype was as follows: positive for vimentin, CD34, BCL2, CD99, STAT6 (diffuse and strong nuclear immunoreactivity), and TLE1; CD10 and synaptophysin (scattered positivity); negative for desmin, beta-catenin P63, P40, keratins (CK AE1-3, CK5/6, 34B-E12), S100, CD31, myosin heavy chain, and hormone receptors. The proliferation marker Ki67 was 20% cell positive.

Thus, evidence of a hypercellular lesion with nuclear pleomorfism, high mitotic index, and infiltrative margins associated with strong nuclear STAT6 immunostain led to the final histologic diagnosis of malignant SFT (Figure 3). According



A B

Figure 1. (A) Mammography. (B) Ultrasound.



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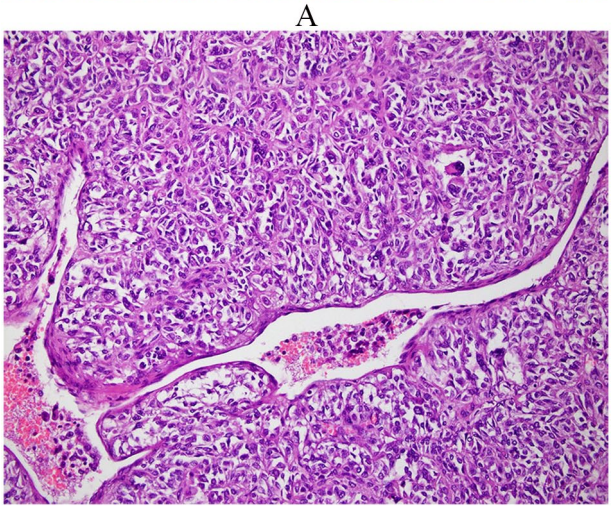

B

Figure 2. H&E stained sections of the surgical specimen. (A) Focal infiltrative margin extending into the perilesional fatty tissue (H&E ×400). (B) Hypercellular lesion with an alveolar-type growth pattern. Hemangiopericytoma-like stag-horn vascular spaces, and giant multinucleated stromal cells showing pleomorphic nuclei, together with collagenous matrix, prominent mitoses, and focal necrosis (H&E ×400).

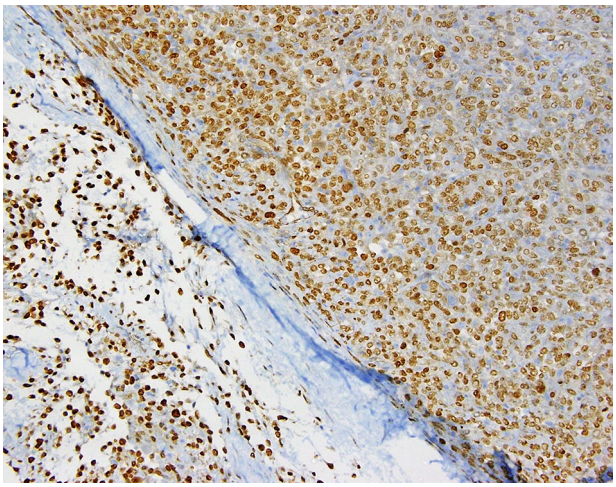

Figure 3. Positive immunohistochemical staining for STAT6 (intense nuclear expression). Well-defined tumour associated with perilesional fatty tissue invasion (×200).

to Demicco et al's[1] refined stratification model, this case fitted into the intermediate risk class for distant metastasis, and the patient was instructed to attend regular controls every 3-4 months (Figure 3).

No adjuvant therapy was indicated, since there is no evidence that neither radiotherapy nor chemotherapy actually add any benefit. The lesion recurred after 18 months, leading to mastectomy to warrant negative margins. This report was done in accordance with the Review Board and Ethics Committee of Mutua Terrassa.

Discussion

Solitary fibrous tumour is a rare spindle-cell fibroblastic tumour usually arising in the pleura. Other reported locations include the upper respiratory tract, mediastinum, head and neck, soft tissue elsewhere, central nervous system (CNS), kidney, and breast.[2-5] There are very few cases described in this latter location,[6-10] and most of them are benign and limited to

Table 1. Differential diagnosis in case of possible solitary fibrous tumour.

BENIGN LESIONS	MALIGNANT LESIONS
Myofibroblastoma Spindle-cell lipoma Leiomyoma Inflammatory myofibroblastic tumour/inflammatory pseudo-tumour	Monophasic synovial sarcoma Desmoid-type fibromatosis Low-grade, spindle-cell, fibromatosis-like metaplastic carcinoma Dermatofibrosarcoma Leiomyosarcoma Fibrosarcoma/malignant fibrous histiocytoma Low- or high-grade myofibroblastic sarcoma Malignant peripheral nerve sheath tumour

the female gender. A malignant variant has also been reported but is even more uncommon.[11]

Although SFT can occur at any age, it is mostly seen in patients in their 50s. It usually presents as a single, painless, and slow-growing lump that shows benign features at the radiological work-up, such well-defined margins and smooth echostructure. Because imaging features are mostly non-specific, the final diagnosis is based on histologic examination.

On histology, STF shows overlapping characteristics with other mesenchymal lesions, such as MFB. The final diagnosis of breast SFT is challenging because there is much variability concerning its cellular, extracellular, and vascular components, and because it can mimic other spindle-cell tumours. Complete removal of the lesion is often required to reach a final diagnosis, since potential sampling errors can occur if only needle biopsy is performed.

According to Magro et al,[12] several conditions can be included in the differential diagnosis (Table 1). However, in most cases, a differential diagnosis should be established between breast SFT and MFB, the latter featuring myoid cells with eosinophilic cytoplasm, nearly no myofibroblastic traits, scant hemangiopericytoma-like pattern, and positive muscle immunostains (desmin, actin).

There is increasing evidence that MFB and other associated benign tumours are linked to loss of material in chromosome 13, whereas SFT is not.[5,13] Recently, a new fusion gene, NAB2-STAT6, has been suggested as a specific diagnostic marker for SFT.[14] Interestingly, in our case, the final diagnosis could only be achieved when this particular immunostain was used.

Treatment for SFT is generally limited to surgical excision, with extended margins if possible. As with other soft-tissue neoplasms, chemotherapy seems to play no role. Addition of radiation therapy is controversial, with most reported cases being SFT located in the CNS, advanced tumours, or patients with adverse prognostic factors, such high histologic grade or incomplete margins at removal. It is unclear whether radiation therapy has any effect on disease progression in such cases.

Wushow et al[15] conducted an analysis on 804 SFT cases registered in the SEER database and found that age > 51 years at presentation, distant metastases, and high histologic grade were independent adverse prognostic factors predicting disease-free survival and overall survival. Although SFT cases usually follow a benign course, a close follow-up is recommended since cases of recurrent tumour (as in our case) or distant relapse have indeed been reported.

Conclusion

Solitary fibrous tumour of the breast is exceedingly uncommon. Radiological assessment usually shows benign features. Histology may show overlapping characteristics with other conditions. Use of STAT6 immunostain is helpful to achieve a diagnosis. Standard treatment consists of lesion removal with adequate margins.

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Author Contributions

IB contributed to fostering of the case study, literature review, attending the patient, writing the manuscript, and is guarantor of the paper. CG contributed to the histological diagnosis, literature review, and critical revision of the manuscript. EV, AP, and AG-F contributed to attending the patient, literature review, and critical revision of the manuscript. NG contributed to fostering of the case study, literature review, and writing the manuscript. All authors reviewed the final manuscript.

Informed Consent

Informed consent was obtained from the patient presented.

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