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Case Report

Solitary fibrous tumor of the breast: report of a case with emphasis on diagnostic role of STAT6 immunostaining

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ABSTRACT

We herein report the clinical, radiological, and pathological findings of a rare case of a solitary fibrous tumor (SFT) occurring in the breast parenchyma of a 62-year-old female. The tumor was incidentally detected at a mammographic screening, and, ultrasonographically, presented as a single, well-circumscribed nodule. On needle core biopsy, the diagnosis of SFT was suggested based on a proliferation of CD34-positive spindly cells set in a fibrous stroma containing medium-sized blood vessels with hyalinization of their walls and branching configuration. The diagnosis was confirmed in the excised specimen, which exhibited a tumor with an immunohistochemical profile consistent with SFT, including diffuse expression of CD34, CD99 and bcl2. As STAT6 nuclear immunoexpression is the result of the inv12(q13q13)-derived *NAB2–STAT6* fusion, which characterizes SFT, we analyzed immunohistochemically our case with a commercially available anti-STAT6 antibody. We showed that mammary SFT exhibits a diffuse nuclear STAT6 immunoreactivty, suggesting its potential diagnostic role. The present case emphasizes that the diagnosis of SFT can be confidentially rendered on needle core biopsy. Although SFT is suspected on characteristic morphologic features, immunohistochemistry, revealing immunoreactivity for CD34, bcl-2, CD99 and STAT6, is crucial in the differential diagnosis of potential benign and malignant mimics.

1. Introduction

Solitary fibrous tumor (SFT) is a relatively rare, spindle-cell fibroblastic tumor that usually occurs in the pleura [13], but it can arise virtually anywhere in the body [6,12]. Only rarely arises SFT in visceral or parenchymal organs, including the central nervous system and kidney [3,12,22]. SFT is very uncommon in the breast, with less than 10 cases reported in the English literature so far [4,11,16,19,30,36]. It typically presents as a single, painless, slowly growing nodule with well-circumscribed margins, in female patients with an age ranging from 49 to 81-years [4,11,16,19,30,36]. Most SFT occurring in the breast are "histologically benign" with an indolent clinical course after a follow-up of 3–11 years [11]. Only one case of SFT with malignant histological features has been described in the breast, but clinical course information is lacking [36].

Breast tumors with similar features of SFT have been reported in the literature by using interchangeably the term "myofibroblastoma (MFB)" [9,27]. Based on the evidence that mammary spindle cell mesenchymal tumors may occasionally exhibit overlapping features of both SFT and MFB [9,20,21,27], it was postulated that both tumors belong to the same category of the so-called "benign tumors of the mammary stroma" [20,21]. However, there is increasing evidence that MFB and SFT are two distinct entities. This is mainly supported by the evidence that MFB falls into the spectrum of the benign mesenchymal tumors associated with the loss of material from chromosome 13 [24,28]. In this regard, some studies have shown that the majority of mammary MFB exhibit the loss of the 13q14 region, as shown by the losses of *RB*/13q14 and/or *FOX1*(*FKHR*)/13q14 loci in tumor cells by FISH analyses [24,33]. Notably, similar results have also been obtained in mammary-type soft tissue MFBs [17,18,24], spindle cell lipoma [8], and cellular angiofibroma [14,18], suggesting the possibility of a genetic link among these entities [24–26]. On the contrary, SFT does not show 13q14 deletion by means of FISH analyses for the detection of *RB1*loci [15]. In addition, recent studies show that a new fusion

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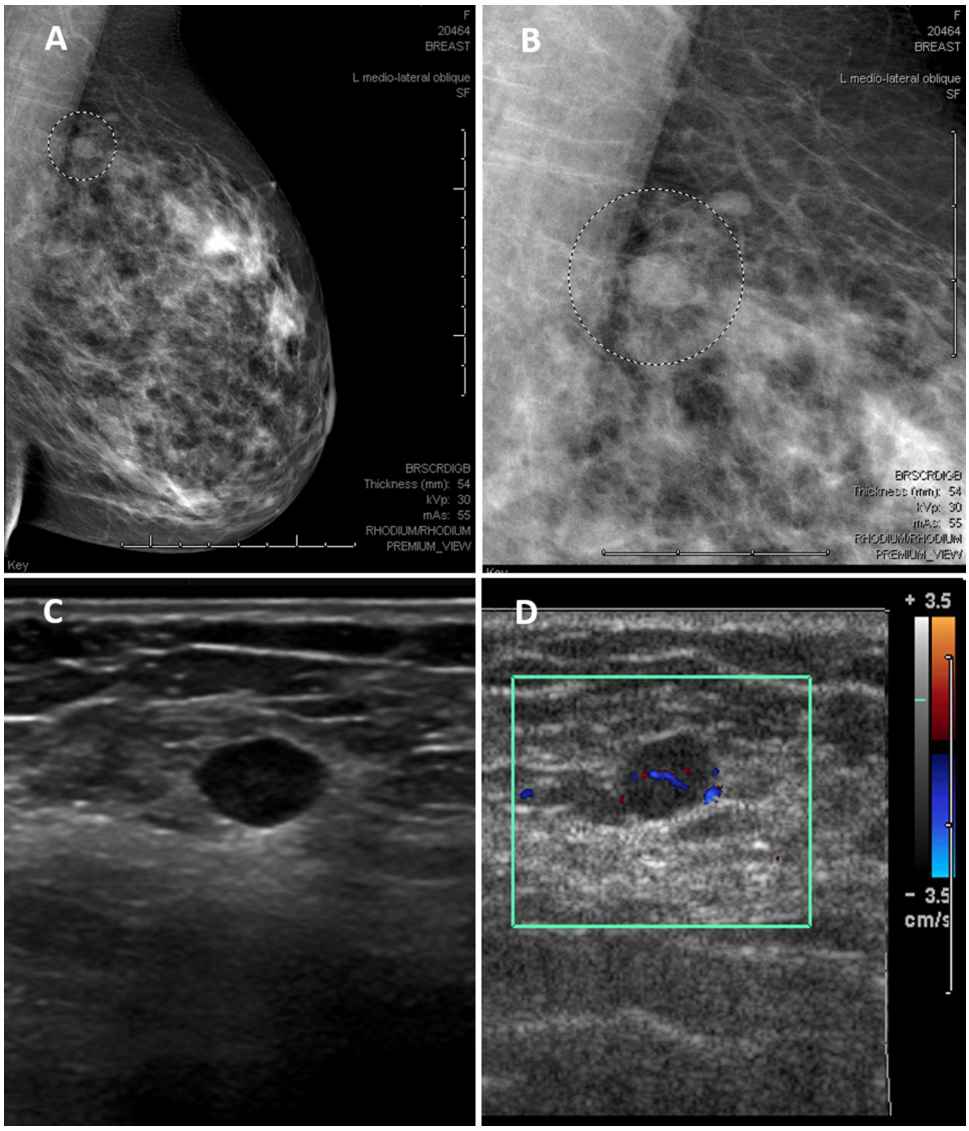

Fig. 1. (A and B) The mammogramm showing a nodular mass with well defined margins. Ultrasound showing a well cirscumscribed hypoechoic mass (C) with internal vascularity (D).

gene, *NAB2–STAT6*, and its variants, may be exploitable as specific diagnostic markers for SFT [7,29]. Immunohistochemical nuclear detection of STAT6 is actually considered as a reliable surrogate for demonstrating the *NAB2–STA6* fusion gene in paraffin-embedded tissues [10,31,37]. The diagnosis of SFT at extra-pleural sites may be challenging, especially when evaluating small biopsies. We herein report the clinico-pathological features of a SFT of the breast parenchyma, which was diagnosed by needle core biopsy. We first show that mammary SFT exhibits diffuse nuclear STAT6 expression, emphasizing its potential diagnostic role.

2. Clinical history

A caucasian 62-year-old female presented for her annual screening mammogram. Her medical history was unremarkable. The mammogram demonstrated heterogeneously dense breast parenchyma. Within the upper outer left breast, there was a new 1 cm mass with obscured margins on spot compression views (Fig. 1A and B). On ultrasound, this corresponded to a circumscribed hypoechoic mass with internal vascularity and enhanced through transmission (Fig. 1C and D). Ultrasound-guided core needle biopsy was performed, and the diagnosis of SFT was suggested. The patient underwent surgical excision of the breast nodule with a rim of normal breast parenchyma. The patient is well with no evidence of local recurrence after a 6-year-follow-up period.

3. Materials and methods

The breast core biopsy and surgical samples were submitted for histological examination in neutral-buffered 10% formalin. They were dehydrated according to the standard techniques, embedded in paraffin, cut to 5-μm, and stained with hematoxylin and eosin. Immunohistochemical studies were performed with the labeled streptavidin–biotin peroxidase detection system using theVentana automated immunostainer (Ventana Medical Systems, Tucson, AZ). The following antibodies were applied: vimentin, CD34, alpha-smooth muscle actin, desmin, wide spectrum cytokeratins (CKMNF116), myogenin, bcl-2 protein, CD99, CD117, epithelial membrane antigen (EMA), HMB45, CD21, CD35, S100 protein, anaplastic lymphoma kinase (ALK1) (all from Dako Cytomation, Glostrup, Denmark). The polyclonal rabbit antibody (s20-S621, Santa Cruz Biotechnologies, Santa Cruz, CA, USA) against the STAT6 C-terminal was used at a dilution of 1:200, and after