Virchows Archiv (1994) 425:89–92

CASE REPORT

S. Damiani · M. Miettinen · J. L. Peterse · V. Eusebi

Solitary fibrous tumour (myofibroblastoma) of the breast

Received: 1 April 1994 / Accepted: 6 June 1994

Abstract Three new cases of the spindle cell tumour of the breast, usually termed myofibroblastoma, are reported. The histology and the immunological profile (expression of vimentin, CD34 antigen and of muscular markers) appear similar to those of solitary fibrous tumours recently described in various sites. It is proposed to include these mammary lesions into the group of solitary fibrous tumours and to regard breast as an additional site of origin.

Key words Solitary fibrous tumour
Myofibroblastoma · Breast

Introduction

Toker et al. [16] described two cases of a mammary stromal tumour constituted by a proliferation of spindle cells which they termed benign spindle cell tumour of the breast. More recently, Wargotz et al. [18] reported a large series of this same entity which they renamed myofibroblastoma on the basis of the ultrastructural findings. Here we report three additional cases of this rare lesion of the breast, with the aim of describing the clinicopathological and imunohistochemical features and of emphasising similarities with the solitary fibrous tumours (SFTs) of soft tissues and serosal cavities.

Materials and methods

The cases were retrieved from the files of the Institute of Anatomic Pathology of the University of Bologna (case 1) and from the files of the Department of Pathology of the Netherlands Cancer Institute, Amsterdam (case 2). Case 3 was obtained from the consultation files of one of us (MM). The clinical findings of each case were examined and routinely stained (haematoxylin and eosin) sections were reviewed.

All cases were evaluated immunohistochemically using the avidin biotin peroxidase complex technique. The following antisera were employed: vimentin (Dakopatts, monoclonal, diluited 1:200), alpha-smooth muscle actin (Dakopatts, monoclonal, diluited 1:100), desmin (Dakopatts, monoclonal, diluited 1:500) and CD34 (Yelem, monoclonal, diluited 1:50).

S. Damiani · V. Eusebi (✉)
Institute of Anatomic Pathology, University of Bologna, Ospedale Bellaria, via Altura 3, I-40139 Bologna, Italy

M. Miettinen
Department of Pathology, Thomas Jefferson Hospital, Philadelphia, USA

J.L. Peterse
Department of Pathology, Netherlands Cancer Institute, Amsterdam, The Netherlands

Results

The clinical findings are summarized in Table 1. All patients were male, aged 63 (case 1), -68 (case 2)- and 45 (case 3)-years-old. They presented with a solitary breast lump which appeared firm and well circumscribed on physical examination. In case 2 a long standing history of bilateral gynaecomastia (of unknown origin) was present.

Histological findings

The three tumours showed a nodular configuration and appeared well delimited from the residual surrounding

Table 1 Solitary fibrous tumours of the breast: clinical findings (*M* male, *L* left breast, *R* right breast, *OQs* outer quadrants)

Case	Age/ sex	Previous history	Clinical features (site)
1	63/M	Unremarkable	Well defined, firm lump of 2 cm across (L)
2	68/M	Long standing history of bilateral gynaecomastia	Well defined lump of 2 cm across clinically "fibroadenoma" (R/OQs)
3	45/M	Unremarkable	Well defind lump of 2,5 cm across

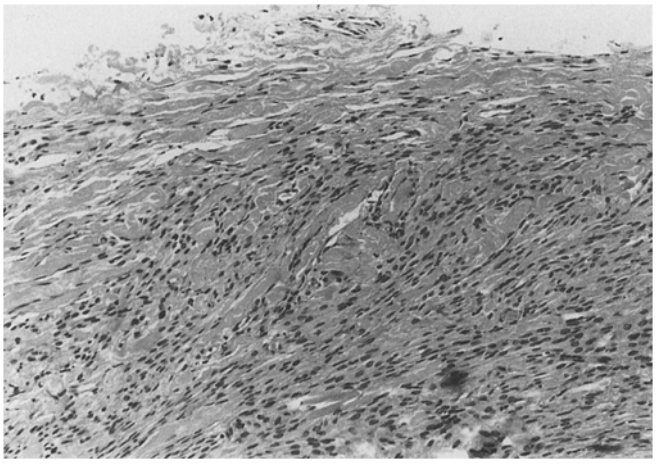

Fig. 1 Areas of closely packed spindle cells show a circumscribed margin, haematoxylin and eosin (H&E) ×100

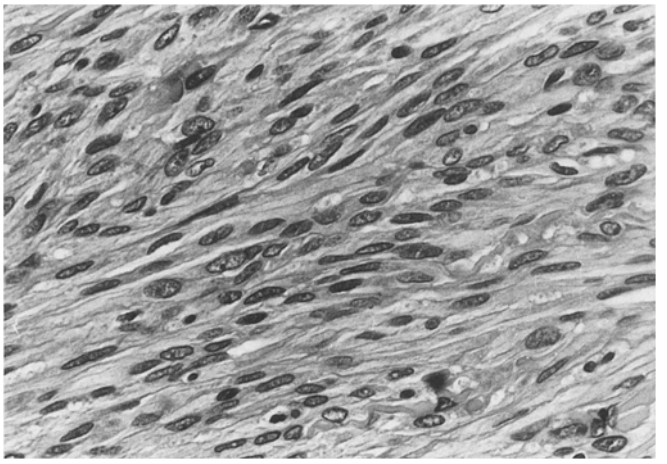

Fig. 4 The nuclei are ovoid to spindle shaped, have finely dispersed chromatin and lack prominent nucleoli, H&E ×400

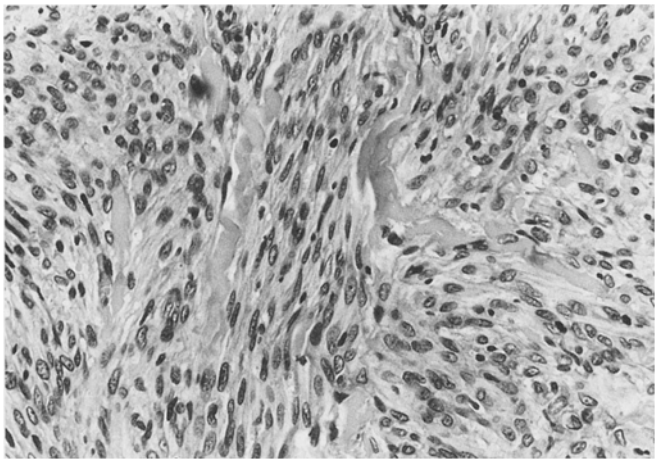

Fig. 2 Broad bands of hyalinized collagen are irregularly scattered among the proliferating elements, H&E ×250

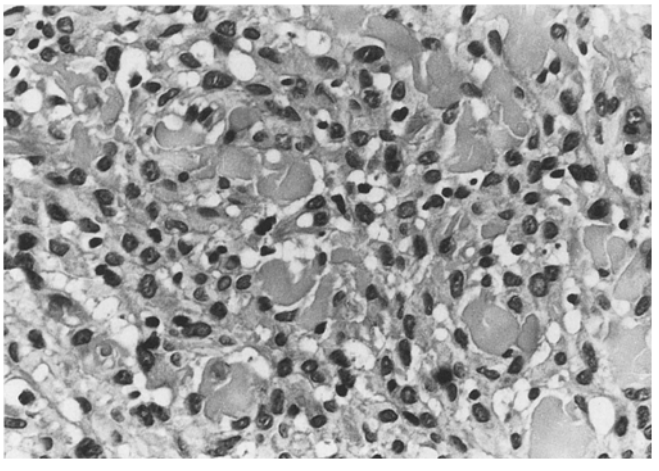

Fig. 3 Broad bands of collagen separate cellular areas, where numerous lymphocytes are seen, H&E ×400

Table 2 Solitary fibrous tumours of the breast: immunohistochemical findings (*nd* not done)

Case	Antisera			
	Vimentin	CD34	Smooth muscle actin	Desmin
1	+	+	−	+
2	nd	−	−	−
3	+	+	+	+

breast tissue. No mammary ducts were entrapped within the lesions (Fig. 1).

At low power, areas of closely packed spindle cells were evident haphazardly intermingled with oedematous and fibrous areas. Broad bands of hyalinized collagen were irregularly scattered among the proliferating elements, being more numerous in the hypocellular patches (Figs. 2, 3). Myxoid areas were also prominent in one case (case 2), while present focally in the remaining two cases. In addition, a mild to moderate perivascular lymphoplasmacellular infiltrate was seen throughout the tumours. The proliferating cells appeared arranged in short fascicles and clusters and, when observed in the closely packed cellular areas, they showed well defined cytoplasmic borders which became indistinct when located in the fibrotic, hyalinized areas. The nuclei were oval to spindle shaped, had a finely dispersed chromatin and lacked prominent nucleoli (Fig. 4). Mitoses were scanty. In one case (case 3), parallely arranged nuclei in a vague palisading-like configuration were also present focally.

Immunohistochemical findings

The immunohistochemical findings are summarized in Table 2. Two of three cases (cases 1 and 3) showed immunoreactivity for vimentin, desmin and CD34 (Fig. 5).

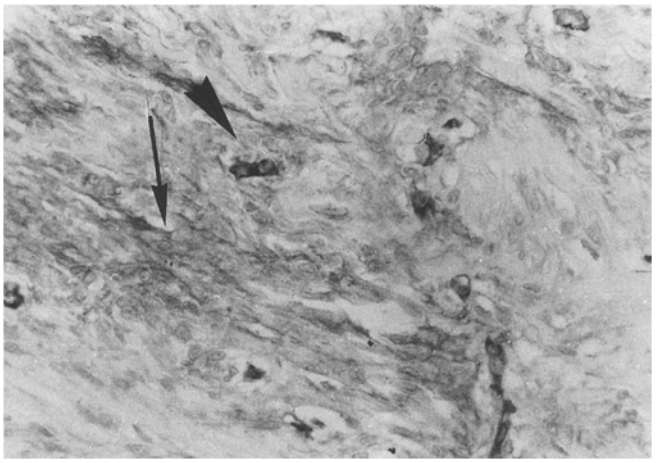

Fig. 5 Case 3: numerous proliferating cells appear immunoreactive with anti-CD34 antiserum (*arrow*). The endothelial cells are also stained (*arrowhead*), avidin biotin peroxidase complex (ABC) ×400

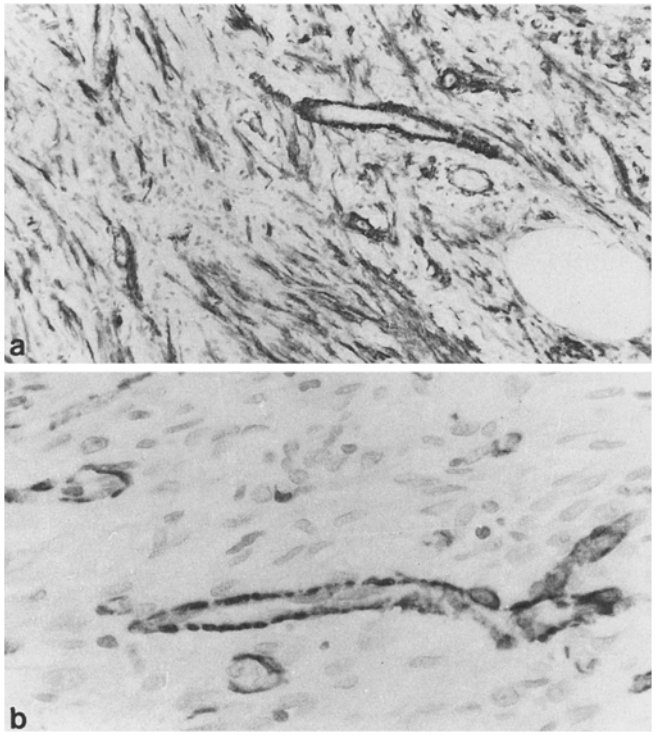

Fig. 6A Case 3: the proliferating cells, together with vascular spaces are immunoreactive with anti-smooth muscle actin antiserum, (ABC) ×175. **B** Case 1: the proliferating cells are negative with anti-smooth muscle actin antiserum. Only vascular spaces are immunostained, (ABC) ×400

Smooth muscle actin stained the proliferating elements in case 3 (Fig. 6a), while gave negative results in case 1 (Fig. 6b). Case 2 showed negative results for all antigens tested. This is probably due to a loss of antigenicity because of erratic fixation or tissue processing.

Discussion

We describe three breast tumours composed of spindle shaped bipolar cells arranged in short bundles and intermingled with bands of hyalinized collagen, showing sometimes myxoid appearance and a moderate perivascular inflammatory infiltrate. Immunohistochemically, two of the three cases expressed vimentin, muscular markers (desmin and/or smooth muscle actin) and CD34 antigen, a membrane glycoprotein observed in stromal precursor elements having the capacity of differentiating as endothelial cells, fibroblasts and smooth muscle cells [14].

All these features appear to be consistent with those of the breast lesions reported by Toker et al. [16] as benign spindle cell tumour and by Wargotz et al. [18] as myofibroblastoma. These tumours have to be distinguished from other benign lesions such as leiomyoma [5] and fibromatosis [17], and from malignant tumours (stromal sarcoma and sarcomatoid carcinomas) [7, 13]. Leiomyoma of the breast usually shows a more prominent muscular differentiation and the proliferating spindle cells are arranged in longer and more regular bundles than those seen in the present cases. Fibromatosis, which is exclusive to the female breast, is characterized by irregular and infiltrative margins and entrapped glandular structures are frequently seen within the stromal proliferation. Finally, stromal sarcomas and sarcomatoid carcinomas of spindle cell type can simulate myofibroblastomas superficially. Nevertheless, the lack of necrosis, cytological atypia and high mitotic activity, usually allows the exclusion of these aggressive malignant tumours.

The histological features of these tumours appear to be identical with those described in the stromal proliferations usually named SFTs and recently reported in various sites [1, 2, 3, 8, 10, 19, 20, 21]. SFTs frequently occur related to serosal surfaces, and were initially thought to be of mesothelial origin [11]. Subsequently, their mesenchymal nature has been demonstrated [4]. They are composed of a proliferation of spindle cells arranged haphazardly in a variable configuration showing hypercellular, fascicular areas alternating with fibrous, hyalinized and sometimes myxoid areas [20]. Immunohistochemically, markers of muscular differentiation (actin and/or desmin) are variously expressed in SFTs [8, 20] and, recently, CD34 antigen has been found in these tumours [19]. It was found in two of the present cases. Morphological similarities between SFTs and myofibroblastoma of the breast have been recently pointed out by Witkin and Rosai [20] and by Lee et al. [12] and the presence of fibroblastic and myofibroblastic components has been suggested [20].

In the mammary spindle cell tumours, origin from myofibroblasts was suggested on the basis of ultrastructural features [18]. Suggestion of a myofibroblastic origin has been reported in most if not all types of soft tissue lesions [6, 9, 15]. However, the myofibroblast is not a fully delineated cell type: ultrastructurally these cells

may show "intermediate" features of both fibroblasts and smooth muscle cells and, immunohistochemically, they can show at least four different cytoskeletal phenotypes, reflecting different functional stages or an origin from different precursors [15]. Ultrastructural or immunohistochemical markers which are absolutely indicative of myofibroblastic cell have not yet been found.

In conclusion, it is apparent that the present cases of spindle cell tumour (myofibroblastoma) of the breast share common morphological and immunohistochemical features with the SFTs in the serosal cavities and in other sites such as upper respiratory tract [21] and orbit [19]. It seems more logical to use the non-committal and unyfing term of solitary fibrous tumours for the breast as for other tissues.

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