Primary inflammatory myofibroblastic tumor of the breast with rapid recurrence and metastasis: A case report

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Abstract. Primary inflammatory myofibroblastic tumor (IMT) of the breast is extremely rare; only 19 cases have been reported in the English literature. In the present study, we present a case of IMT in a 56-year-old female patient who was admitted to our hospital due to a mass found in her right breast. Mammogram and ultrasound revealed a well-circumscribed mass and surgery was performed. Histopathologically, the lesion was composed of spindle and inflammatory cells, including plasma cells and lymphocytes. Mitotic figures were not observed. Immunohistochemically, the tumor cells were positive for SM-actin, anaplastic lymphoma kinase (ALK) and vimentin and focal positive for desmin, but negative for NSE, S-100, CD117, CD34, NF, CD21, CD35 and CD68. Thus, we made a diagnosis of IMT and advised regular follow-up. However, the patient had local recurrence and metastasis to the left groin area 3, 7 and 10 months after the initial surgery. Notably, the histopathological characteristics of the recurrent and metastatic foci were similar to those of the initial specimen, but mitotic figures were clearly observed. Thus, we conclude that IMT shows occasionally malignant biological behavior although it is a neoplasm of intermediate biological potential that frequently recurs and rarely metastasizes. We advise that clinical physicians should regularly follow up patients after focal resection for IMT.

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Introduction

Inflammatory myofibroblastic tumors (IMTs) are composed of myofibroblastic cells accompanied by an inflammatory infiltrate of plasma cells, lymphocytes and eosinophils. IMT used to be considered as an inflammatory pseudotumor, xanthogranuloma, plasma-cell granuloma, plasma-cell pseudotumor or an inflammatory myofibroblastic tumor. IMT commonly occurs in the lung, mesentery, omentum and retroperitoneum, but it may also be observed in the extremities, head and neck region, liver, spleen, thyroid, gastrointestinal tract, genitourinary tract and other systems (1-11). The tumors usually follow a benign course, but recurrences have been documented in up to 25% of cases. Recurrence rates are related to body site, multifocality and completeness of resection (12-17). Rare malignant transformation has been reported (18,19). It is rare for IMT to occur in the breast, and only 19 cases have been reported in the English literature (20-27). Moreover, recurrence or metastasis of IMT is exceedingly rare. Thus, we present a 56-year-old female patient with IMT of the breast which recurred and metastasized 3, 7 and 10 months after initial surgery. Our aim is to emphasize that IMT shows occasionally malignant biological behavior although it is a neoplasm of intermediate biological potential that frequently recurs and rarely metastasizes. Thus, clinical physicians should regularly follow up patients after focal resection for IMT.

Case report

A 56-year-old female was admitted to our hospital 5 days after finding a mass in the upper inner quadrant of her right breast. The patient had no adenopathy. Mammogram and ultrasound revealed a 4-cm mass at the 1 o'clock position that was highly suspicious for malignancy. The rapid frozen section during surgery revealed that the mass was a tumor with potential malignancy. Thus, a resection of the mass without lymph nodules was performed after informing the family of the patient. Grossly, the specimen was a gray-yellow segment of fibroadipose tissue, measuring 6.8x5.2x3.5 cm; it contained a well-circumscribed gray-white mass measuring 4x4x3 cm. The cut surface was gray-white and the texture was soft. Microscopically, the tumor was mainly composed

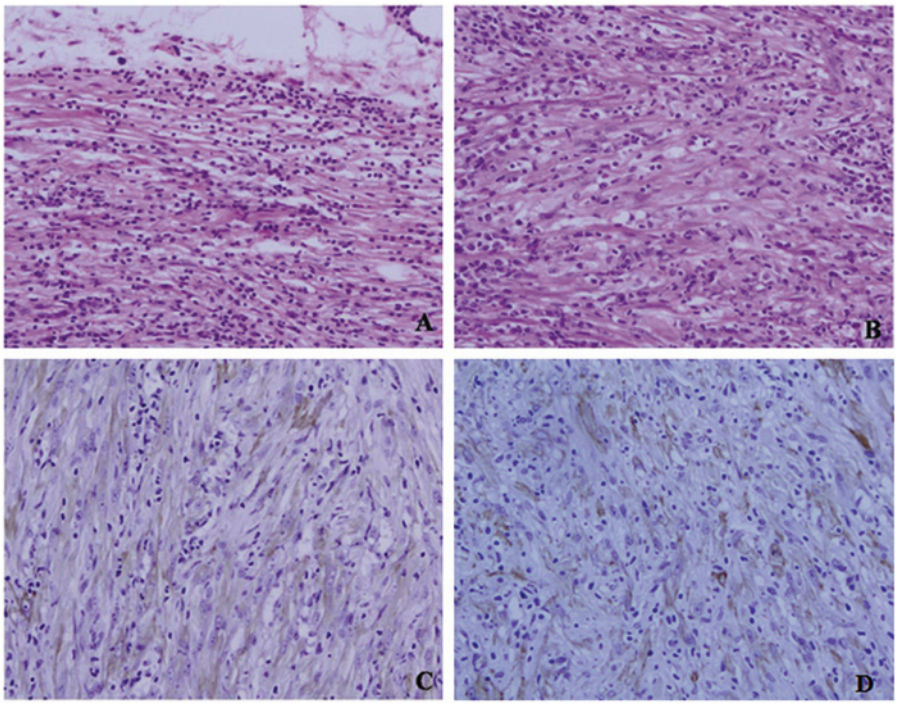

Figure 1. Tumor was mainly composed of spindle cells, forming swirling storiform-like patterns, and inflammatory cells, including plasma cells and lymphocytes. (A and B) The spindle cells were cytologically bland and most had wispy pink cytoplasm. No mitotic figures were found. (C and D) Immunohistochemically, the tumor cells were positive for ALK and SM-actin. ALK, anaplastic lymphoma kinase.

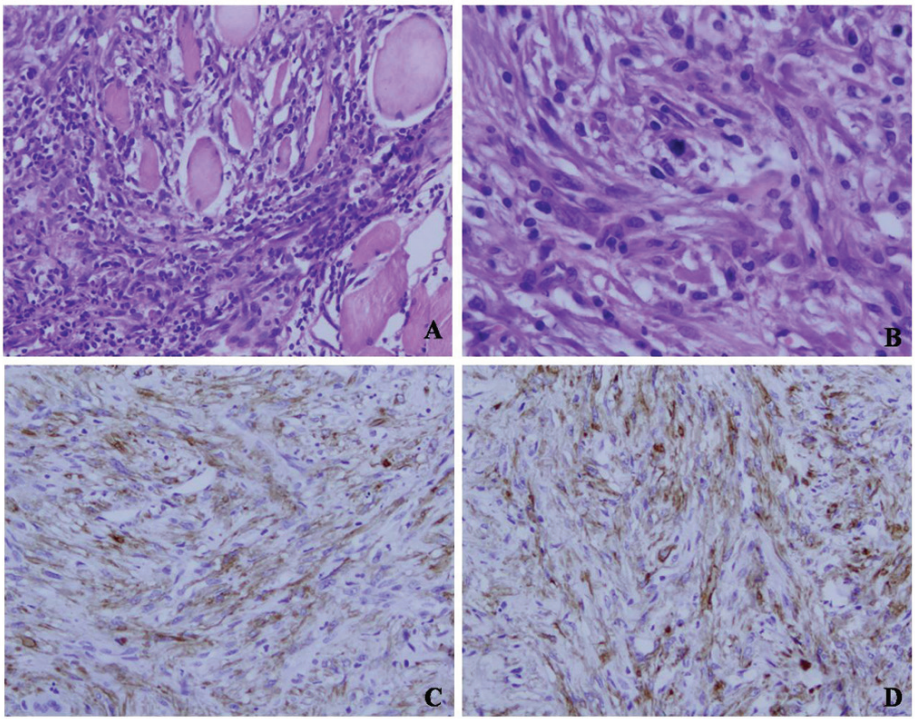

Figure 2. (A and B) The histopathological examination showed that the tumor cells had invaded into the surrounding striated muscle, and mitotic figures were found. (C and D) Immohistochemically, the tumor cells also expressed SM-actin and ALK. ALK, anaplastic lymphoma kinase.

of spindle cells, forming swirling storiform-like patterns, and inflammatory cells, including plasma cells and lymphocytes. The spindle cells were cytologically bland and most had wispy pink cytoplasm. No mitotic figures were found (Fig. 1A and B). Immunohistochemically, the tumor cells were diffusely positive for SM-actin, anaplastic lymphoma kinase (ALK) and vimentin (Fig. 1C and D) and negative for CK, CD117, CD34, CD21, CD35, NSE, S-100 and NF. The

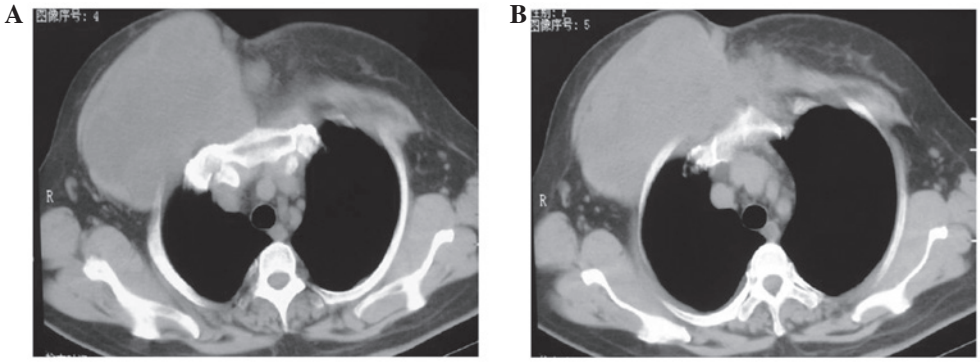

Figure 3. (A) Seven months after initial surgery, two new masses measuring 10x8x7 and 4x3x3 cm were found at the same site and the chest wall, respectively. (B) CT revealed that the tumor involved the ribs and vessels.

margins of the resection were negative for tumor cells. Thus, we made a diagnosis of IMT and advised regular follow-up. However, three months later, a new mass measuring 3x3x3 cm was observed at the same site. Ultrasound revealed a mixed mass, and the site was considered to be a recurrent focus. A second excision was performed. The histopathological examination revealed that the tumor cells had invaded into the surrounding striated muscle. Moreover, mitotic figures were found (Fig. 2A and B). Immohistochemically, the tumor cells also expressed SM-actin and ALK (Fig. 2A and B). Thus, the diagnosis of malignant IMT was confirmed. Regular follow-up was again advised. Seven months after the initial surgery, two new masses measuring 10x8x7 and 4x3x3 cm were found at the same site and the chest wall, respectively (Fig. 3A). CT scan revealed that the tumor involved the ribs and vessels (Fig. 3B). It was impossible to excise the mass. Thus, the patient received radiotherapy. However, the patient found a mass measuring 1.5x1.0x1.0 cm in her left groin area 10 months after the initial surgery. Needle biopsy revealed a tumor with spindle cells similar to the original tumor in the right breast. In addition, the tumor cells were positive for ALK, SM-actin and vimentin, but negative for desmin, CD117, CD34, NSE, S-100, CK, ALK, EMA, CD21 and CD35. Thus, we concluded that the site was a metastatic focus of IMT.

The study protocol was approved by the Medical Ethics Committee of the Fourth Military Medical University in Xi'an, China. Written informed consent was obtained from the patient.

Discussion

IMT was first described in the lungs in 1939 (28). It is an uncommon mesenchymal tumor, and it has been gradually recognized by pathologists and clinical physicians. IMT is composed of a spectrum of fibroblastic or myofibrotic proliferations with a varying infiltrate of inflammatory cells, including lymphocytes, plasma cells and histiocytes. Most IMTs occur in the lungs and airways of young patients. However, other organs, including mesentery, omentum, stomach, small intestine, large intestine, mediastinum, retroperitoneum, liver and bladder, have been documented (1-11). Among these extrapulmonary IMTs, 43% arise in the mesentery and omentum (29). Cases of IMT of the breast are scarce. To our knowledge, only 19 cases have been described in the English literature (20-27). Moreover, all the IMTs were unilateral and surgically excised. However, three showed recurrence following surgery, with two of the three patients having bilateral recurrence (30). With regard to our case, the tumor showed local recurrence 3 and 7 months after surgery. Notably, a metastatic focus was confirmed 10 months after the initialsurgical resection. IMT presents with recurrence, metastasis or malignant transformation in certain cases, although most tumors behave in a benign manner after surgical resection, and IMT is classified as an intermediate neoplasm in the World Health Organization histological typing. Patients diagnosed with IMT should be regularly followed up even if surgical resection is performed.

The pathogenesis of IMT is unknown. Some consider IMT to be an immunological response to an infectious or non-infectious insult (31,32). Other researchers found that there was ectopic chromosomal rearrangements in the long arm of chromosome 2 and the short arm of chromosome 9, and confirmed that IMT was a monoclonal proliferation by genetic and molecular techniques (33-36). In addition, approximately half of IMTs harbor a clonal cytogenetic aberration that activates the ALK-receptor tyrosine kinase gene at 2p23 (15,37). Thus, IMT should be considered as a true neoplasm, rather than inflammatory pseudotumor as at present. These aggressive features, such as local recurrence, metastasis and malignant transformation, suggested a neoplastic process. In our case, the tumor cells were positive for ALK besides SM-actin and vimentin and supported the diagnosis of IMT.

Similar to most soft-tissue sarcomas, IMTs are traditionally insensitive to chemotherapy and radiotherapy. In addition, nonsteroidal anti-inflammatory drugs (NSAIDs), steroids and cyclosporin-A have been used as treatment modalities, but surgical resection is considered to be the treatment of choice.

In conclusion, IMT shows occasionally malignant biological behavior although it is a neoplasm of intermediate biological potential that frequently recurs and rarely metastasizes. Thus, clinical physicians should regularly follow up patients after focal resection for IMT.

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