Two Cases of Malignant Solitary Fibrous Tumor of the Breast (Postprint)

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Abstract

This study analyzes and summarizes the clinical and pathological features of two cases of malignant solitary fibrous tumor (SFT) of the breast diagnosed and treated at the Department of Breast Surgery, Peking Union Medical College Hospital. Both patients presented primarily with a large breast mass and underwent local extended excision of the breast mass without addressing ipsilateral axillary lymphatic tissue. Postoperative pathology demonstrated CD34 (+), S-100 (-), consistent with the immunohistochemical profile of SFT. The tumors were diagnosed as malignant SFT due to tumor cell pleomorphism and high mitotic activity. Neither patient received postoperative adjuvant therapy. One patient developed local recurrence at 6 months postoperatively; to date, neither has exhibited distant metastasis. Primary malignant SFT of the breast requires pathological confirmation for diagnosis. Local extended excision of the breast mass or simple mastectomy of the affected breast constitutes the main treatment modality. Currently, there is no definitive evidence that axillary lymph node dissection and adjuvant radiotherapy or chemotherapy can prolong patient survival.

Full Text

Preamble

Malignant Breast Solitary Fibrous Tumor: Report of Two Cases and Literature Review

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Abstract

We retrospectively analyzed the clinicopathological characteristics of two cases of malignant breast solitary fibrous tumor (SFT) treated at the Department of Breast Surgery, Peking Union Medical College Hospital, with a review of relevant literature. Both patients presented with giant breast masses and underwent wide local excision without axillary lymph node dissection. Pathological examination revealed typical SFT histological features with CD34 positivity and S-100 negativity. The presence of hypercellularity and nuclear atypia supported the diagnosis of malignant SFT. Neither patient received adjuvant systemic therapy. One patient developed local recurrence six months postoperatively. To date, neither patient has shown evidence of distant metastasis. Tumor biopsy is crucial for diagnosing malignant breast SFT. Wide local excision or simple mastectomy remains the mainstay of surgical treatment. Currently, there is no solid evidence that axillary lymph node dissection or adjuvant chemoradiotherapy improves patient survival.

Keywords: breast neoplasms; solitary fibrous tumor; malignant solitary fibrous tumor

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1. Clinical Data

1.1 Case 1

A patient with a history of right breast myofibroblastoma surgery at an outside hospital was admitted to Peking Union Medical College Hospital in 2016. Postoperative pathology from the initial surgery revealed a spindle cell tumor with numerous mitotic figures. Immunohistochemical analysis demonstrated CD34 positivity and S-100 negativity, leading to a pathological diagnosis of malignant solitary fibrous tumor of the right breast with a high mitotic count (20/10 HPF). The patient did not receive adjuvant therapy following the initial surgery. Six months postoperatively, the patient developed local recurrence, though no distant metastasis has been detected to date.

1.2 Case 2

A patient who had previously undergone right breast mass excision with a pathological diagnosis of myofibroblastoma at an outside hospital presented for regular follow-up. In 2016, the patient noticed a new mass beneath the previous surgical scar and sought care at our institution. Physical examination revealed a 5 cm mass without nipple discharge, breast pain, or other symptoms. Breast ultrasound demonstrated a large hypoechoic mass measuring approximately 10 cm with ill-defined margins. Color Doppler imaging showed several blood flow

signals peripherally and internally. Mammography identified a large, slightly low-density mass in the right breast, while bilateral axillary ultrasound revealed no significant lymphadenopathy. Based on the clinical history and imaging findings, a preliminary diagnosis of mesenchymal cell-derived tumor was considered.

The patient underwent wide local excision of the right breast mass in January 2016. The surgical procedure was uneventful, with intraoperative removal of tumor tissue and surrounding normal tissue; axillary lymph nodes were not dissected. The excised specimen measured 9.3 cm × 7.2 cm × 3.5 cm. Pathological examination revealed a malignant solitary fibrous tumor. Immunohistochemical results showed: AE1/AE3 (-), Bcl-2 (-), CD117 (-), CD34 (+), Caldesmon (-), Calponin (+), Desmin (-), ER (-), Ki-67 index 10%, MyoD1 (-), PR (-), S-100 (-), Vimentin (+), and beta-catenin (+). The patient did not receive adjuvant chemotherapy or radiotherapy postoperatively.

The patient subsequently developed a right chest wall mass that gradually increased in size, associated with skin redness and swelling. This represented a local recurrence of the mesenchymal tumor. The patient underwent repeat excision of the chest wall mass, including partial pectoralis muscle and rib tissue, at an outside hospital. To date, there is no evidence of distant metastasis.

[Figure 1: see original paper] Gross specimen and histological section (HE staining) of malignant breast solitary fibrous tumor

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2. Discussion

Solitary fibrous tumor is a rare spindle cell neoplasm that most commonly arises in the thoracic cavity, though cases involving the breast and other soft tissues have been reported. The incidence of SFT among all soft tissue tumors is less than 2%. The median age at presentation is approximately 50 years. Most patients present with a painless mass, and the clinical presentation may resemble that of fibroadenoma or breast cancer. Recent rapid enlargement of the mass suggests malignant transformation.

Imaging studies often lack specific features for SFT, making it difficult to distinguish from other breast lesions such as phyllodes tumor. Fine-needle aspiration biopsy typically provides only cytological evidence and cannot establish a definitive diagnosis due to limited tissue sampling. Core needle biopsy is recommended to obtain adequate tissue for pathological examination and immunohistochemical analysis.

Pathologically, SFT typically shows a patternless architecture of spindle cells with collagenous stroma. Immunohistochemistry is essential for diagnosis and differentiation from other mesenchymal tumors such as myofibroblastoma. Characteristic immunophenotypic features include positivity for CD34, Bcl-2, and CD99, while markers such as S-100, Actin, and cytokeratin are typically negative. The diagnosis of malignant SFT requires at least one of the following

criteria: (1) tumor size greater than 10 cm; (2) high cellularity with crowding; (3) high mitotic activity (>4 mitoses/10 HPF); (4) presence of hemorrhage or necrosis; (5) nuclear pleomorphism; or (6) infiltration beyond the pseudocapsule or vascular invasion. Both patients in our series met the criteria for malignancy, exhibiting high mitotic counts (20/10 HPF) and cellular pleomorphism.

Complete surgical resection remains the cornerstone of treatment for SFT. For breast lesions, either wide local excision or total mastectomy may be performed. Given that malignant mesenchymal tumors primarily metastasize through hematogenous routes rather than lymphatic spread, axillary lymph node dissection is generally not indicated. Multiple studies have reported that regional lymph node dissection was not performed in patients with non-thoracic SFT, and there is currently no evidence that axillary lymph node dissection or adjuvant chemoradiotherapy improves survival outcomes. For patients with incomplete resection or unresectable disease, adjuvant radiotherapy or chemotherapy may be considered, though evidence for their benefit remains limited.

Approximately 50% of patients with malignant SFT can be cured by complete surgical excision. However, histological grade, positive surgical margins, and non-thoracic primary site are important risk factors for recurrence. Some patients may develop recurrence within months of initial treatment, and cases with dedifferentiated components may progress to widespread metastasis. Both of our patients experienced local recurrence, consistent with the aggressive biological behavior of malignant SFT. Long-term regular follow-up is essential for early detection of recurrence.

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Note: Figure translations are in progress. See original paper for figures.