*JMS2026; Vol9 (2): 159-166*
*UDK: 616.19-006.48-076*
*https://doi.org/10.55302/JMS2692159d*

# SCHWANNOMA OF THE BREAST MIMICKING A FIBROEPITHELIAL TUMOR: A CASE REPORT

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**Abstract**

Schwannomas are benign peripheral nerve sheath tumors that most often occur as solitary lesions in the extremities and head and neck region. Involvement of the breast is rare and can mimic more common breast neoplasms on imaging.

We report a 55-year-old woman with a one-year history of painful, palpable right breast lump. Ultrasound demonstrated a well-circumscribed, round, solid, hypoechoic nodule with diameter of 2 cm and regular margins, raising suspicion for a fibroepithelial tumor. The patient underwent tumorectomy without preoperative needle biopsy.

On gross inspection, the lesion was encapsulated and tan-white. Histologic examination revealed a benign spindle cell neoplasm with alternating hypercellular Antoni A and hypocellular Antoni B areas. Tumor cells showed strong, diffuse positive immunohistochemical signal for S-100 and Vimentin, supporting the diagnosis of schwannoma.

This case highlights breast schwannoma as an important, though uncommon, consideration in the differential diagnosis of well-defined breast masses. Because breast schwannomas show no specific mammographic or ultrasonographic features, definitive diagnosis relies on histopathologic evaluation and immunohistochemistry. Awareness of this entity may help prevent misclassification of lesions such as fibroadenoma, phyllodes tumor, or breast carcinoma.

***Keywords:*** breast, schwannoma, peripheral nerve sheath tumor, S-100, spindle cell neoplasm

## Introduction

Schwannoma (neurilemmoma) is a benign, encapsulated peripheral nerve sheath tumor composed of Schwann cells and typically presents as a solitary, slow-growing mass. It most commonly arises in the head and neck region or along peripheral nerves of the extremities [1].

Histologically, schwannoma is characterized by alternating Antoni A and Antoni B areas, and the tumor cells show strong, diffuse immunoreactivity for S-100 protein which is helpful for confirmation [2].

In the breast, schwannoma is uncommon and therefore can represent a diagnostic pitfall clinically and radiologically, because clinical and imaging findings are nonspecific and can mimic more common breast lesions, including fibroadenoma, phyllodes tumor, and, less commonly, carcinoma [3].

Reported figures in the literature emphasize its rarity, with breast schwannomas representing approximately 2–3% of all schwannomas and about 0.2% of benign breast tumors [4,5].

Primary schwannoma of the breast may pose a diagnostic challenge because clinical and imaging findings are nonspecific and often suggest more common benign breast lesions. For this reason, the diagnosis is usually established only after excision and histopathologic evaluation [3,6].

We report a case of breast schwannoma in a 55-year-old woman to emphasize this uncommon location and the key morphologic and immunohistochemical features required for accurate diagnosis.

**Case presentation**

A 55-year-old woman presented with a one-year history of a slowly growing, painful palpable mass in the right breast. The patient reported intermittent localized pain but no nipple discharge, skin changes, or history of trauma. Her personal and family history were unremarkable for breast carcinoma or other malignancies.

Breast ultrasound examination demonstrated a well-circumscribed, round, 2 cm solid hypoechoic nodule with regular margins. Based on the radiologic findings, the lesion was interpreted as most consistent with a benign fibroepithelial tumor, and no enlarged axillary lymph nodes were identified. The patient underwent tumorectomy without prior core needle biopsy.

On gross examination, the excised specimen contained a well-demarcated, encapsulated, firm mass measuring 2 cm in greatest diameter. The cut surface was tan-white, homogeneous, and whorled, without areas of necrosis or hemorrhage.

Histologic examination revealed a benign spindle cell neoplasm composed of alternating hypercellular and hypocellular areas. The hypercellular areas corresponded to Antoni A regions, characterized by spindle cells arranged in fascicles with nuclear palisading and formation of Verocay bodies. The hypocellular Antoni B areas showed loosely arranged spindle cells in a myxoid stroma. No significant cytologic atypia, mitotic activity, or necrosis was identified.

Immunohistochemical (IHC) analysis demonstrated strong and diffuse positivity for S-100 protein and Vimentin in the tumor cells, confirming neural differentiation and supporting the diagnosis of schwannoma. The morphologic and immunohistochemical findings were consistent with a benign schwannoma of the breast.

**Results and Discussion**

Schwannoma is a benign peripheral nerve sheath tumor that arises from Schwann cells and most commonly occurs in the head, neck, and extremities [4]. Involvement of the breast is extremely rare, accounting for a very small fraction of all breast tumors [1,3].

Because of its rarity and nonspecific clinical and radiologic features, breast schwannoma is rarely suspected preoperatively and is most often diagnosed only after histopathological examination [4].

Clinically, patients usually present with a slow-growing, well-circumscribed, palpable mass, which may be painless or, in some cases, associated with pain or tenderness due to its neural origin [5]. Radiologically, schwannomas typically appear as well-defined, hypoechoic solid masses on ultrasound, often mimicking more common benign breast lesions such as fibroadenoma or other fibroepithelial tumors [2,5].

Due to the benign radiologic appearance, these lesions are frequently excised without prior core needle biopsy [5].

Histologically, schwannoma is characterized by the presence of alternating Antoni A and Antoni B areas. Antoni A areas are hypercellular and composed of spindle cells with nuclear palisading and Verocay body formation, while Antoni B areas are hypocellular with a loose, myxoid stroma [4]. Immunohistochemically, tumor cells show strong and diffuse positivity for S-100 protein, reflecting their neural crest origin, and are also positive for Vimentin. These findings are essential for confirming the diagnosis [4,6,9].

Histopathological and immunohistochemical findings are shown in Figures 1–4.

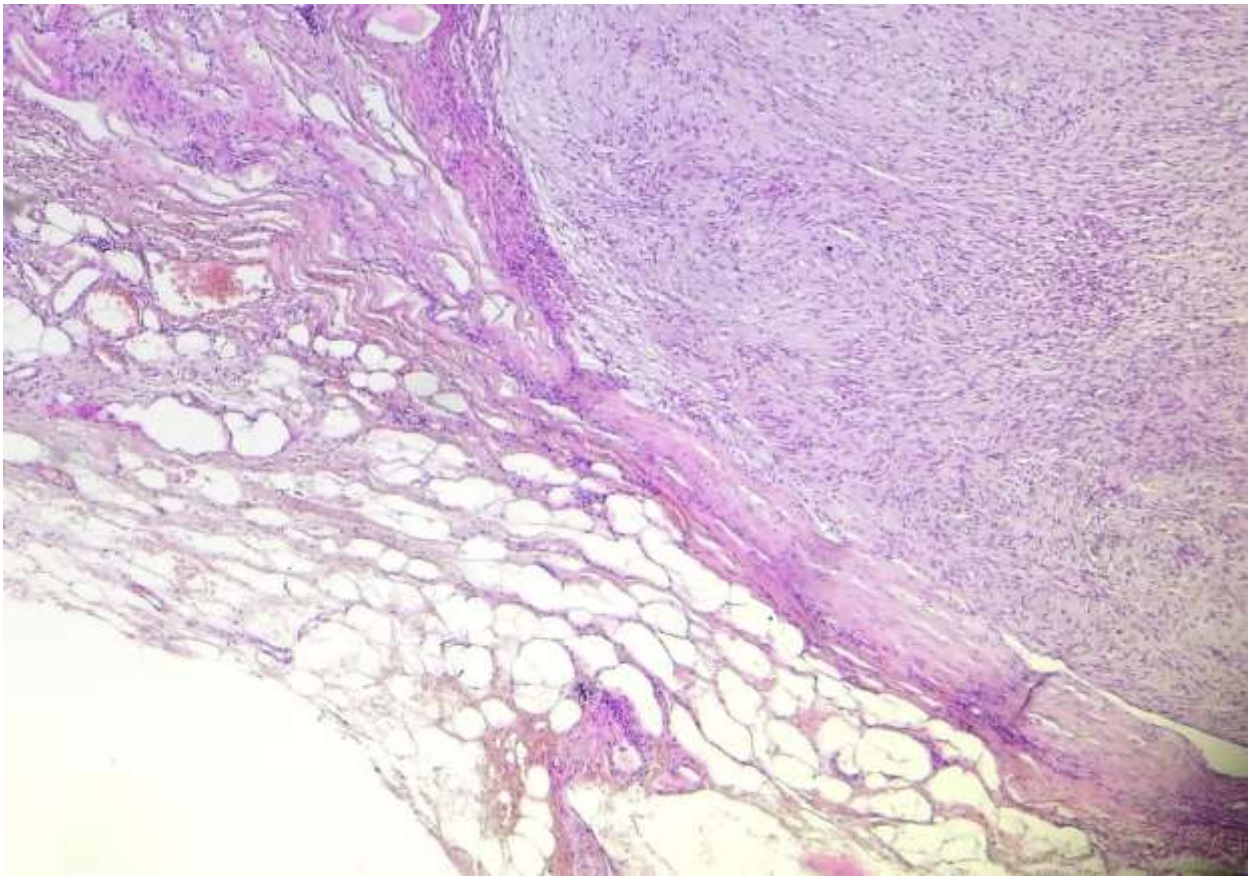

**Figure 1.** Well-demarcated encapsulated spindle cell tumor adjacent to breast parenchyma and adipose tissue (Hematoxylin and eosin stain, ×4 magnification).

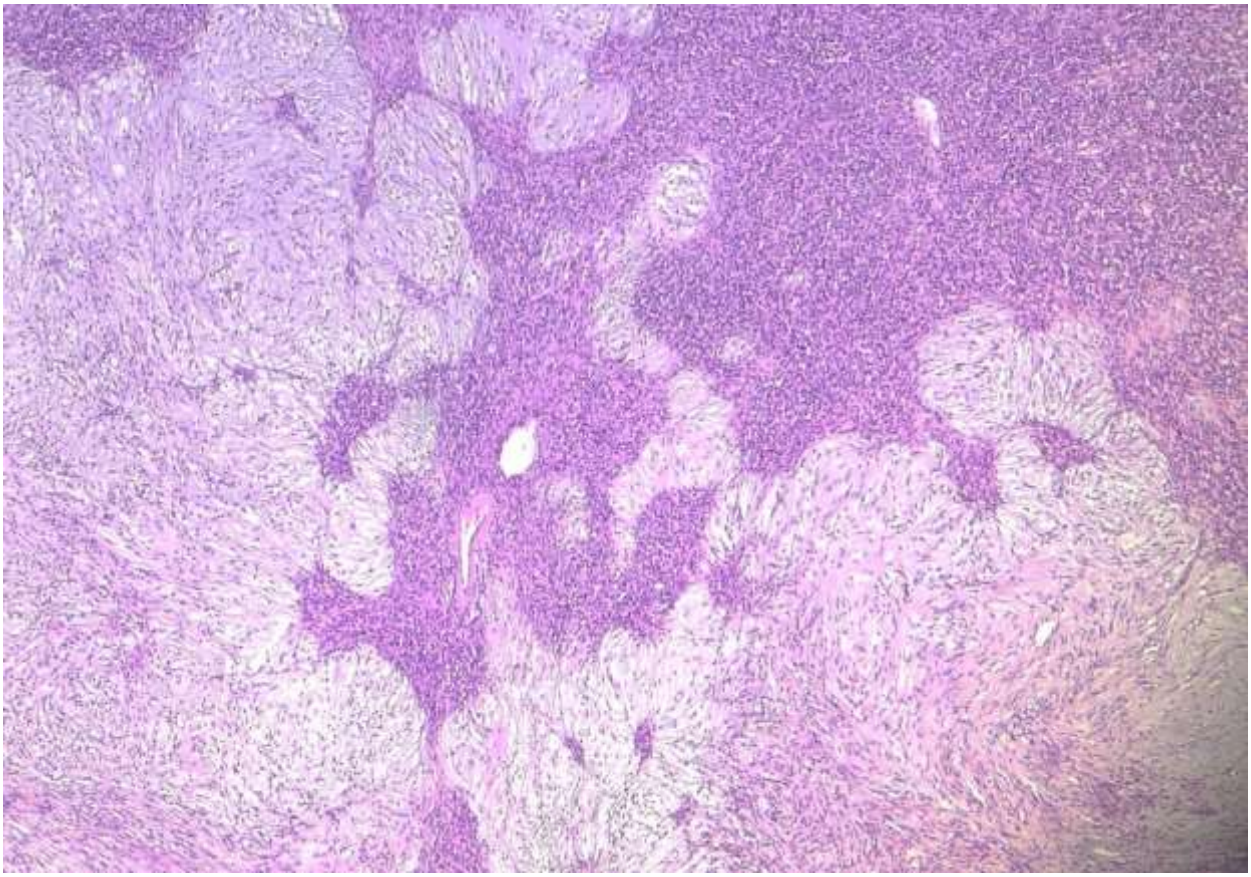

**Figure 2.** Spindle cell tumor with alternating hypercellular (Antoni A) and hypocellular (Antoni B) areas (Hematoxylin and eosin stain, ×4 magnification).

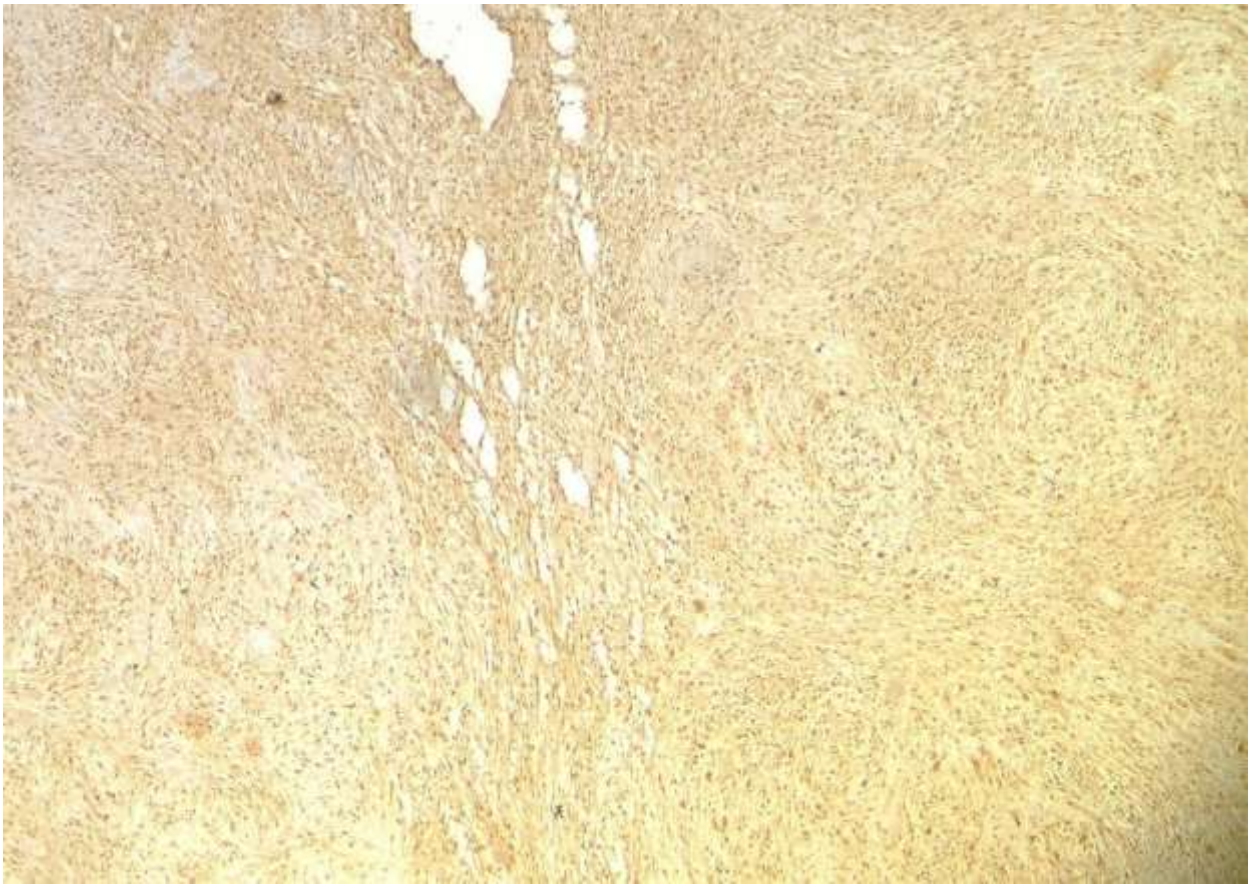

**Figure 3.** Tumor cells showing strong diffuse nuclear and cytoplasmic positivity for S-100 protein (immunohistochemistry, ×20).

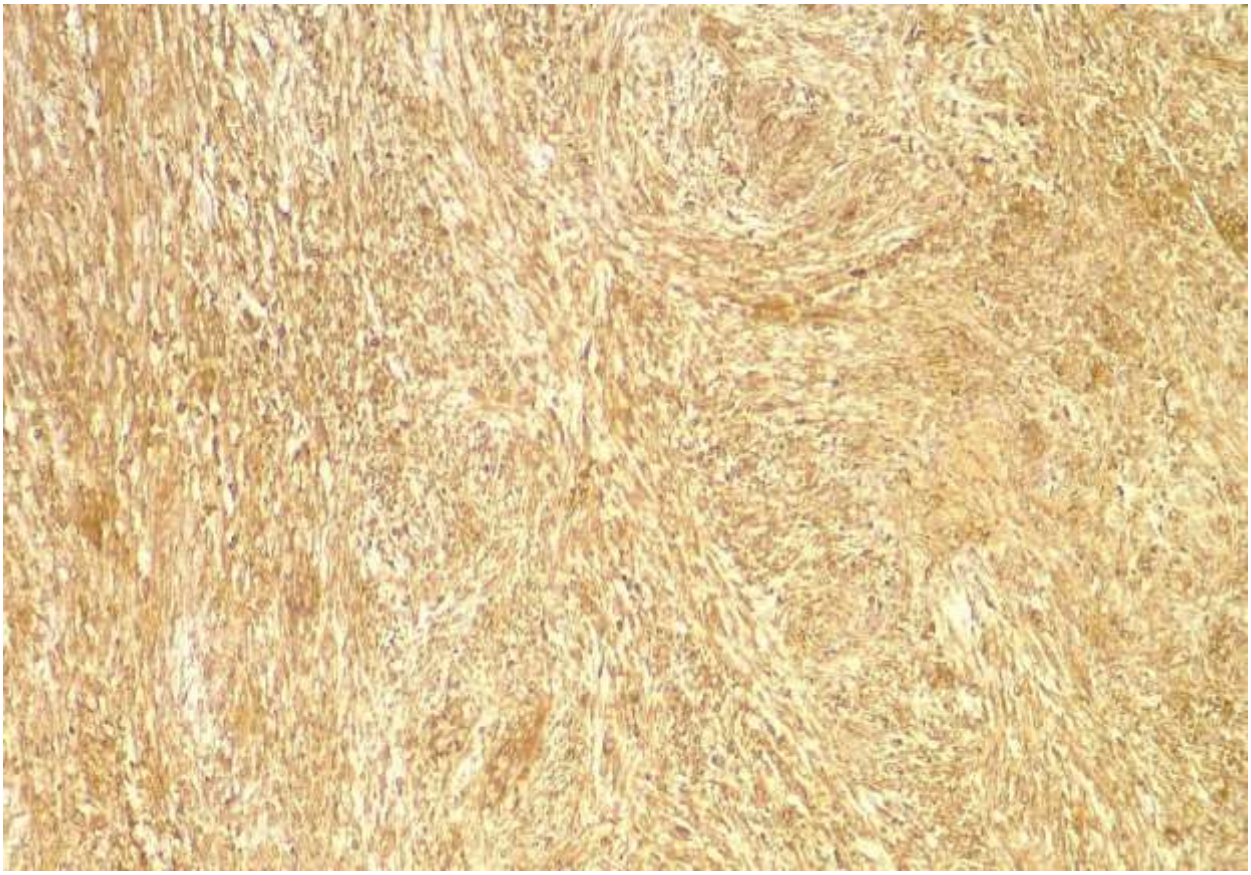

**Figure 4.** Tumor cells showing diffuse cytoplasmic positivity for Vimentin (immunohistochemistry, ×20).

The main differential diagnosis includes other spindle cell lesions of the breast, both benign and malignant. The most important entities in the differential diagnosis include fibroadenoma with prominent stromal component, phyllodes tumor, myofibroblastoma, neurofibroma, spindle cell lipoma, fibromatosis, and spindle cell metaplastic carcinoma [7,8,10,11].

Fibroadenoma and phyllodes tumor typically show a biphasic pattern with epithelial and stromal components, which is absent in schwannoma [7].

Myofibroblastoma usually shows desmin and CD34 positivity and is typically S-100 negative (8). Neurofibroma may also be S-100 positive but lacks the characteristic Antoni A and Antoni B architecture and Verocay bodies seen in schwannoma [4].

Fibromatosis is characterized by infiltrative growth and nuclear beta-catenin positivity [8]. Spindle cell metaplastic carcinoma represents an important malignant differential diagnosis and can be excluded by cytokeratin positivity and S-100 negativity in most cases [7,8].

Therefore, the combination of typical histologic features and strong diffuse S-100 positivity is crucial for establishing the correct diagnosis [4].

The differential diagnosis of spindle cell lesions of the breast and their main histologic and immunohistochemical features are summarized in Table 1.

**Table 1.** Differential diagnosis and immunohistochemical profile of spindle cell lesions of the breast .

| Lesion | Histologic features | S-100 | Cytokeratin | CD34 | Desmin | βcatenin | Other markers |
|---|---|---|---|---|---|---|---|
| **Schwannoma** | Antoni A and B areas, Verocay bodies, encapsulated | Positive (diffuse) | Negative | Negative | Negative | Negative | SOX10 + |
| **Neurofibroma** | Wavy spindle cells, collagen bundles, non-encapsulated | Positive (patchy) | Negative | Negative | Negative | Negative | SOX10 + |
| **Myofibroblastoma** | Bland spindle cells, collagen bundles | Negative | Negative | Positive | Positive | Negative | ER + |
| **Spindle cell lipoma** | Spindle cells + mature fat | Negative | Negative | Positive | Negative | Negative | / |
| **Fibromatosis** | Infiltrative spindle cells | Negative | Negative | Negative | Negative | βcatenin nuclear + | SMA + |
| **Phyllodes tumor** | Biphasic (epithelium + stroma) | Negative | Epithelium + | Stroma + | Variable | Negative | / |
| **Fibroadenoma** | Biphasic, pericanalicular/intracanalicular | Negative | Epithelium + | Stroma + | Variable | Negative | / |
| **Metaplastic spindle cell carcinoma** | Malignant spindle cells | Negative | Positive | Negative | Negative | Negative | p63 + |
| **Leiomyoma** | Eosinophilic spindle cells | Negative | Negative | Negative | Positive | Negative | SMA + |
| **Malignant peripheral nerve sheath tumor** | Atypia, mitoses, necrosis | Variable S-100 | Negative | Negative | Negative | Negative | SOX10 variable |

## Conclusion

Schwannoma of the breast is a rare benign peripheral nerve sheath tumor that can clinically and radiologically mimic more common benign breast lesions, particularly fibroadenoma and other fibroepithelial tumors.

Due to its nonspecific imaging characteristics, definitive diagnosis relies on histopathological examination and immunohistochemical confirmation, with strong diffuse S-100 positivity being a key diagnostic feature. The main differential diagnosis includes other spindle cell lesions of the breast, both benign and malignant, making careful morphologic and immunohistochemical evaluation essential to avoid misdiagnosis.

Complete surgical excision is curative, and prognosis is excellent. This case highlights the importance of considering schwannoma in the differential diagnosis of well-circumscribed spindle cell lesions of the breast.

Abbreviations
ER - Estrogen receptor
SMA - Smooth muscle actin S-100 - S-100 protein
IHC - Immunohistochemistry

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