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Spindle cell carcinoma of the breast: a comprehensive analysis

Ambria S. Moten, M.D., Senthil N. Jayarajan, M.D., Alliric I. Willis, M.D.*

Department of Surgery, Temple University School of Medicine, Philadelphia, PA, USA

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Spindle cell carcinoma;
Breast cancer;
Mastectomy;
Radiation

Abstract

BACKGROUND: Breast spindle cell malignancies are rare. No standard treatment exists.

METHODS: The Surveillance, Epidemiology, and End Results database was used to identify patients with breast spindle cell malignancies, 1992 to 2011. Descriptive statistical analysis and survival analysis were performed.

RESULTS: A total of 286 patients were identified (98.6% female). Approximately, 15% had estrogen receptor–positive tumors and 12.5% had progesterone receptor–positive tumors. Nearly 38% underwent partial mastectomy, whereas 55.5% underwent mastectomy. The frequency of partial mastectomy has increased in more recent years. One-third received radiation. Lymph node metastases were infrequent (9.3%) and distant metastases were uncommon (6.1%). Ten-year survival rates for patients with early-stage (I and II) disease were 83.9% after partial mastectomy, 86.7% after partial mastectomy plus radiation, and 71.6% after complete mastectomy. Three-year survival rates for patients with late-stage (III and IV) disease were low with 40.0% after complete mastectomy and 0% after complete mastectomy plus radiation.

CONCLUSIONS: This nationally representative analysis demonstrates that early-stage spindle cell carcinoma of the breast is adequately treated by partial mastectomy. Radiation may be considered for small, potentially early survival benefit. For late stage disease, complete mastectomy is appropriate; however, survival is poor, and radiation contributes no significant additional benefit.

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Spindle cell carcinoma (SpCC) of the breast is a rare entity. It has been reported to comprise .02% to .3% of all invasive breast cancers.[1,2] Most details about the disease have arisen from published case reports and series. SpCC tends to present as a relatively large, firm, well-circumscribed lesion in the upper outer quadrant of the breast.[3,4] Diagnosis is supported by the abundance of spindle cells,[1,5] and immunoreactivity for high-molecular-weight cytokeratins and p63.[2,3,5–7] These tumors are usually hormone receptor negative[1–3,5] and have a low incidence of lymph node involvement.[4,8–11]

Management of this cancer has varied across published reports. Surgical management has ranged from local excision to radical mastectomy.[4,10,12,13] The addition of radiotherapy to the management of SpCC has also varied.[9,10,13] A standard treatment has yet to be defined. Therefore, the goal of this study was to use a large, nationally representative data set to assess the features and treatment of SpCC of the breast and to determine how patient outcome is affected by treatment.

Methods

The Surveillance, Epidemiology, and End Results (SEER) database was used to identify breast cancer cases with spindle

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* Corresponding author. Tel.: +1-215-955-5528; fax: +1-215-503-8505.
E-mail address: alliric.willis@jefferson.edu

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cell malignancies diagnosed between 1992 and 2011. Spindle cell malignancies of the breast were identified as International Classification of Diseases for Oncology, Third Edition, code 8004/3 for malignant tumor, spindle cell type, 8032/3 for SpCC, and 8801/3 for spindle cell sarcoma.

Stata 12.1 software was used to produce descriptive statistics regarding age, sex, race, disease grade, disease stage, and tumor, node, metastasis classification, as well as hormone receptor status, radiation type, surgery type, and radiation sequence with surgery. Those with missing or unknown data were excluded from analysis.

Two groups were formed: patients who underwent partial mastectomy, and patients who underwent complete mastectomy. The complete mastectomy group included patients who underwent subcutaneous mastectomy, total mastectomy, modified radical mastectomy, or radical mastectomy. Cancer-specific survival rates and Kaplan-Meier survival curves were produced for both the partial mastectomy and complete mastectomy groups. The log-rank test was performed to determine the statistical significance between survival curves. A hazard ratio (HR), adjusted for grade, stage, race, sex, and radiation sequence with surgery, was calculated to compare patients who underwent complete mastectomy to patients who underwent partial mastectomy.

To delineate the role of disease stage in patient outcome after treatment, additional survival analysis was performed based on stage of disease at presentation. Early stage disease was defined as stages I and II, whereas late stage disease was defined as stages III and IV. Cancer-specific survival rates and Kaplan-Meier survival curves were produced for those with early and late stage disease based on receipt of various treatment combinations (partial mastectomy ± radiation, or complete mastectomy ± radiation). The log-rank test was performed to determine the statistical significance between the survival curves. HRs, adjusted for sex and race, were calculated to compare treatment types based on stage of disease.

Results

A total of 286 patient records were identified, of which 10 (3.5%) were diagnosed with malignant tumor spindle cell type, 204 (71.3%) were diagnosed with SpCC, and 72 (25.2%) were diagnosed with spindle cell sarcoma. The median age was 64 years. Demographics of the study population are presented in Table 1.

The greatest proportion of patients presented with grade III tumors and with stage IIA disease. Lymph node involvement was infrequent and distant metastases were uncommon (Table 2). The vast majority of patients had hormone receptor–negative tumors (Table 2).

Approximately, 93% of patients received surgery (Table 3). Most of the patients (66.7%) did not receive radiotherapy. Of those patients who did receive radiotherapy, most received adjuvant radiation (Table 3).

Table 1 Demographics of the study population

Characteristic	n (%)
Sex	
Female	282 (98.6)
Male	4 (1.4)
Age category (y)	
< 30	4 (1.4)
30–39	11 (3.9)
40–49	36 (12.6)
50–59	62 (21.7)
60–69	55 (19.2)
70–79	65 (22.7)
≥80	53 (18.5)
Race	
White	247 (86.4)
Black	27 (9.4)
Other	12 (4.2)
Period of diagnosis	
1992–1996	50 (17.5)
1997–2001	73 (25.5)
2002–2006	87 (30.4)
2007–2011	76 (26.6)

There was no significant difference in the receipt of radiation based on surgery type (P value = .66).

Over time, the proportion of patients who received partial mastectomy significantly increased (30.2% from period 1997 to 2001, to 44.0% from period 2007 to 2011), whereas the proportion of patients who received modified radical mastectomy decreased (44.4% from period 1997 to 2001% to 17.3% from time period 2007 to 2011; P value = .02). The size of tumors did not significantly change over time (P value = .67).

After dividing the study population into 2 groups (partial mastectomy and complete mastectomy), cancer-specific 10-year survival rates were 82.5% for those who underwent partial mastectomy and 61.5% for those who underwent complete mastectomy. Fig. 1 demonstrates the Kaplan-Meier survival curves (log rank, $P < .01$). On Cox proportional model (adjusted for grade, stage, race, sex, and radiation sequence with surgery) survival was significantly worse for patients who underwent complete mastectomy compared with patients who underwent partial mastectomy (HR = 1.96; 95% confidence interval [CI] = 1.10 to 3.49).

After dividing the study population into patients with early-stage (I and II) and late-stage (III and IV) disease, patients with early-stage disease had 10-year cancer-specific survival rates of 83.9% if they underwent partial mastectomy, 86.7% if they underwent partial mastectomy plus radiation, and 71.6% if they underwent complete mastectomy. Fig. 2 demonstrates the Kaplan-Meier survival curves (log rank, $P = .164$). There was no significant increased risk of death for patients with early stage disease who underwent partial mastectomy plus radiation (HR = .74; 95% CI = .12 to 4.46) or complete mastectomy (HR

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