Suspected spinal cord compression in breast cancer patients: A multidisciplinary risk assessment

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Summary

Breast cancer is the most common cause of metastatic epidural spinal cord compression (SCC) in women, and this condition results in significant neurologic dysfunction and morbidity. Prior studies of patients with suspected SCC did not employ multivariate analysis techniques, often included persons with a wide variety of malignancies, and generally focused on identifying associated neurologic and radiologic features. We therefore conducted a study examining a more comprehensive set of potential clinical risk factors in breast cancer patients with suspected SCC.

We retrospectively analyzed 123 episodes of suspected SCC among 93 breast cancer patients evaluated by spine computed tomography (CT) scanning. Multiple logistic regression analysis was employed to identify independent predictors of SCC. Clinically significant metastatic epidural cancer was defined as thecal sac compression (TSC), which occurred in 33 episodes (27%). Four independent predictors of TSC were identified and included oncologic features (known bone metastases ≥ 2 years, metastatic disease at initial diagnosis) in addition to neurologic and radiologic features (objective weakness, vertebral compression fracture on spine radiograph). These four predictors stratified episodes into subgroups with widely varying risks of TSC, ranging from 12% (0 risk factors) to 85% (≥ 3 risk factors).

These results suggest that the evaluation of breast cancer patients with suspected SCC should include clinical information about their disease course in addition to neurologic examination and prior imaging studies. If confirmed, these predictors may help clinicians assess risk in this patient population.

Introduction

Metastatic epidural cancer resulting in spinal cord compression (SCC) or cauda equina syndrome (CES) is a feared, potentially devastating complication of malignancy [1, 2]. Loss of neurologic function is often irreversible [3, 4], causing profound effects on quality of life and significant morbidity. Studies have demonstrated that the extent of neurologic damage prior to therapy is the most important prognostic factor with regard to preservation of motor function [5–9]. Thus early diagnosis of...
metastatic epidural SCC, and prompt therapy remain the ultimate goal of the clinician. However, the most sensitive indicator of SCC, back pain, is very nonspecific [10], and not all cancer patients with back pain warrant emergent definitive imaging of the epidural space [11]. More effective risk assessment strategies could improve patient care by identifying those at high risk who need immediate evaluation and those at low risk who can safely avoid costly and sometimes uncomfortable imaging studies.

Metastatic breast carcinoma is the most common primary tumor in women with SCC [3, 7, 12, 13] (hereafter, SCC will refer to both SCC and CES, unless otherwise specified). Patients with SCC secondary to breast cancer, compared with other malignancies, have a longer median survival after the diagnosis of SCC and generally respond better to therapy [4, 6, 7, 14–16]. In order to optimally evaluate and manage breast cancer patients with suspected SCC, one must be able to effectively assess risk of SCC in this population. Prior studies examining individuals with suspected metastatic epidural SCC have generally included patients with a wide array of malignancies and have focused on identifying neurologic and radiologic predictors, without much emphasis on prior clinical and oncologic history [12, 17–21]. Consequently the generalizability of the results of such studies to breast cancer patients may be limited and important clinical risk factors may have been missed.

In an attempt to better assess the risk of SCC in this population by identifying potential oncologic, neurologic, and radiologic risk factors, we retrospectively analyzed 123 episodes of suspected SCC in women with breast cancer who were evaluated by spinal computed tomography (CT).

Patients and methods

Patient population

We identified episodes of suspected spinal cord compression in cancer patients by reviewing the Radiology Department’s CT scan records of all spine CT scans performed at the Dana Farber Cancer Institute, Boston, Massachusetts, between February 1, 1985 and September 30, 1988. During this period at our institution, the standard practice for all cases of suspected SCC was to obtain a spinal CT scan as a definitive imaging study under the supervision of a neuroradiologist. Myelography and magnetic resonance imaging (MRI), the latter which became available on a limited basis during the study period, were reserved for infrequent cases of uncertainty after CT scanning and for occasional patients with poorly-localized signs and symptoms of metastatic epidural SCC. CT scans were included as index studies if the indication was consistent with a clinical suspicion of SCC. The patients’ medical records were reviewed, and any patients with previously diagnosed SCC or scans obtained solely to document metastatic cancer without suspected SCC were excluded. Initially 405 episodes were identified, and the following episodes were subsequently excluded: 5 episodes with less than three months of follow-up medical information, 9 episodes with scans unavailable for review, and 49 episodes with either prior radiotherapy to the spine at or near the site of suspected SCC or a prior CT diagnosis of thecal sac compression within a year prior to the index CT scan. Among the remaining 342 episodes, 146 (42%) represented breast cancer patients with suspected SCC. Twenty-three episodes with minimal chart documentation of neurologic signs and symptoms were further excluded, and the remaining 123 episodes were employed for this study.

CT scanning

Spinal CT scans were performed on a General Electric 9800 scanner and included a minimum of two consecutive vertebral levels above and below the clinically suspected site and a minimum of two 5 mm-slices through each vertebral body and one 5 mm slice through the vertebral disc in the plane of the disc. A neuroradiologist who monitored the scans added additional slices to further assess suspicious areas and determine the full extent of any epidural disease.