ORIGINAL ARTICLES

# Cauda equina compression in breast cancer - incidence and treatment outcome

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## Summary

*Purpose:* To determine the incidence and treatment outcome of compression of the cauda equina by metastatic disease in patients with breast cancer.

*Methods:* A retrospective study of individuals diagnosed with breast cancer at a single institution during a 16-year period was undertaken.

*Results:* Of the 1,283 patients studied, 15 (1.2%) developed cauda equina syndrome from metastatic disease. The median survival was eight months; ten (67%) survived for at least six months. Among the evaluable patients, pain was completely relieved in eight of ten women; complete resolution of neurologic deficits was observed in five of nine patients.

*Conclusion:* Metastatic breast cancer compression of the cauda equina and long-term survival of patients are infrequent occurrences. Beneficial responses can be mediated by radiotherapy.

*Key words:* Cauda Equina Compression; Breast Cancer; Radiotherapy.

## Introduction

Reported neurological complications associated with metastatic carcinoma of the breast include spinal cord compression, brain involvement, and meningeal carcinomatosis [1-8], but affection of the cauda equina is seldom addressed.

Our objectives were to establish the frequency of compression of the cauda equina by metastatic breast cancer (CCE-MBC), to present the results of treatment by radiation, and determine survival in a consecutive series of patients with CCE-MBC.

## Materials and Methods

Fifteen women between the ages of 36 and 64 years out of 1,283 patients diagnosed with breast cancer between 1982 and 1997 were treated by radiation for palliation of CCE-MBC.

A diagnosis of cauda equina compression was accepted on the basis of clinically consistent symptoms and signs with myelographic (n=8) or magnetic resonance imaging (n=7) evidence of CCE-MBC.

Treatment of compression of the cauda equina involved the use of dexamethasone and radiation. Megavoltage radiotherapy from a 6 million volt linear accelerator usually comprised treatment of involved fields plus two vertebrae above and below the site of compression. The mean total absorbed dose at 3 to 4 cm depth from a posterior treatment portal was 24 Gy (range 4 Gy to 30 Gy); daily fractions of 2.5 Gy to 4 Gy were used. All patients initially received parenteral dexamethasone 4 mg every six hours and, after one to three days, received the drug by mouth with subsequent tapering of dosage.

Responses to treatment were determined at completion of radiotherapy or within two months. Survival was estimated from the diagnosis of CCE-MBC to either the date of death or last contact with the patient.

## Results

The median interval between the diagnosis of breast cancer and involvement of the cauda equina by suspected osseous metastases was 37 months (range 1 to 100 months) with a mean patient age at the onset of cauda equina compression of 51 years. At the time of detection of CCE-MBC, all but one patient had foci of metastatic disease elsewhere in the body. Seven women (47%) had more than four positive axillary nodes at the time of diagnosis of breast cancer, including a patient who had clinically matted nodes in the axilla.

Table 1 shows the characteristics of the patients. Some salient features are described in the illustrative case report that follows.

*Case Report:* A 58-year-old woman was admitted to our hospital in June 1997 with a six-months history of pain in the lower back and right lower limb plus numbness in the anterior aspect of the right leg. The abnormal neurological examination finding was hypoesthesia in the ipsilateral leg.

In March 1989, the patient was submitted to a modified radical mastectomy and 8 cycles of chemotherapy for her stage II breast cancer.

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Table 1. — *Clinical Summary*

| Case no. | Age (yrs) | Site | Compression of the Cauda Equina Manifestations* | | | | | | | | Survival** (mos) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Pain | | Sensory impairment | | Non-ambulatory | | Anal/Bladder sphincter impairment | | |
| | | | PreRx | PostRx | PreRx | PostRx | PreRx | PostRx | PreRx | PostRx | |
| 1 | 54 | L3 | + | – | – | – | – | – | – | – | (13) |
| 2 | 48 | L3 | + | – | – | – | + | – | – | – | (4) |
| 3 | 56 | L5-S1 | + | NK | + | NK | – | – | – | – | (4) |
| 4 | 56 | L4 | – | – | – | – | + | NK | – | – | (8) |
| 5 | 36 | L5 | + | – | – | – | – | – | – | – | (10) |
| 6 | 64 | L2-S1 | + | – | – | – | + | – | + | – | (6) |
| 7 | 48 | L4 | + | ± | – | – | + | + | – | – | (7) |
| 8 | 43 | L2-L5 | + | NK | – | – | + | ± | – | – | (2) |
| 9 | 46 | L3-L4 | + | – | – | – | + | + | – | – | (10) |
| 10 | 58 | L2-L3 | + | – | + | – | – | – | – | – | (25) Alive |
| 11 | 61 | L3-L4 | + | – | – | – | + | – | – | – | (9) |
| 12 | 46 | L3-L4 | + | NK | – | – | + | ± | – | – | (<1) |
| 13 | 56 | L2-L3 | + | – | – | – | + | – | – | – | (11) |
| 14 | 44 | L3 | + | + | – | – | – | – | – | – | (35) |
| 15 | 55 | L3-L5 | – | – | + | NK | + | NK | – | – | (1) |

*PreRx = Before treatment; PostRx = After treatment; NK = Not known; ± = some degree of pain relief or regained motion was experienced; **Survival measured from the time of diagnosis of cauda equina compression by metastatic tumor.

Computed tomographic scans of the abdomen and head disclosed liver metastases and metastatic disease in the calvarium; bone marrow examination revealed infiltration of the marrow by metastatic carcinoma. Magnetic resonance imaging of the lumbar spine (Figure 1) demonstrated neoplastic disease at the second and third neural foramina.

Local irradiation of the lumbar spine was started at once concurrently with dexamethasone. Resolution of pain and numbness of the leg was noted on completion of the radiotherapy course of 30 Gy given in 10 fractions.

The patient has been under treatment with gemcitabine and cisplatin for progressive metastatic disease in the liver as of June 1999.

Two-segment compression of the cauda equina was observed in nine of 15 patients (60%). The median duration of antecedent symptoms among the 11 evaluated individuals was one week (range 2 to 90 days).

After completion of treatment, complete or partial relief of pain was noted in nine of ten assessable patients. The sole individual who was paraplegic prior to therapy never regained useful function; nine individuals were subsequently ambulatory (including five who were not initially paraparetic or paraplegic). Sensory or bladder sphincter impairment resolved in two patients.

The overall median survival was eight months. The crude survival rate at one year was 20% (3/15). The median post-treatment survival was eight months (range 2-10 months) for non-ambulatory patients, and 10.5 months (range 4-35 months) for those who were ambulatory.

## Discussion

In the retrospective study of Tatsui and colleagues [9] evaluating survival of patients after the detection of spinal metastases, longer survival was noted in patients with metastatic breast cancer compared to individuals with lung cancer metastasizing to the spine (29.4±33.5 months versus 3.6±6.1 months, respectively). Thus, it would seem important to know the frequency, outcome,

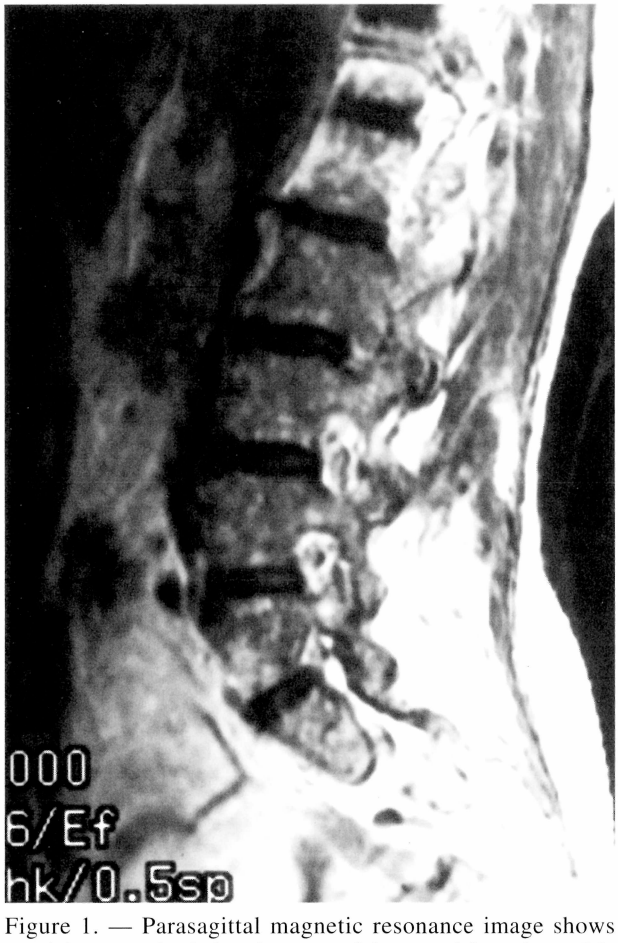


Figure 1. — Parasagittal magnetic resonance image shows suspicious neoplastic involvement of the neural foramina at L2-L3 segments.

and survival following treatment for palliation of patients with CCE-MBC.

In the present study, the frequency of CCE-MBC was 1.2%. In the report of Patanaphan *et al.* [10] on the metastatic patterns of mammary gland carcinomas, the most common site of distant spread was bone. Regarding pathogenesis, spinal epidural compression in breast cancer patients usually results from direct extension of vertebral metastatic deposits [4, 11]. The preceding consideration may be associated with the fact that neoplastic dissemination to the ossei [4], especially to the vertebrae [11], has been observed in as many as 60% to 70% of patients with carcinoma of the breast.

In some reports of large series of patients [12, 13] with spinal epidural compression by metastatic tumor, breast cancer was found to metastasize more often to the thoracic spine. Boogerd and colleagues [11] noted that the most frequently affected portion of the spine was the fourth lumbar segment. Nonetheless, in these reports [11-13] ascertained patient outcomes in cases of CCE-MBC are not mentioned.

Several of our findings are in accord with observations from previous reports about spinal cord compression by metastatic carcinoma of the breast [4, 8, 11] – reports which include some cases of CCE-MBC. First, the patient age at the time of detection of neural compression is usually in the early fifties [4, 8, 11]. Second, the most common manifestation of spinal neoplastic involvement is pain [4, 11]. Third, the median duration of symptoms and neurologic deficits was one week [8]. Fourth, more than one segment of the spine was affected in more than a third of the cases [4, 8, 11]. We believe that our radiotherapy-achieved results are comparable to patient outcomes in other series addressing spinal cord compression in breast carcinoma.

In summary, cauda equina compression is a relatively uncommon neurological complication among breast cancer patients. Our observations confirm that a significant percentage of cases of CCE-MBC will benefit from the judicious application of radiotherapy. However, as in almost all cases of distant metastatic disease, the prognosis is generally poor albeit in a few patients survival is longer.

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