Resection of Solitary Metastases in Breast Cancer Patients: a Case Report

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Introduction

Breast cancer is the most frequent malignancy in the female population and a significant cause of morbidity and mortality. With earlier age and stage at presentation, the survival rate is expected to increase. Early detection surgical removal of the lesion, systemic therapy and radiotherapy are effective in managing the disease. However, 30-80% of the patients will develop metastatic disease following surgery and/or chemotherapy, endocrine therapy or radiotherapy. Although distant spread from breast cancer is commonly found in bones, lungs, liver, central nervous system and skin, other less common sites have been occasionally reported (1).

Bone metastasis in breast cancer is a significant clinical problem. They usually indicate incurable disease with a guarded prognosis, but are also associated with skeletal-related morbidities including bone pain, pathological fractures, spinal cord compression, and hypercalcaemia. In patients with bone metastases, the goal of management is to prevent further skeletal-related events, manage complications, reduce bone pain, and improve quality of life.

Although metastatic breast cancer is widely believed to carry a grim prognosis, treatment developments over the past 25 years have greatly improved survival outcomes in the patients. Bone is one of the earliest and most common sites of breast cancer metastasis and it is generally associated with better outcomes than visceral involvement. Standard treatment for breast cancer bone metastasis is systemic hormonal therapy or chemotherapy. We report the case of a 52-year old breast cancer patient with a history of serial resections for solitary bone and lung metastases, treated with curative intent.

Key words: breast cancer, solitary metastasis, curative treatment, surgery

Case presentation

We report the case of a 52-year old Caucasian woman, without classic risk factors for breast cancer, who was referred
to The Oncology Institute „Prof. Dr. Ion Chiricuţă” in august 2006 for the management of a lump in the left breast.

Breast conserving surgery was first performed (lumpectomy with axillary lymph node dissection). The histopathological exam showed a 2.5 cm macroscopic tumor which microscopically was compatible with a grade Nottingham I invasive ductal carcinoma. The tumor was 55% ER positive, PR negative. HER-2/neu assessment was not performed. 17 axillary lymph nodes were negative. Pathological stage was pT2NoMoLoVoRo. The workup did not show any distant metastases.

She finished her adjuvant chemotherapy (4 cycles of epirubicin 100 mg/mp and cyclophosphamide) in December 2006. She was then included in a randomized, phase III trial comparing the efficacy of Exemestane versus Anastrozole in hormone receptor positive postmenopausal breast cancer; adjuvant hormonal therapy with Anastrozole was started in January 2007. She also received adjuvant radiotherapy with a total dose of 60 Gy/30fr/44 days on tumor bed.

In March 2009, 26 months after adjuvant hormonal therapy with Anastrozole was started, the patient presented with left posterolateral thoracic pain and left mastodynia. Clinical exam revealed rib pain produced by palpation of IV and V posterior left ribs.

A chest X-ray was performed which showed the presence of a suspicious osteolytic area located on the posterolateral IV costal arch. Bone scintigraphy showed hypercaptation of respective area, with no other bone lesions. Thorax CT confirmed the presence of the unique osteolytic lesion, with no visceral involvement.

In the differential diagnosis a solitary bone plasmacytoma was excluded by hematological exam.

Consequently, we concluded that the patient had solitary metastatic disease to the rib. Various therapeutic options were discussed with the patient, including systemic hormonal therapy together with bisphosphonates therapy, or the same plus the addition of local radiotherapy to control pain; taking into consideration that this was a solitary metastasis, we also discussed the surgical resection of the lesion.

In May 2009 the patient underwent surgery. Posterolateral IV rib arch resection was performed. The histopathological exam showed a 2/4 cm bone fragment with invasive ductal carcinoma infiltration.

The final diagnosis was a completely resected breast origin solitary bone metastases.

In January 2012, 31 months after hormonal therapy with Tamoxifen was started, routine CT examination revealed...
the presence of an 8 mm solitary pulmonary nodule, located in the left superior lobe. There were no other metastatic lesions. She had no symptoms. Considering the patient’s good clinical status, the presence of one solitary metastasis and taking into account the 31 months free of disease interval following first solitary metastases resection, re-resection was decided. She underwent surgery again on May 2012. A left upper lobectomy was performed. The histopathological exam showed a breast origin metastasis. The tumor was 90% ER positive, PR negative and HER-2/neu was 2+.

On June 2012 hormonal therapy with Letrozole was started.

The last control was in April 2013. Clinical exam, thoracic radiography and abdominal echography were performed and the results showed maintained clinically complete response.

**Discussion**

The traditional belief of both patients and their physicians has been that metastatic breast cancer offers only the grimmest prognosis, with average survival times of 1-2 years. This belief has fostered treatment regimens based on the notion that palliative treatment is the optimal choice for most patients, with more aggressive therapeutic approaches likely to result in useless patient distress.

A more aggressive treatment approach may be appropriate for those patients in whom metastatic disease is limited to a solitary lesion or to multiple lesions at a single organ site. When those patients can be rendered clinically disease free by local treatment (surgery or radiation), there is the potential of achieving a complete remission from chemotherapy, and patients can remain disease free for prolonged periods of time (15-20 years or more). In a clinical trial conducted at the M.D. Anderson Cancer Center by Holmes and colleagues (2), patients with solitary metastases were treated with surgical resection with or without radiation therapy, followed by systemic chemotherapy, consisting of fluorouracil, doxorubicin, and cyclophosphamide, and hormonal therapy, consisting of Tamoxifen. Nearly 25% of patients were alive without disease 15 years after treatment, and only two additional events have occurred at a maximum follow-up of 26 years (2,3).

Bone is one of the earliest and most common sites of breast cancer metastasis. The usual first treatment choice for bone metastasis not at risk for fracture is systemic therapy, either hormonal therapy or chemotherapy. This is especially true for isolated lesions, which account for approximately 20% of all bone metastasis (4). Isolated bone metastasis have a somewhat indolent course and generally respond well to hormonal therapy (5-7). For patients in whom the metastasis are hormone-receptor negative, or whom become refractory to hormonal treatment, chemotherapy has been shown to be effective (8). In metastatic disease confined to the skeletal system and treated with hormonal therapy, with or without chemotherapy, median survival time of 48 months and a 5-year survival rate of 39% have been reported (5,9). More recently, osteoclast inhibitory therapy using bisphosphonates has become widely used (10). Radiation therapy, either locally or through the systemic administration of radioisotopes, has also been used effectively in these patients, providing pain relief and, in some cases, evidence of bone healing (11,12).

The use of surgery for the treatment of bone metastases has typically been reserved for lesions that are not responsive to systemic therapy and that are associated with a serious potential for decline in the quality of life in order to reduce fractures, treat spinal cord or nerve compression, and prophylaxes of imminent fractures.

The use of surgery as a curative treatment option for bone metastasis has been actively considered in the case of isolated metastases to the sternum. Two studies from the 1980s presented results from a limited number of patients indicating that surgical resection of solitary sternum metastasis, where there was no evidence of systemic spread, may have lead to significantly better survival (13). Based on the results of those studies we aimed to treat our patient with curative intent by performing posterolateral IV rib arch resection.

As for pulmonary solitary metastases, surgery tends to become a standard treatment for this category of patients regardless the primary tumor site. There have been some retrospective studies which examined survival outcomes in breast cancer patients with isolated metastases to the lung treated with surgery, with or without postsurgical systemic therapy (14-21). Median survival times ranged from 42 months to 79 months, with 5-year actuarial survival rates ranging from 35-80% and 10 year actuarial survival rates ranging from 8-60%. In two studies that presented outcomes from patients who received medical treatment only for pulmonary metastases (17,20), survival was significantly lower for those patients. It has been shown that better outcome after surgery was associated with good performance status, long DFI after the treatment of the primary tumor (16,18,21) and complete resection of the tumor (14,19,21).

**Conclusions**

Treatment recommendations for metastasis breast cancer patients continue to evolve every day. We are perhaps today in the position to treat solitary breast cancer metastasis with curative intent, using surgery with or without radiotherapy or chemotherapy. The data are suggestive and support the need for well-designed clinical trials to determine the exact role of surgical intervention in such patients with solitary metastasis.

**References**


