UNUSUAL CASE OF DORSAL VERTEBRAL METASTASES FROM A MALE BREAST CANCER

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ABSTRACT

Introduction*: Breast cancer is a malignant neoplasm arising from mammary glands and is a rare entity in the male patient. Spine is a common site for skeletal metastases.*

Case presentation*: A 53-years-old male was admitted to our Neurosurgical unit because of an untreatable dorsal pain. He had been treated 3 years before for breast cancer. A dorsal Magnetic Resonance Imaging (MRI) evidenced pathological masses at T8 level. A total body Computed Tomography (CT) scan revealed lungs and liver metastases. After a multidisciplinary consult, a posterior T8 decompression, a radiofrequency thermoablation in T8 vertebral body followed by screws and rods fixation (T7-T9) was performed. Post-operative course was uneventful and the patient experienced a significant improvement of dorsal pain. Cycles of adjuvant chemo-radiotherapy followed. After 8 months, patient is still alive and in good general conditions but a spine MRI revealed a rapid and widespread diffusion of ostelytic metastases.*

Conclusion*: Despite the high incidence of breast cancer metastases to the spine, very few clinical reports (just eight, whose only one treated surgically) in the literature deal specifically with metastases from male breast cancer, which is rarer and with a worst prognosis than female counterpart. In spite of the poor course, surgery still plays a role in treating these kind of malignancies and in improving quality of life.*

Keywords*: male breast cancer, therapy, metastatic breast cancer, dorsal vertebral metastatic, surgery.*

DOI: 10.19193/0393-6384_2017_6_181

Received *November 30, 2016;* ***Accepted*** *May 20, 2017*

Introduction

Breast cancer (BC) is a malignant neoplasm arising from mammary glands and is a rare entity in the male patient (European prevalence: 1/100000)[(1)]. The Surveillance, Epidemiology, and End Results (SEER) registry contains a total of 5,494 cases of male breast cancer (MBC) and 835,000 cases of female breast cancer (FBC) diagnosed from 1973 through 2005[(2)]. Genes that have been implicated in the etiology of MBC include BRCA 1-2[(3)]) AR gene, cytochrome P45017 (CYP17), the XXY karyotype (Klinefelter syndrome), the PTEN tumor suppressor gene associated with Cowden syndrome, and the CHEK2 gene[(4)]. An effective role of HLA system in the pathogenesis has not been still clarified as in other malignancies[(5-6)]. In addition to the genetic factors associated with an increased risk of MBC, several epidemiologic risk factors have been investigated, including disorders associated with elevated estrogen levels, testicular disorders, benign breast conditions (e.g., gynecomastia), occupational and environmental exposures, and dietary factors. Several malignancies tend to metastasize to the bones and the spine is a common site for skeletal metastases[(7, 8, 9)].

In the whole breast cancer population, one out of three patients presents recurrence within 10 years; furthermore, the bone is the most common site of BC metastases and their incidence spreads from 3.6% at 5 years, to 5.9% at 15 years. This can cause several events, such as bone pain, pathological fractures, pancytopenia and, in case of spinal metastases, cord compression[10]. Although MBC is clinically and epidemiologically similar to FBC, and its treatment follows the same indication, survival rates are significantly lower[11-12-13]. We report here the rare case of a MBC metastasizing to the thoracic spine, treated by posterior decompression and transpedicle fixation and by a radiofrequency thermoablation of the lesion. To our knowledge, there are only eight cases reported in literature, whose only one treated surgically by vertebroplasty. In consideration of the very low number of reports, there are no standardized guidelines for the management of these lesions.

Case presentation

A 53-years-old male was admitted to our Neurosurgical unit because of an untreatable dorsal pain. At the hospitalization, he was presenting a positive Delitala sign, with pain at pressure on the thoracic spine, but no other neurological sign. He had been treated 3 years before for breast cancer, for which reason he had undergone total mastectomy with axillary lymphadenectomy. Because of this dorsal pain, an MRI imaging of the spine was performed. It evidenced pathological masses at T8 level, attributable to breast cancer metastases (Fig 1).

After the hospitalization, a pre-operative CT scan confirmed the presence of the metastatic vertebral mass and also reported mediastinal involvement. A total body CT scan revealed lungs and liver metastases. After a multidisciplinary consult, a surgical option was decided to lessen pain and restore stability to the segmental dorsal spinal unit. During surgical treatment he underwent posterior T8 decompression and a radiofrequency (RF) electrode (Vertebral Augmentation System, DFINE) was introduced into the lytic lesion (Fig 2). The tissue was heated to about 45°C. A radiofrequency thermoablation (MetaSTAR, Dfine, San Jose, USA) in T8 vertebral body was performed and than followed by screws and rods fixation (T7-T9) and partial resection of the mass (Fig 2). Autologous fibrin glue was used as sealant on the dural plane[14-15-16-17]. Post-operative course was uneventful and the patient was discharged one week after hospitalization with a significant improvement of dorsal pain. Cycles of adjuvant chemo-radiotherapy followed. After 8 months, patient is still alive and in good general conditions, but a spine MRI revealed a rapid and widespread diffusion of MBC metastases (Fig 3).

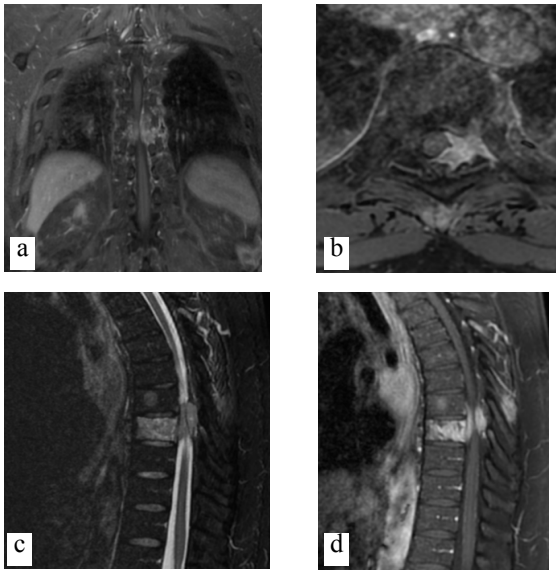

Fig 1: Magnetic resonance imaging (MRI): **a** and **b** coronal and axial T1-weighted images after gadolinium administration, showing a neoplastic involvement of T8 vertebral body. **c** T2-weighted images showing impingement of the spinal cord. **d** STIR sequence shows an osteolytic lesion on T8 vertebral body.

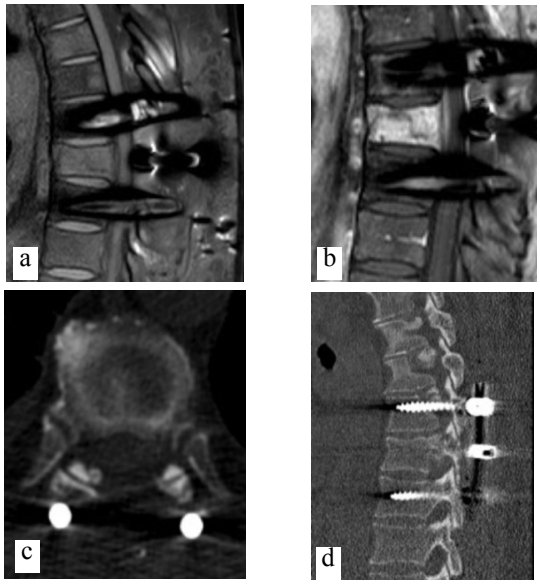

Fig 2: Magnetic resonance imaging (MRI): **a** and **b** T1-weighted after gadolinium administration and STIR images, showing the reduction of volume of T8 vertebral body, with reduced impingement on the spinal cord. **c** and **d** Computed tomography (CT) scan of the thoracic spine showing a local posterior decompression and the transpedicle fixation in T7-T9.

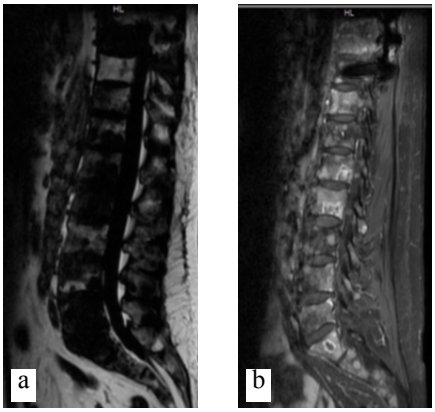

Fig 3: Magnetic resonance imaging (MRI): **a** and **b** T1-weighted and STIR images after gadolinium administration, showing widespread diffusion of osteolytic metastases.

Discussion

Spinal metastases are frequently diagnosed in case of several malignancies, such as breast, lung, colon, renal and prostate cancer[18-19], melanoma, myeloma and lymphoma[20-12]. Among these, breast cancer (BC) metastases are of the most common[19]. In patients with metastatic BC, skeletal involvement is very frequent, with an incidence of 47-85% in autopsy series, mostly lytic lesions. Despite the high incidence of BC metastases to the spine, very few clinical reports in the literature deal specifically with metastases from MBC, which is rarer than female counterpart. The ideal treatment for this cancer requires a multidisciplinary approach[21] and treatments include chemo and hormonetherapy, radiotherapy and surgery. The exact indications for surgery, in patients with advanced metastatic spine disease from BC are controversial, although it is generally agreed that the surgery is palliative, not curative[22]. To the best of our knowledge, only 8 cases of MBC spinal metastases have been reported in literature. Only in one case an operative treatment was reported: in that case, the patient had undergone a C3 vertebroplasty, in order to treat cervicalgia, and guarantee pain relief. Percutaneous imaging-guided ablative therapies using thermal energy sources such as RF, microwave, laser, and high-intensity focused sonography have received much recent attention as minimally invasive strategies for the treatment of focal malignant diseases[23-24].

The main aim of thermal tumor ablation therapy is to destroy a variable quote of tumor by using heat to kill the malignant cells in a minimally invasive fashion without damaging adjacent vital structures. Possible advantages include low cost, suitability for real-time imaging guidance, and the ability to perform ablative procedures on outpatients. Radiofrequency thermal ablation (RFTA) is considered the treatment of choice for osteoid osteomas, in which it has long been safely used. Other benign conditions (chondroblastoma, osteoblastoma, giant cell tumor, etc.), can also be treated by this technique, which is less invasive than traditional surgical procedures. RFTA ablation is also an option for the palliation of localized, painful osteolytic metastatic and myeloma lesions. The reduction in pain improves the quality of life of patients with cancer, who often have multiple morbidities and a limited life expectancy. In some cases, these patients are treated with RFTA because conventional therapies (surgery, radiotherapy, chemotherapy, etc.) have been exhausted. In other cases, it is combined with conventional therapies or other percutaneous treatments, e.g., cementoplasty, offering faster pain relief and bone strengthening[25-26]. In our case a persistent and untreatable dorsal pain was the only symptom reported by our patient, thus, after a multi disciplinary consult, a palliative surgery was programmed and the thoracic lesion was treated by decompression, postero-lateral fixation and coblation of the involved vertebral body followed, after weeks, by cycles of adjuvant treatment. The prognosis of the MBC is undoubtedly worse of BC in women. Some researchers justify this by assuming a different and greater biological aggressiveness[27-28] but also a average delay in diagnosis of 6 to 10 months since the onset of symptoms maybe for the rarity of this disease in men and for the low index of suspicion in both patient and physician. As a result, the diagnosis in men occurs with greater progression of the illness[29].

In our case patient a palliative surgery was performed to lower pain and to restore stability to the segmental spinal thoracic unit involved by the tumor. After 8 months, patient is still alive and in good general conditions but widespread lytic lesions were observed in a spine MRI. Despite the poor prognosis of metastasizing BC patients, whose median survival is about 10 months after the diagnosis of spinal involvement, surgery still plays a role in treating these kind of malignancies and in improving quality of life[30]. Even if systemic therapy of bone metastases or locoregional palliative RF may be useful in treating pain and preventing fractures, early decompressive surgery is proven to be effective in providing plain relief, neurologic

improvement, muscle strength maintenance, continence, and recovery of general conditions[31]. Despite this, there is still not a clear consensus or evidence based guidelines about the indication both for surgery and for surgical approach[32].

To sum up, MBC is a rare neoplasm which represents <1% of all malignancies in men. It can metastasize to several sites and mostly spinal metastases are very rare. Untreatable back-pain can be the only symptom of spinal involvement, even with no other neurological signs. In such cases, a radiological assessment is needed to confirm or discard the hypothesis of metastases or pathological fracture. In case of spinal metastases from BC, there is no clear consensus about the operative treatment; however, our rare case of spinal involvement from advanced male breast cancer demonstrates that surgery can preserve neurological functions and ensure early pain control, also if in the short time. Further multicenter and randomized studies are still needed to confirm the role of the surgery in case of spinal metastases.

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