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Sternal Metastasis from Breast Cancer: Resection and Reconstruction by Mersilene Mesh and Titanium Bar

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Abstract

Breast cancer (BC) is the most common cancer in women. Sternal metastasis usually occurs in an isolated setting. Sternal metastasis of BC has rarely been reported in the literature. We report the case of a women, with history of right mastectomy and axillary node dissection for breast cancer, who was presented pain overlying the sternum 3 years after completion of adjuvant systemic therapy. A computed tomography of the chest revealed a 53 mm tissue mass with sternal destruction. Transparietal biopsy of the sternal mass was performed and pathology revealed a carcinoma difficult to type. Sternectomy with node dissection was done. The sternum was reconstructed by Mersilene mesh and a titanium bar. A bilateral pectoralis advancement flap was then used to close the defect. Pathology revealed an invasive ductal carcinoma. Postoperative course was uneventful. Appropriate surgical technique for a well selected case maintains functional status and improves survival.

Keywords: Sternal metastasis; Solitary bone metastasis; Sternectomy; Polypropylene

Introduction

Breast cancer (BC) is the most common cancer in women. Bone is the most common metastatic site of BC and sternal metastasis usually occurs in an isolated setting. Sternal metastasis of BC has rarely been reported in the literature. We present here a case of solitary bone metastasis to the sternum as a recurrent presentation of breast cancer in a 57-year-old woman.

Case Report

A 57 year old woman was diagnosed to have invasive ductal carcinoma of the right breast since 5 years. She underwent right mastectomy and axillary node dissection after 1 month of 12 lymph nodes, 3 were involved. Margins were negative. Immunohistochemistry was negative for estrogen and progesterone, and positive for human epidermal growth factor (HER2). This patient received adjuvant chemotherapy and locoregional radiation treatment. Three years after completion of adjuvant systemic therapy, this woman presented pain overlying the sternum. A computed tomography (CT) of the chest revealed a 47 X 44 X 53 mm tissue mass with sternal destruction without metastasis in the lung or the mediastinum (Figure 1). The tumour is eroding the sternal bone and surrounding soft-tissue. Bone scan found no other bone invasion except in the sternum. Transparietal biopsy of the sternal mass was performed and pathology revealed a carcinoma difficult to type. Surgical treatment for sternal tumour was indicated by oncologic multidisciplinary team. Sternotomy with node dissection through median sternotomy skin incision was done. The sternum was reconstructed by using Mersilene mesh and a titanium bar fixed to the 4 th ribs. A bilateral pectoralis advancement flap was then used to close the defect (Figure 2). Mediastinal and subcutaneous drainage was used. Pathology revealed an invasive ductal carcinoma infiltrating the sternum. Postoperative course was uneventful during a 10 – day in- hospital stay. After 15-month follow-up, the patient denied any shortness of breath, chest pain or limitation on her daily activities.

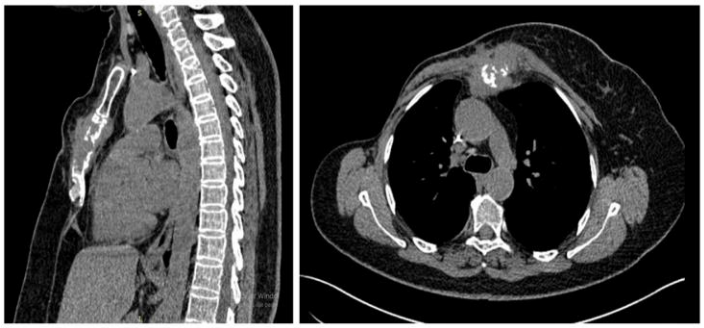

Figure 1: *Computed tomography of the thorax shows a soft tissue mass with manubrial destruction.*

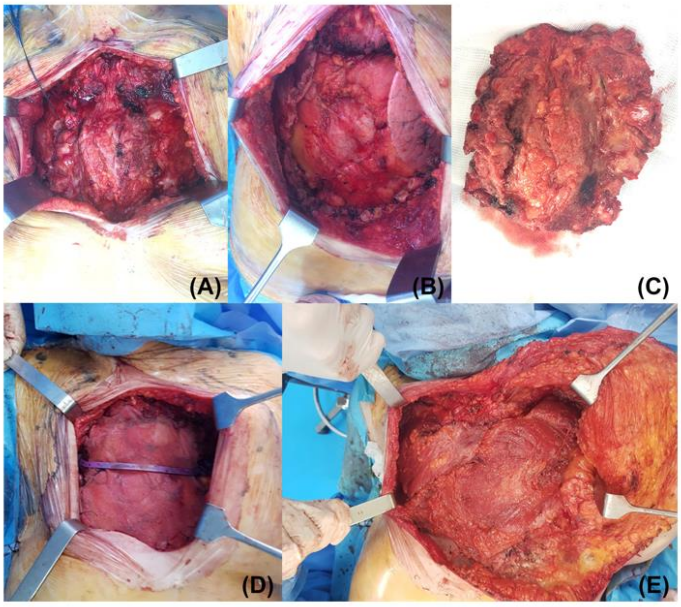

Figure 2: *Intraoperative photograph showing the tumor tissue (A). The tumor has been completely resected (B). Sequential sternal resections: the resected specimen (C). Sternal reconstruction using Mersilene mesh and a titanium bar (D). A bilateral pectoralis advancement flap was used to close the defect (E).*

Discussion

The most common site of metastasis in BC is the bones. In patients with BC, the presence of isolated sternal metastasis is relatively uncommon, with reported incidence of 1.9% - 2.4% [1]. The surgical treatment is challenging the place of radiotherapy. Complete resection of solitary metastases from BC is justified and can contribute to a long-term survival. In addition, sternal metastases are different from other bony metastases, such as vertebral metastases, in that their lack of an expansive communicative vasculature. They might remain solitary for an extended time [2]. Because the sternum is important for maintaining the integrity of the thoracic bones, sternal resection significantly affects respiratory and circulatory function. To preserve the integrity of the chest and protect vital organs, it is important to reconstruct the thoracic cage [3]. There are many methods for the reconstruction of sternal defect, include the reconstruction of soft tissue by free flaps, greater omentum and polyester patch. And the restore of chest wall rigidity with three-dimensional printing bioscaffold, acrylic cement, metal plate or mesh, polypropylene or Mersilene mesh and allograft or homograft of bone [4]. But none have proven to be clearly superior. In our case, Mersilene mesh has been used because of its solidity, manageability, long-term tolerability, virtual absence of foreign body reactions or septic complications, and low cost. It offers the fixation of the thoracic bones and the protection of endothoracic organs. Titanium bar was successfully added for greater stability. Furthermore, muscle flaps have replaced other tissues, such as simple skin flaps, for the coverage of soft tissue defects, because of their safety and long-term stability. The 5-year survival rates for chest wall or sternal resections are described between 18 and 71%. Age at sternal resection, mastectomy or breast-conserving surgery at primary tumour, disease free interval, lymph node status of the primary tumour, preoperative chemotherapy and the type of sternal resection had a significant influence on overall survivals [5].

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