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Case report

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Surgical treatment of solitary sternal metastasis from breast cancer. Case report

BACKGROUND: Bone metastasis is a frequent and early complication of breast cancer. This case report describes a technique for a partial exeresis of the sternum and the reconstruction of the pleura with autologous dermis from the lower abdomen and the loss of substance with a myocutaneous flap.

PATIENTS AND METHODS: We describe the case of a 50-year old woman with a sternal excavated lesion with pathologic fracture due to an invasive adenocarcinoma, treated with a partial exeresis of the sternum and the reconstruction with a myocutaneous flap.

RESULTS: The patient doesn't show evidence of recurrent disease and the stability of her chest well preserved.

CONCLUSION: Metastatic breast cancer to the sternum, if detected early and treated aggressively, holds the possibility of such a cure.

KEY WORDS: Breast cancer, Sternal metastasis, Sternectomy

Introduction

Bone metastasis is a frequent complication of cancer presents in 70% of patients with advanced breast or prostate cancer, 15-30% of patients with lung, colon, stomach, bladder, uterus, rectum, thyroid or kidney cancer¹.

Breast cancer is the most common malignancy in women and the bones represent one of the earliest and most usual site of metastasis in 26-50% of breast cancer^{2,3}.

The invasion of cancer cells into bone activates both osteoclasts that destroy the bone and cellular growth factors that increase cancer cells growth^{4,5}. The typical presenting symptom is pain. As bone destruction progresses, fractures become more common⁴.

When the sternum is involved, it usually presents as a solitary lesion^{6,7}. Sternectomy could be curative in carefully selected patients^{7,8} with stable disease, no other metastases, no other diseases⁶.

This case report describes a technique for a partial exeresis of the sternum and the subsequent reconstruction of the pleura with autologous dermis from the lower abdomen and the loss of substance with a myocutaneous flap.

Case Report

We hereby report the case of a 50-year old woman who was referred to our University Hospital for the management of a sternal excavated lesion with pathologic sternal fracture (Fig. 1). She experienced pain in the sternal area that got worse with deep breaths. Four years ago, she underwent radical right side mastectomy followed by CEF (cyclophosphamide, epirubin and fluorouracil) chemotherapy and radiotherapy.

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The clinical and histological characteristics of the primary breast cancer revealed a Stage IIIa adenocarcinoma with positive axillary lymph node metastasis. Her estrogen receptor assay, as well as the amplification of the human epidermal growth factor receptor type 2 (HER2/neu), was negative and expression of her progesterone receptors was low.

On admission her vital signs were normal and her chest was clear on auscultation. Sternum's palpation evoked tenderness; a round-shaped excavated lesion was localized in the proximal third of the sternum, that appeared fractured. The remainder of her examination results was normal.

Computed tomography (CT) scanning of our patient's chest revealed a 62 × 32 mm mass in her distal part of sternum, with periosteal edema, with cutaneous fistulization (Fig. 2).

There was no specific direct evidence of vascular invasion but we raised the question of pericardial invasion. Our patient was vigorously scrutinized for metastatic disease, which included routine blood chemistries and the determination of carcinoembryonic antigen (CEA) and CA 15-3 serum markers. CT scan of neck and abdomen

for restaging revealed no other foci of metastatic disease. A bone scan showed uptake only in sternum.

Our patient was anaesthetized and ventilated with a single lumen endotracheal tube. An epidural catheter was also inserted for pain control during the peri-operative period. After marking the margins of resection on the basis of CT finding (8 × 10 cm), rectangular incision was performed at all layers up to the costal cartilages from third to seventh rib and sternum, including post – radiotherapy scar tissue on the right side.

Mobilization began first on the left side of her sternum with exposure and section of the ribs, and costo-sternal plane was dissected up to the pericardium on the left, up to the sternum on the right and mammary vessels were sectioned between absorbable ligatures; a strong adherence between the pleura and sternum was treated with partial pleurectomy.



Fig. 1: Sternal excavated lesion with pathologic sternal fracture

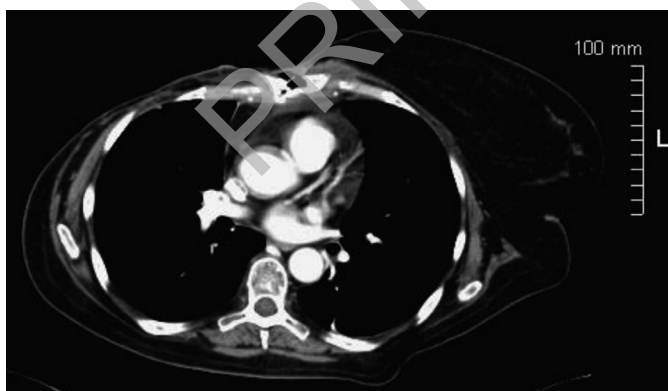


Fig. 2.: 62 × 32 mm mass in distal part of sternum, with periosteal edema and fistulization



Fig. 3. Demolitive result



Fig. 4.: Final result

Her left internal thoracic artery and the intercostals neurovascular bundle were ligated with absorbable suture (Fig. 3).

From a diamond incision of the lower abdomen, a dis-epidermized area was positioned to cover the pleural gap with a running suture in absorbable material (polyglactine 3/0).

Closure of the sternal defect was performed with a single 0.6-mm Gore-Tex cardiovascular mesh.

To cover the parietal defect, a rotation pectoral pedicle was sutured in precordial region with a running suture in absorbable material (polyglactone 25 2/0).

Pleural drainage and right submammary aspirative drainage and under the flap were positioned.

Epidural analgesia was employed in the immediate postoperative period. Postoperative respiratory function tests revealed satisfactory results and our patient could be relieved from endotracheal intubation a day after the operation. She did not have any problems in her daily activities or any occurrence of chest flailing or paradoxical movement of the chest.

No flap infection or wound dehiscence was noted, and she was discharged from hospital nine days after the operation.

Pathology revealed an invasive adenocarcinoma infiltrating the sternum and focal perineural invasion; immunohistochemistry was CK7+, ER and PR+ and TTF1 negative. She received two additional cycles of CEF chemotherapy consisting of 2 cycles of oral cyclophosphamide at a dose of 75 mg/m² on days 1 through 14, 60 mg/m² of epirubicin on days 1 and 8, and 500 mg/m² of fluorouracil intravenously on days 1 and 8. During her CEF therapy she also received antibiotic prophylaxis with ciprofloxacin at a dose of 500 mg orally twice daily. She feels well 18 months after the diagnosis, and she exhibited no evidence of recurrent disease on serial CT and MRI scans of her chest, abdomen, and brain. She remains asymptomatic and the stability of her chest wall is well preserved.

Discussion

Certain primary tumors, including breast cancer, have a particular propensity for bone metastasis. In patients with breast cancer, the incidences of either sternal involvement or an isolated sternal metastasis, as reported in literature, are of 5.2% and 1.9% to 2.4%, respectively^{1,6}.

The most frequent sites of bone metastasis are the thoracic and lumbosacral spine. The consequences of bone metastasis are often devastating, as only 20% of patients with breast cancer survives five years after the diagnosis⁵. Sternal resections are complex surgical procedures with potentially severe complications. The main goal of sternal resection is to achieve local control by wide local excision of a tumor⁸.

Chest wall resection for breast cancer was first performed by Schede in 1866 and then by Sauerbruch in 1907; partial sternectomy for a primary sarcoma was first described by Holden in 1878. In 1959 Brodin and Linden first performed and described total sternectomy in a case of chondrosarcoma involving the entire sternum¹.

Partial or total sternectomy, together with rib resection, are common thoracic surgical procedures for primary and secondary tumors arising from any of the structures forming the chest wall, as well as recurrent breast cancer or lung tumors invading the chest wall¹.

Conclusion

Bone metastasis is a frequent and early complication of breast cancer, the most common malignancy in women. The typical presenting symptom is pain and, as bone destruction progresses, fractures become common. Myocutaneous flaps and prosthetic materials greatly facilitate reconstruction after massive chest wall resection, resulting in improved patient's survival. Our purpose in reporting this case of sternum invasion is to arouse interest for further research: metastatic breast cancer to the sternum, if detected early and treated aggressively, holds the possibility of such a cure.

Riassunto

SCOPO: Le metastasi ossee sono una complicanza frequente e precoce del carcinoma della mammella. Questo caso clinico descrive una tecnica per una sternectomia parziale e ricostruzione della pleura con derma autologo dai quadrati inferiori dell'addome e della perdita di sostanza con un lembo mio cutaneo.

PAZIENTI E METODI: Riportiamo il caso di una donna di 50 anni con una lesione escavata dello sterno e consensuale frattura patologica da adenocarcinoma invasivo, trattato con exeresi parziale dello sterno e ricostruzione con un lembo mio cutaneo.

RISULTATI: La paziente non ha mostrato evidenza di recidiva di malattia e la stabilità della parte toracica era preservata.

CONCLUSIONI: Le metastasi sternali da carcinoma della mammella, se diagnosticati precocemente e trattati in maniera aggressiva con intento radicale, offrono una possibilità di guarigione.

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