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Retrospective Analysis of Patients with Sternum AsA Site of Recurrence in Treated Cases of Carcinoma Breast and Effect of Palliative Therapy-ASingle Cancer Centre Experience.

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Abstract
Background: *Bone metastasis is a frequent complication of cancer. It occurs in up to 70% of patients with advanced breast cancer. Sternal involvement in patients with breast cancer is relatively rare and its treatment is still controversial. The present retrospective analysis aims to bring forth the role of palliative treatment (radiotherapy and chemotherapy) in this unusual site of bony recurrence.*
Material & methods: *Data of pre-treated carcinoma breast patients from Nov 2012- Nov 2013 who had histopathologically proven sternal site recurrence and had received palliative treatment (radiotherapy & chemotherapy) were considered for analysis. Response to palliative radiotherapy and chemotherapy was assessed using RECIST criteria version 1.1, whilepain was assessed using pre and post treatment VAS score.*
Result*: 9 patients with sternum as site of metastasis were detected. Post RT 7/9 (77.77%) patients had partial response while 2/9 (22.22%) patient had negligible response. 2/9 (22.22%) patients after completion of palliative radiation and chemotherapy treatment had complete response,6/9 (66.66%) had partial response and 1 had stable disease. All 9 patients were found to be having moderate response to pain, assessed 1 month after completion of treatment.*
Conclusion*: Sternal metastasis to a certain extent can be taken care of with the palliative treatment and supportive care but the exact etiopathogenesis, prevention protocols and definitive modality of treatment still needs to be explored and discussed.*

I. Introduction

Breast cancer generally tends to spread to bones, and metastases to various other sites are a frequent finding. Metastasis to bone is seen almost in 70% of breast cancer patients and in approximately 15% to 30% of patients with carcinoma of the lung, colon, stomach, bladder uterus, rectum, thyroid or kidney. Breast cancer has the tendency to relapse in the bones, and 56% of autopsy cases reveal the occurrence of bone metastasis. 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 are alive five years after the discovery of bone metastasis [1].In patients with breast cancer, the presence of either sternal involvement or an isolated sternal metastasisis relatively uncommon, with reportedincidences of 5.2% and 1.9% to 2.4%, respectively [2] Meanwhile, local recurrence following the primary treatment of breast cancer ranges from less than 5% for stage I to greater than 25% for stages II and III with an extremely variable disease-free interval [3].Bone is a frequent site of initial relapse after curative surgery in patients with breast cancer[4] About 20~40% of bone metastases from breast cancer are presented as solitarylesions initially[5] and the sternum accounts for 5~ 34% of solitary skeletal metastases [6].Although the sternum is an unusual and infrequent site for solitary relapse in patients with breast cancer, the optimal treatment for these patients is still unknown. Breast cancer is the most common type of cancer in females, accounting for29% of estimated new cancer cases and 14% of estimated cancer-related mortalities [7]. Although breast cancer has become curable since some last decade, individuals treated for breast carcinoma remains at risk of local or distant recurrence indefinitely, depending on various factors. Local recurrence is commonly considered a first sign of treatmentfailure. Approximately 30% of patients experience local recurrence of breast cancer [8].Traditional options for the treatment of local recurrence following mastectomyinclude surgery, radiation therapy (RT), chemotherapy, hormonal therapy or a combination of modalities[9].The recurrence of tumors invading the sternumand ribs following mastectomy is relatively rare, but treatment problems are frequently encountered [10]. Sternal recurrences are considered under StageIV as per AJCC staging. Patients with metastases confined to the sternum have longer survival [11] and less chances of dissemination as the sternum lacks communication to the paravertebral venous plexus, which carries tumor cells to the pulmonary circulation [12] Many of sternal relapse were caused by local tumor invasion from either the primary site or adjacent lymph nodes [13], so they frequently presents as solitarylesion unlike other bone metastasis [14]. These features make effectivelocal control desired. Though the best treatment option is yet to be explored for inoperable cases; sternectomy is generally considered standard of care for isolated operable cases. Although resection of the sternum and ribs occasionally causes defects of the

thoracic wall, resulting in secondary complications and influencing the normal cardio-pulmonary function [15], definitive role of radiation therapy in this regard is lacking. This study summarises patient and tumor characteristics and effect of palliative radiation, chemotherapy and supportive care given in these patients of sternal recurrence.

Fig 1a-Arrow depicting sternal site swelling

II. Material & Method

Data of 9/938 patients of carcinoma breast in a follow up period from Nov2012 to Nov 2013 who presented with sternal swelling (fig.1a), pain and were found to be having sternal site recurrence was considered. These patients had been assessed clinically, radiologically (CT/MRI and Bone scan) (fig.1b & 1c)and were cytologically proven for recurrence .Cytology in all patient was metastaticadenocarcinoma from breast (fig 2A & 2B). They had received Palliative RT (20 Gy/5#) by cobalt-60 machine by single anterior field at depth as measured on CT scan along with Inj.Zolidronic acid 4mg as supportive care therapy followed by palliativetaxane based chemotherapy. Response after 1 month of completion of palliativeradiotherapyand then subsequently after completion of chemotherapy was analysedutilisingrevised RECIST criteria (1.1). Response in pain, if any, was also assessed utilising visual analogue score(VAS), pre and post treatment score.VAS score reduction of 100% was considered as complete responsewhile <100 % to >=30% was considered as partial response while <30% was considered as no response.

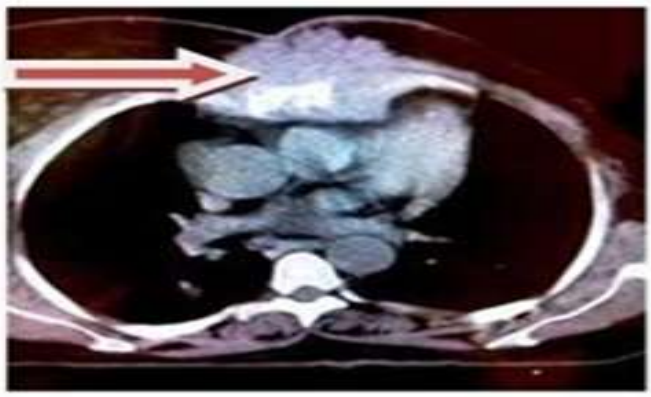

Fig 1b-CT scan showing sternal region mass

Fig 1c-Bone scan showing showing sternal metastasis

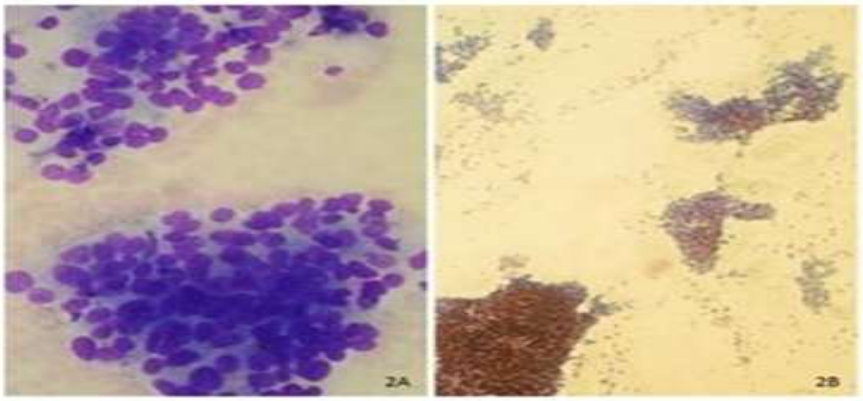

Fig 2A - Smear shows tumor cells arranged in glandular configuration with nuclearoverlapping and exhibiting prominent nucleoli. Myoepithelial cells are absent, MGG stain, x 80.
Fig 2B - Smear shows cellular clusters of tumor cells arranged in tight cohesive clusters as well as sheets, Papanicalou stain, x10

III. Observation & Results

Patient and tumor characteristics are as illustrated (Table-1).7/9 (77.77%) patients had partial response while 2/9 (22.22%) patient had stable disease post 1 month of completion of palliative radiotherapy. 2/9 (22.22%) patients after completion of palliative treatment had complete response, 6/9 (66.66%) had partial response and 1 had stable disease (fig 5). All 9 patients were found to be having moderate response to pain, assessed 1 month after completion of palliative treatment (fig 6). Patients with ER+, PR+ showed better response as compared to ER+,PR- and ER-,PR- patients (fig7).

Table 1- Patientand Tumor characteristics (n=9)

Patient characteristics N (%)
Stage II 3 III 6
Age 30-40 2 41-50 4 51-60 3
Initial site of disease UOQ 2 UIQ 6 LOQ 0 LIQ 1
Receptor status ER+/PR+/Her2neu + 2 ER+/PR-/Her2neu - 6 ER-/PR-/Her2neu- 1
Time to recurrence <1 year 2 >1 year 7

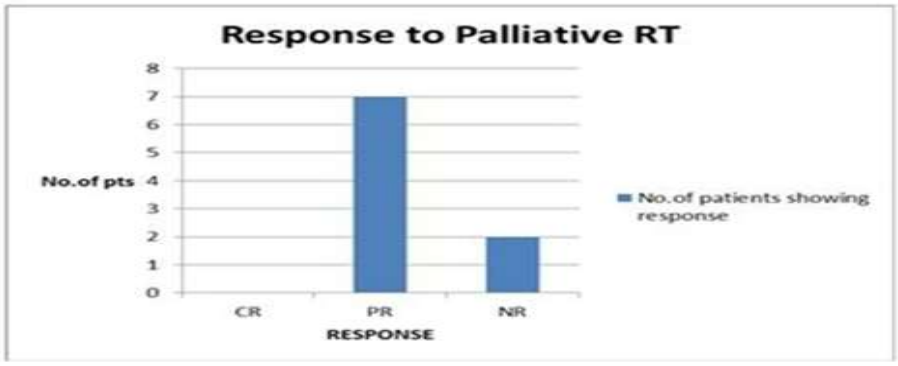

Fig 4- Response in mass reduction after 1 month of palliative radiotherapy

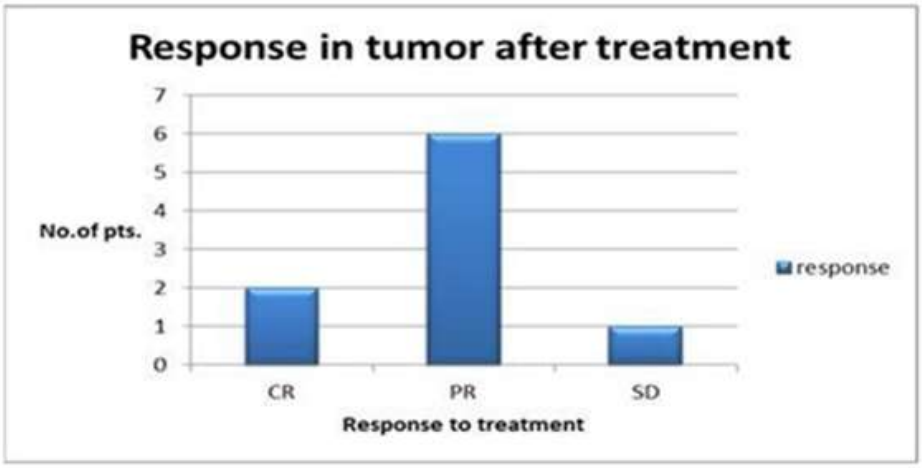

Fig.5 – Response at 1 month post palliativetreatment.

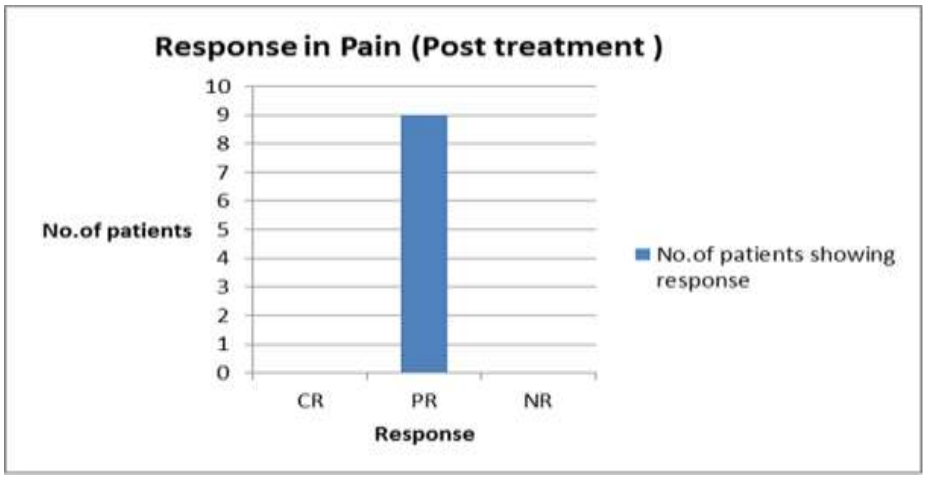

Fig.6- Response in Painafter completion of palliative treatment

Receptor wise response rates

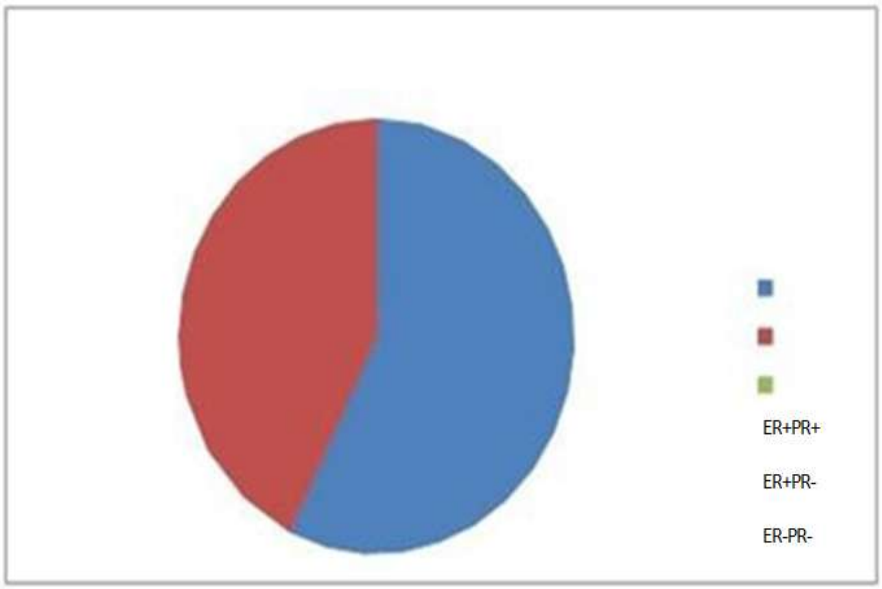

Fig. 7- Response rate according to receptor status.

IV. Discussion

100% patients showed decrease of the tumor size more than 30% and all patients with sternal pain experienced pain relief in the study done by Kim et al [16].Chung et al.[17] reported that 90.5% (19 patients/21 patients) of patients with a sternal or parasternal recurrence could achieve a complete response following radiation therapy, this good response following radiation therapy is consistent with previous reports. Park and Tarver reported 3 cases of solitary sternal metastasis from breast carcinoma that was treated with systemic therapy [18]. Although follow-up results on these patients were not clearly mentioned, the authors stated that single metastasis in the sternum have the unique tendency to remain solitary for longer than metastasis to other sites. Metastatic breast cancer confined to theskeletal system is a complication that can be diagnosed relatively easily. It is highly responsive to treatment and it is frequently associated with extendedpatient survival [19].A retrospective series noted long-term survival in eightpatients with isolated sternal recurrences. With a median follow-up of six years, seven of the eight patients with sternal metastases were alive with one death from metastatic breast cancer ten years after sternal recurrence.

Two patients are in continuous complete remission at seven and 14 years fromsternal recurrence [20].These remarkable results from contemporary US based oncology practices suggest sternal involvement could represent direct local/regional extension rather than systemic spread and carry a much better prognosis. In a retrospective analysis done by Andrew H Kawai et al found that 71% of patients had enlarged internal mammary lymph nodes who had developed sternal recurrence.Noguchi et al. performed sternectomy in nine patients with solitary sternal relapse of breast cancer and reported that the median survival time was 30 months after the sternectomy, which was longer than the survival time in patients with other bone metastases [21]. In the study done by Haeyoung et al. the median survival time was 27 months and the 5-year overall survival ratewas 51.9%. These results were comparable to Noguchi's surgical result. Also it was seen that the morbidity and mortality associated with surgery was more compared to RT. Though studies have shown good results with surgery as well as radiationtherapy but the overall picture still remains unclear regarding the management issues of sternal recurrences in ca breast. Some further studies of multimodality therapy is necessary toestablishwhether aggressive local therapy can help to achieve long-term survival and to select optimal treatment in metastatic breast cancer limited to the sternum. Although it is difficult to decide whether surgery or radiation therapy offers a better treatment result for solitary sternal relapse, radiation therapy may be considered as a reasonable option due to its comparable survival results and little morbidity. The present analysis emphasises to the fact that radiation therapy in the form of palliative RT to the local site is effective in reducing pain and along with taxane based chemotherapy leads to reduction in the size of the mass.

V. Conclusion

Though sternal metastasis to a certain extent can be taken care of with the palliative radiation therapy and/or chemotherapy but the exact etiopathogenesis and preventionprotocols still needs to be explored and discussed.

References

[1]. Solitary metastatic adenocarcinoma of the sternum treated by total sternectomy and chest wall reconstruction using a Gore-Tex patch and myocutaneousflap:acasereport .StavrosI ,Daliakopoulos1*,Michael .N ,Klimatsidas2, Reiner Korfer1.

[2]. Kwai AH, Stomper PC, Kaplan WD: Clinical significance of isolated scintigraphic sternal lesions in patients with breast cancer. J Nucl Med 1988, 29:324-3281.

[3]. Picciochi A, Granone P, Cardillo G, Margaritora S, Benzoni C, D'ugoD:Prosthetic reconstruction of the chest wall. IntSurg 1993, 78:221-224.

[4]. Elder EE, Kennedy CW, Gluch L, et al. Patterns of breast cancer relapse. Eur J SurgOncol2006;32:922-927.

[5]. Koizumi M, Yoshimoto M, Kasumi F, Ogata E. Comparison between solitary and multiple skeletal metastatic lesions of breast cancer patients. Ann Oncol2003;14:1234-1240.

[6]. Boxer DI, Todd CE, Coleman R, Fogelman I. Bone secondaries in breast cancer: the solitary metastasis. J Nucl Med 1989;30:1318-1320.

[7]. Siegel R, Naishadham D and Jemal A: Cancer statistics, 2012. CA Cancer J Clin 62: 10-29, 2012.

[8]. 8.Pennery E: The role of endocrine therapies in reducing risk of recurrence in postmenopausal women with hormone receptor-positive breast cancer. Eur J OncolNurs 12: 233-243, 2008.

[9]. Halyard MY, Wasif N, Harris EE, et al: ACR appropriateness criteria localregional recurrence (LR) and salvage surgery: Am J ClinOncol35: 178 -182, 2012.

[10]. Sersa G, Cufer T, Paulin SM, Cemazar M and SnojM ::Electrochemotherapy of chest wall breast cancer recurrence. Cancer Treat Rev 38: 379-386, 2012.

[11]. Singletary SE, Walsh G, Vauthey JN, et al. A role for curative surgery in the treatmentofselectedpatientswithmetastaticbreastcancer.Oncologist2003;8:241-251.

[12]. Boxer DI, Todd CE, Coleman R, Fogelman I. Bone secondaries in breast cancer: the solitary metastasis. J Nucl Med 1989;30:1318-13202.

[13]. Kwai AH, Stomper PC, Kaplan WD. Clinicalsignificanceofisolatedscintigraphicsternallesionsinpatientswithbreastcancer.JNuclMed1988;29:324-3284.

[14]. Koizumi M, Yoshimoto M, Kasumi F, Ogata E. Comparison between solitary and multiple skeletal metastatic lesions of breast cancer patients. Ann Oncol 2003;14:1234-1240.

[15]. Chagpar A, Meric-Bernstam F, Hunt KK, et al: Chest wall recurrence after mastectomy does not always portend a dismal outcome. Ann SurgOncol 10: 628-634, 2003

[16]. ResultsofThree-DimensionalConformalRadiationTherapyfor the Treatment of a Solitary Sternal Relapse of Breast Cancer,Haeyoung Kim et al DOI: 10.3857/JKSTRO.2008.26.2.91.

[17]. ChungEJ, Suh CO, ParkW, Lee HD, Lee KS, Kim GE. Parasternal recurrence after curative resection of breast cancer.J Korean Cancer Assoc1998;30:253-261.
[18]. .ParkHM,TarverRD:Solitarysternalmetastasisfrombreastcarcinoma.ClinNucl Med 1983, 8:373-374.
[19]. Sherry MM, Greco FA, Johnson DH, Hainsworth JD: Metastatic breast cancerconfinedtoskeletalsystem:anindolentdisease.AmJMed1986,81:381-386.
[20]. ChockalingamP, Astrow AB, Klein P, Huang Y, Reichman BS, Citron ML. Isolated sternal involvement in breast cancer: is it truly stage IV disease? Clin Breast Cancer. 2011 Jun;11(3):191-4. Epub 2011 May3. PubMed PMID:21665140.
[21]. Noguchi S, Miyauchi K, Nishizawa Y, Imaoka S, Koyama H, IwanagaT:Results of surgical treatment for sternal metastasis of breast cancer. Cancer 1988, 62:1397-1401.