

CASE REPORT

Metastatic Squamous Cell Carcinoma of Sternum: An Oncological Curiosity

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ABSTRACT

Skeletal metastasis is a frequent complication of cancer resulting in significant morbidity as well as mortality. We highlight a case of a 73-year-old gentleman with metastatic squamous cell carcinoma of the sternum. He denied dysphagia, shortness of breath, goitre, and presence of chronic non-healing ulcer. He was anaemic and carcinoembryonic antigen (CEA) was 18.7. Chest radiograph on lateral view showed a suspicious cortical irregularity. Computed tomography (CT) scan of thorax revealed an aggressive sternal lesion with soft tissue component. Ultrasound-guided biopsy was performed and the biopsy was consistent with metastatic squamous cell carcinoma. Squamous cell carcinoma has a predilection to metastasize via haematogenous spread, but direct extension of tumour into the bone is not frequently seen. Finding the primary cause is utmost importance either via imaging modalities or invasive procedures. Isolated secondary lesion is extremely rare but unfortunate among defaulters. We discuss its diagnostic work-up and treatment options conserved to manage this condition.

INTRODUCTION

Skeletal metastasis is a diagnostic dilemma to the attending surgeon as well as the oncologist. It can result in significant morbidity and mortality if prompt diagnosis cannot be achieved. The prevalence of bone metastasis is estimated to account of 70% of all malignant bone tumours with majority happen in breast and prostate cancer. Bone metastases most commonly affect the axial skeleton¹. Metastatic

tumour of the sternum is rare with paucity of published articles regarding the incidence of sternal metastasis². When it happens, it can lead to loss of the biomechanical support of the sternum-rib-thoracic spine complex and risk of fracture causing acute kyphosis and neurological injury².

Bone metastases are haematogenous in onset. Blood flow is high in the red marrow as compared to yellow marrow accounting for the predilection of metastases for those sites, commonly to the axial skeleton³. Our case showed a very unusual manifestation of initial presentation of bone metastasis with absences of symptoms or signs of primary origin.

CASE PRESENTATION

A 73-year-old gentleman presented with 3-month history of sternal pain after falling from a motorbike. He was previously well. During the initial trauma, he was treated with analgesia and discharged home uneventfully. However, due to persistent pain, he sought for a second opinion. He had a 20-pack/year history of cigarette smoking. There was no history of chronic cough, fever, or night sweats. He denied dysphagia, shortness of breath, non-healing ulcer, and neck swelling. On examination, there were no obvious masses, deformities, ulcer, or discolouration seen at the sternum. Full detailed physical examination of heart, lungs and abdomen including per rectal examination revealed no abnormality. There was no lymphadenopathy as well.

Work up revealed anaemia with haemoglobin level of 9 g/dL with normal serum electrolyte, renal and liver functions. However, the level of carcinoembryonic antigen (CEA) was elevated with result of 18.7. A chest radiograph on AP view did not demonstrate any lung lesions (Figure 1A) but on lateral view, it showed a suspicious cortical irregularity (Figure 1B).

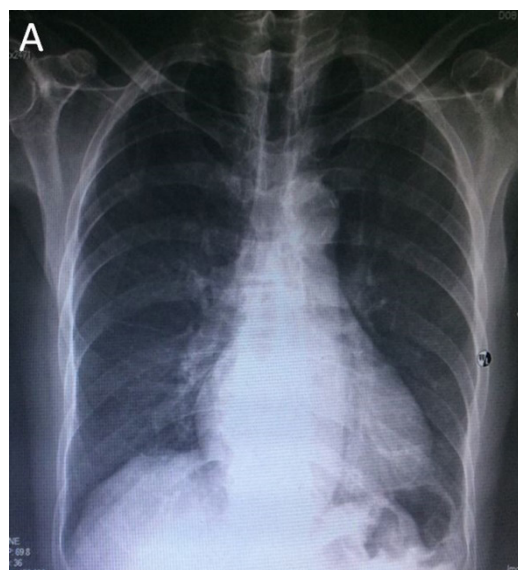


Figure 1A Chest radiograph showing as normal finding from PA view

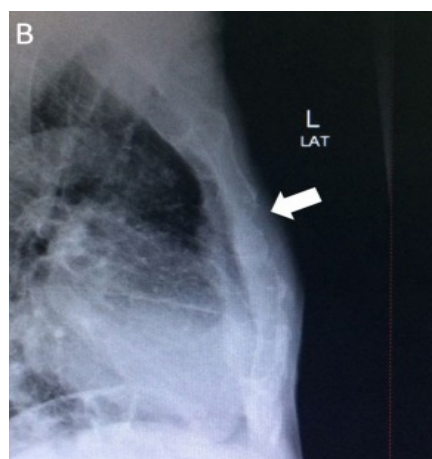


Figure 1B Chest radiograph from lateral view showing abnormal cortical outlines of the sternum (white arrow)

Computed tomography (CT) scan of thorax revealed an aggressive sternal lesion with soft tissue component measuring 4.1 × 6.8 × 6.4 cm (Figure 2A) with absence of oesophageal or lung lesion (Figure 2B and Figure 2C). It was more prominent on 3-dimensional (3D) view (Figure 3). Ultrasound-guided biopsy was performed and the biopsy was consistent with metastatic squamous cell carcinoma (Figure 4A and Figure 4B). In view of the elevated CEA level, a colonoscopy was performed, but to our surprise, it was a normal finding. We were deciding for more advanced imaging such as PET scan, but he unfortunately lost to follow up.

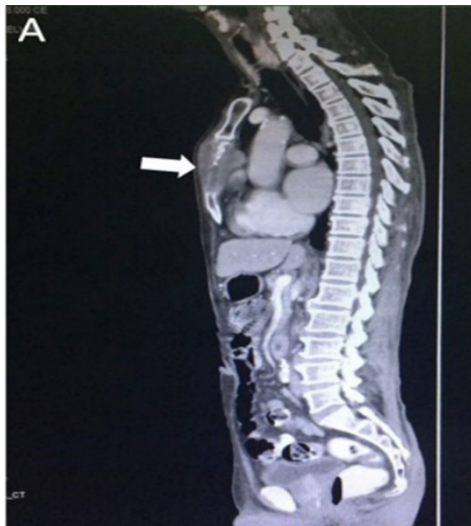


Figure 2A Sagittal view of CT of thorax revealing an aggressive lytic lesion of the body of sternum (white arrow)

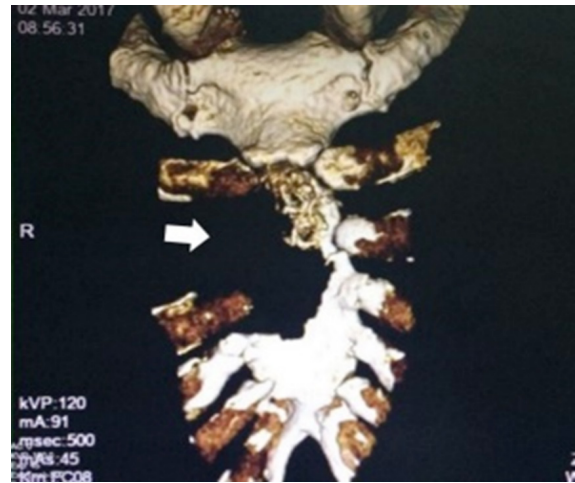
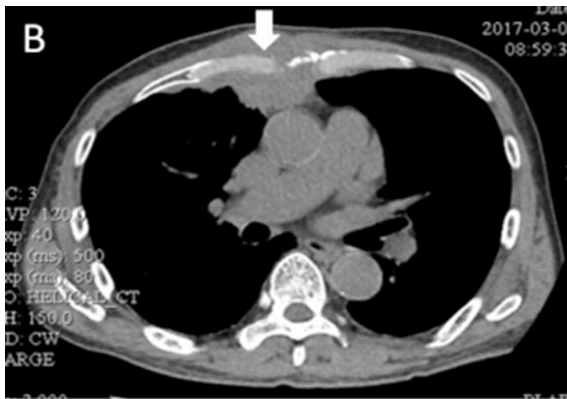
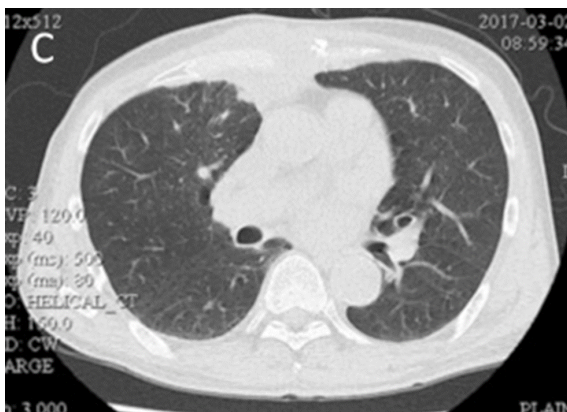


Figure 3 3D reconstruction of CT of thorax showing an aggressive lesion of sternum (white arrow)



2B



2C

Figure 2B Axial view showing sternal lesion (white arrow) with absence of oesophageal cancer or dilated oesophagus

Figure 2C Lung window view revealing normal appearance of the bilateral lung fields

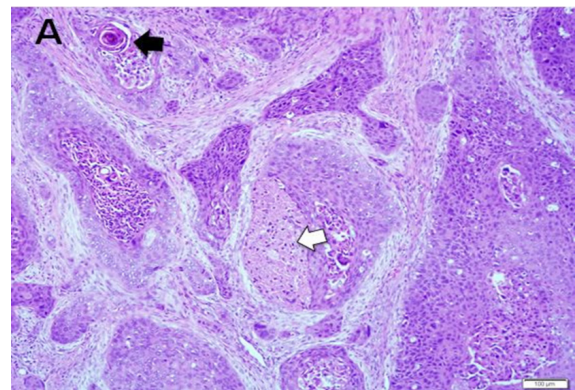


Figure 4A Section from the tumour showing sheets and islands of malignant cells with marked desmoplastic stroma. There are also presence of necrosis (white arrow) and keratin pearl (black arrow) (H&E, original magnification $\times 10$).

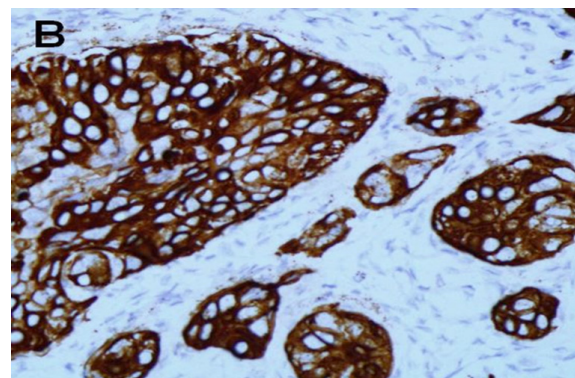


Figure 4B The malignant cells are positive for CK5/6 (Immunohistochemistry, original magnification $\times 40$)

DISCUSSION

When skeletal metastasis is the presenting problem and the primary site is occult, there is a need to identify the primary site as soon as possible. Due to its nature of being a late presentation, many studies on bone metastasis had been on autopsy series. Although skeletal metastasis is common especially vertebral spine, isolated metastatic tumours of the sternum are rare. The common histology are mostly adenocarcinoma or ductal in origin arise from the breast, kidney, gastrointestinal tract, lung, and even thymus^{4, 5, 6}. Squamous carcinoma metastatic to bone marrow is an exceedingly rare lesion. Although the search for the primary tumour is often time-consuming and difficult, its identification and histologic diagnosis provide valuable information for determining the appropriate treatment.

For our patient, a vigorous search for the primary tumour was undertaken. Combinations of non-invasive as well as invasive modality were carried out to assist the final diagnosis. The histopathological findings of metastatic squamous cell carcinoma, coupled with the CT scan were highly suggestive of the lung as the primary culprit. Metastatic skeletal disease places an enormous burden on patients, secondary to pain, functional impairment, and worsening quality of life. Treatment modalities include systemic (chemotherapy or hormonal therapy) or local (radiotherapy or surgery) therapy which all carry their own benefits and complications.

Resection of sternal malignancies carries formidable surgical challenges. The main difficulty is making a radical full thickness resection and reconstruction of chest wall without compromising the stability and its ventilatory mechanics⁷. Literature reviews of radical or complete chest wall resection are only performed for primary malignancy of sternum or rarely, in metastatic sternum⁸. Resection of a metastasis, therefore, should only be performed if the primary disease has been controlled with no evidence of

other metastasis provided the patient is fit to undergo the procedure. Thus, the role of surgery is controversial in this case.

Pain management is also often an important part of management especially pain is the main presenting complaint. Radiotherapy is the standard of care for bone metastasis. It takes time to take effect and may fail to relieve pain in 20 – 30% of patients⁹. Radiation therapy over the sternum is hampered by the proximity to thoracic viscera. It can have devastating complication to the thoracic viscera including cardiovascular disease, acute pneumonitis and oesophageal problems¹⁰. Minimally invasive and image-guided procedures are gaining wider acceptance in treating these lesions as an adjunct to radiotherapy.

The mechanism of pain relief of bone metastasis after radiofrequency ablation (RFA) and percutaneous osteoplasty includes (a) bone stabilization and prevent micro-motion; (b) direct tissue toxicity; (c) necrosis of neural tissue; and (d) thermal injury. However, osteoplasty of non-weight-bearing flat bones is rarely reported¹⁰. Combined RFA and percutaneous osteoplasty appears to be promising for the palliative treatment of both spinal and extra-spinal metastasis. This is evident in a retrospective study by Tian et al. showing effective methods for pain relief and functional recovery in patients with painful extraspinal bone metastases and can significantly improve quality of life¹¹.

CONCLUSIONS

Palliative treatment is of consideration in the management of this patient who displayed a systemic disease. The combination therapy with full abbreviation radiofrequency ablation and percutaneous osteoplasty is feasible, effective, and safe. It is a promising technique for the treatment of painful bone metastases and can improve quality of life. Combination therapy can be considered in this patient if analgesia fails.

CONFLICT OF INTEREST

The authors declare that they have no competing interests in publishing this case.

CONSENTS

Written informed consent was obtained from the patient to publish the case. A copy of written consent is available for review by the Chief Editor.

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