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Abstract Form

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Project Title:	Management of Giant Cell Tumor of Bone with Thoracic Metastases: A Case Series

Research Category (please check one):

☐	**Original Research**	☒	**Clinical Vignette**	☐	**Quality Improvement**	☐	**Medical Education Innovation**

Abstract

Introduction: Giant cell tumor of bone (GCTB) is a relatively rare, benign, but locally aggressive neoplasm that accounts for approximately 6% of all primary bone tumors with unpredictable behavior[1]. The pathogenesis is thought to be related to overexpression of RANKL by osteoblast-like stromal cells leading to osteoclast cell recruitment. One to four percent of GCTB patients are also found to have histologically benign pulmonary metastases and can be treated primarily with curettage vs wide resection without adjuvant therapy[1]. However, in situations where initial surgery is contraindicated, such as those associated with severe functional compromise, significant co-morbidities or unresectable disease, treatment options include radiation therapy, arterial embolization, and denosumab. We present two cases of patients with GCTB with thoracic involvement who were treated with either denosumab alone or resection first that later required denosumab therapy.
Case report: A 30-year-old man with history of an unspecified benign bone tumor involving the right hallux status post amputation four years prior to admission presented with new onset pleuritic chest pain. CT imaging demonstrated innumerable lung nodules and masses with dystrophic calcifications, the largest measuring 14-cm. Biopsy confirmed a diagnosis of metastatic GCTB. As the disease was deemed unresectable, he was started on denosumab weekly for three weeks, followed by monthly injection. Repeat imaging after four months confirmed treatment response with decrease in number and size of his lesions with the largest measuring 10-cm. Another case involved a 20-year-old man with no past medical history who presented with a slow-growing mass over his right pectoralis for 3 months prior to admission with associated dyspnea, cough, and 40-lb weight loss. Imaging demonstrated an aggressive-appearing chest wall mass with intrathoracic extension up to 11.5cm into the pleural and mediastinal space and destruction of the right anterior fifth rib. Biopsy demonstrated grade III GCTB, and the patient underwent resection of the chest wall, rib 5 total excision, and rib 6 lateral resection without adjuvant treatment. However, surveillance imaging six months later demonstrated new bilateral pleural and pulmonary nodules with biopsy-proven metastatic disease recurrence. He is currently being treated with denosumab with plans for possible radiation therapy versus serial embolizations.
Discussion: GCTB is a rare, locally aggressive benign bone tumor that predominantly affects young adults and occasionally results in metastasis to other organs, especially the thoracic region. Treatment typically involves RANK-ligand inhibition with denosumab, during which patients require close monitoring of electrolyte levels and dental hygiene to monitor for jaw osteonecrosis. Although the first patient was able to demonstrate partial response with denosumab treatment alone, the second patient showed signs of recurrence six months post-resection and required systemic therapy with denosumab. If there is evidence of disease progression while being treated with denosumab, second-line treatment includes radiation therapy, embolization, or even interferon alfa-2b which showed some activity against GCTB in case reports[2]. Secondary malignant transformation is exceedingly rare with reported incidence ranging from 1.4 to 6.6% of cases and is defined as a high-grade sarcoma that presents on the same anatomic site of a previous benign GCTB. The exact mechanism is unclear but thought to be related to alterations of the tumor suppressor gene p53 since recurrent cases of GCTB were found to express p53 more frequently than nonrecurrent ones[3]. Medical oncology providers should be aware of the possibility of malignant transformation in all patients with GCTB and should involve a multi-disciplinary approach to management, with future research focusing on elucidating reliable predictive biomarkers for malignant transformation.

References:
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