Bladder neoplasm • Carcinoma • Bone metastasis

Abstract
We report a case of a 61-year-old gentleman who presented with frank hematuria with associated weight loss and ongoing left knee pain. Subsequent investigation revealed a muscle invasive bladder carcinoma with a related unusual bone metastasis. Though bone metastases form bladder carcinoma are common, frequent deposition sites include the spinal column and pelvis. This case report is to the best of our knowledge the first reported case of a tibial metastasis for relevant bladder carcinoma. Furthermore, we reviewed the literature, relevant diagnostic and management surrounding such occurrences.

Introduction
Bladder cancer is a common urological cancer with significant morbidity and mortality. It is the 9th most common cancer worldwide, with approximately 130,000 deaths per year [1]. Though bone metastases have been observed with bladder cancer, they are considerably less common when compared to prostate and breast cancer. Common bone metastases sites for bladder carcinoma include pelvis and spine [2]. Our case reports an unusual metastasis to the tibia.
Following discussion at the multi disciplinary meeting, he underwent a left total knee replacement and was commenced on a course of chemotherapy (cisplatin and gemcitabine). On review in the clinic at 2 months, he is mobile and pain free. He is undergoing regular surveillance cystoscopy.

**Discussion**

Transitional cell carcinoma (TCC) represents the vast majority of malignant bladder tumors. The most frequent site of metastases of TCC is to lymph nodes (51–88%), lung (36–40%), bone (22–37%) and adrenal glands (6–21%) [2]. Data suggests that bone metastasis represent a surrogate to the degree of muscle invasion of the bladder neoplasm [2]. About 30% of patients at presentation have muscle invasive disease, with 10–15% having metastatic disease evident [3]. Another 30% of newly diagnosed bladder neoplasms are likely to have occult metastatic disease [3].

The spine and pelvis are the most common bony metastatic deposit sites. Hematogenous seeding is the most common source for bladder neoplasm metastasis [4]. It has been postulated that the propensity for bladder and other urological malignancies to disseminate to the spine is due to the anatomical relationship between the urological venous system and the large network of vertebral veins known as Batson’s plexus [5].

Typical presentation of bone metastasis includes extensive bone pain with subsequent loss of function. Imaging is integral in assessing risk of pathological fracture. Conventional imaging has been largely replaced with higher imaging modality including CT or MRI scans. Isotope bone scan, though frequently used due to high sensitivity, lacks the specificity of CT or MRI [6]. Bone biopsy is often a viable option (under CT guidance) if there is any discrepancy in diagnosis or results changing management strategy [6].

The presence of bony involvement in bladder neoplasm indicates an advanced disease process. Median survival of between 6 and 12 months has been reported with bone metastasis [7]. Management of bony metastasis includes pain control with analgesia and/or radiotherapy. Orthopedic consultation is crucial for preemptive surgical management to stabilize and maintain functional status. Mirel’s score highlights those that would benefit from prophylactic fixation of long bones with metastatic disease [8].

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Fig. 1. Subtle lytic lesion involving the medial portion the left tibia.

Fig. 2. MRI displaying a large lesion with extensive marrow edema, consistent with metastasis.
lesions. This score is based on the lesion site, size, pain severity and nature (lytic, sclerotic or mixed) [8]. Prophylactic fixation has been associated with significant symptom relief. Our case represents an unusual location of bone metastasis from TCC of the bladder, to the best of our knowledge this is the first reported case of a tibial metastasis.

**Conclusion**

Muscle-invasive bladder cancer carries a substantial risk of bone metastasis. This should be suspected in all patients presenting with bone pain and/or loss of function. Clinicians should be aware of atypical presentations of bone metastasis, as well as the importance of early orthopedic review in management of these patients.

**References**