

## Primary Osteosarcoma of the Urinary Bladder

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### Abstract

Osteosarcoma is a very rare tumour of the urinary bladder and should be distinguished from other bone-forming tumours, such as carcinosarcoma and transitional cell carcinoma with osseous metaplasia. The prognosis for this tumour is very poor. In our case report, a 62-year-old man who presented with right flank pain, dysuria and haematuria was found to have a primary osteosarcoma of the urinary bladder with metastatic pulmonary nodules.

### Keywords

Urinary bladder; Osteosarcoma; Tumour

### Introduction

Osteosarcoma of the urinary bladder is a rare mesenchymal malignant neoplasm that can form osseous, osteoid and chondroid matrix in soft tissues [1]. Less than 40 cases have been reported with a male to female ratio of 4 to 1 with age ranging from 41-86 years of age [2,3]. The aetiology of sarcomatoid tumours is poorly understood, but previous radiotherapy or chemotherapy is associated with the development of sarcomatoid carcinoma [4].

### Case Presentation

A 62-year-old male with a three-month history of right flank pain haematuria and poor urinary flow. He was an ex-smoker. Ultrasonography demonstrated right hydronephrosis and a bladder mass with an extra luminal component (Fig 1A). Computed tomography (CT) demonstrated a large well defined partially calcified soft tissue pelvic mass and multiple right-sided metastatic pulmonary nodules consistent with metastases (Fig. 1A & 1B). Magnetic resonance imaging confirmed a large irregular mass on the posterior wall of the bladder (Fig. 1C).

Cystoscopy at the time revealed a large smooth polypoid partially calcified mass with a papillary area on the posterior urinary bladder wall. This mass was resected transurethrally. Histopathology demonstrated extensively necrotic fragments of tissue infiltrated with high-grade neoplastic tissue with large areas of chondroid and osseous differentiation (Fig. 2 and Fig. 2A). The biopsy specimen was stained in several sections by immunoperoxidase technique for the epithelial cytokeratin; the results were negative. Pathological staging was T3N0M1. Patient declined for further treatment and was managed with palliative supportive treatment. He died 15 months later.

### Discussion

Soft tissue sarcoma of the genitourinary (GU) tract are uncommon and they account for approximately 2.1% of overall GU malignancies and urinary bladder (UB) sarcomas account for less than 1% of malignant UB tumors [1-5]. Ordonez (1856) reported of a malignant bladder tumour containing elements of cartilage or bone and suggested that extra-skeletal osteosarcomas may represent malignant growth of a single component in a teratoma [3]. Chitiyo described 4 possible pathohistogeneses of osteosarcoma: metaplasia of the bladder epithelium, stromal metaplasia, transfer of osteoblasts via a haematogenous route and development of osteoblasts from immature mesenchymal tissue derived from the Wolfian body [5].

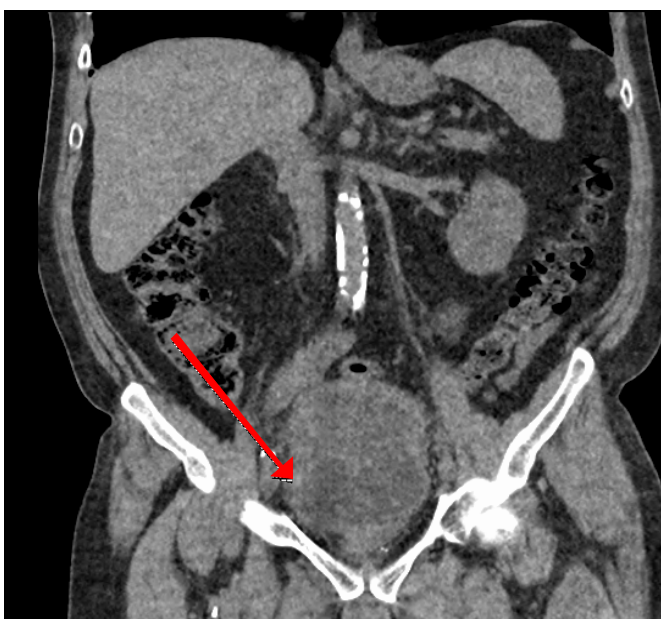
Osseous metaplasia should be considered in the differential diagnosis of osteosarcoma with sarcomatoid-urothelial carcinoma and urothelial carcinomas. Positive cytokeratin immunostaining and ultrastructural epithelial characteristics are retained in malignant mesenchymal elements indicate the likely epithelial origin of the tumour. In this case, the histology of the bladder tumour was identical to osteosarcoma of the bone with characteristic formation of lace-like osteoid interspersed between malignant cells and abundant chondroid matrix [8]. Distinction from carcinosarcoma does not have major therapeutic implications, as both tumours require aggressive therapy. Distinction from a transitional cell carcinoma with osseous metaplasia is important if the carcinoma is low grade [9].

The mean survival of bladder osteosarcoma is less than 6 months. The tumor is locally aggressive and distant metastases are usually confined to the lung. Improved survival may be associated with radical cystectomy and adjuvant chemoradiotherapy in the non- metastatic setting; however prognosis remain poor irrespective of treatment [8-10]. Our patient unexpectedly survived for 15 months.

## Conclusion

Primary osteogenic carcinoma of the bladder is a rare and aggressive. Osteosarcoma can be differentiated from urothelial carcinoma with osseous metaplastic change and sarcomatoid differentiation. Prognosis is poor and management is typically supportive.

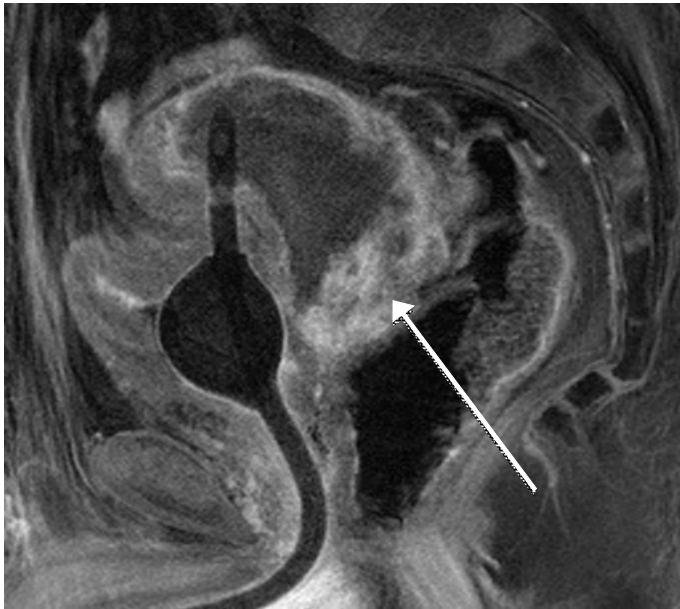
## Figures



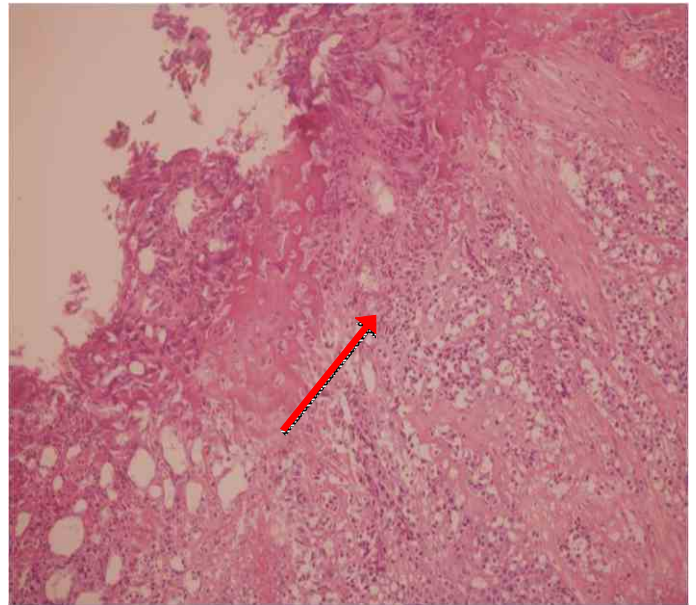
**Figure 1A:** Coronal view non-contrast computed tomography scan confirmed large soft tissue well defined partially calcified mass in the pelvis (Red arrow).



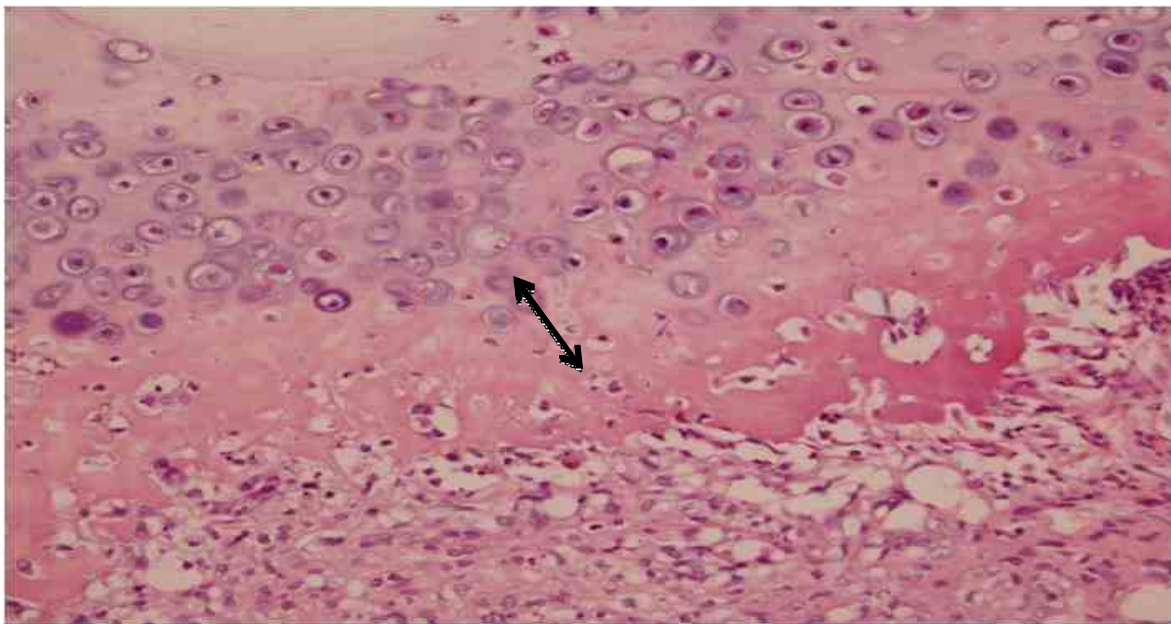
**Figure 1B:** Axial view shows 1.6cm metastatic right lung nodule



**Figure 1c:** Sagittal view of Magnetic resonance imaging: A large pelvic mass separate from rectum and sigmoid colon. Foley catheter in situ. Consistent with T3N0M1



**Figure 2:** Histopathology of endoscopic resected tumour: Solid nests of high-grade urothelial carcinoma infiltrating the muscularis propria of the urinary bladder (H &E, magnification  $\times 40$ )



**Figure 2A:** Histopathology (High magnification): Osteosarcoma of the urinary bladder with malignant osteoid formation and chondroid differentiation (H&E,  $\times 200$ )

## Learning points

1. Osteosarcoma of the urinary bladder is a rare aggressive tumour with poor prognosis.
2. The most common symptoms are macroscopic haematuria and dysuria.
3. Osteosarcoma of the bladder should be distinguished from other bladder tumours that may be associated with bone formation, such as carcinosarcomas and transitional cell carcinomas with osseous metaplasia, both of which have a better prognosis than osteosarcoma.
4. The stage of the disease at the time of diagnosis is the best predictor of survival.



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