

Lumbar Vertebra Collapse- First Manifestation of Renal Cell Carcinoma: A Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. Author PA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author SV managed the analyses of the study and managed the literature searches. Author KN managed the analyses of the study. All authors read and approved the final manuscript

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Case Study

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ABSTRACT

Renal cell carcinoma is the most common urological malignancy having aggressive and unpredictable metastatic potential. In the available literature, a number of cases of isolated metastasis to the spine from renal cell carcinoma have been described, but there is a dearth of literature regarding a case in which symptoms from the metastasis of a renal cell carcinoma preceded the detection of the primary tumor. We present a unique case of our knowledge in which a young patient presents with lumbar vertebra collapse for which he was managed and subsequently diagnosed with renal clear cell carcinoma with spinal metastasis.

Keywords: Renal cell carcinoma; spinal metastasis; vertebra collapse.

1. INTRODUCTION

Renal cell carcinoma (RCC) is the most common kidney malignancy. Osseous metastasis from

renal cell carcinoma is commonly seen in upto 50% of cases, out of these 15% occur in the spine [1]. Spinal metastases are a significant cause of high morbidity rates among cancer

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patients [2]. With osseous metastases, RCC typically has an aggressive course, resulting in limited expected survival of 12-22 months [3,4].

One third of patients with renal cell carcinoma already had metastasis at the time of initial diagnosis [5]. Patient with localized RCC develop distant metastasis within 5 years [6,7], but dilemma exists that when symptoms from the metastasis precedes the detection of primary carcinoma. There may be undue delay till the underlying malignancy is discovered which may ultimately affect the long term survival of patients.

This obstacle can be overcome by detailed examination, early diagnosis & management of advanced metastatic disease and primary cancer. In the present case we report the case of a young patient who presented initially with lumbar vertebra collapse later on diagnosed as spinal metastasis with renal clear cell carcinoma as the primary tumor.

2. CASE REPORT

A 39 years young male presented to our outpatient department with complaints of backache radiating to bilateral thighs and both lower limb weakness for 1 month, following which he was unable to walk without support for last 15 days. There was no history of abdominal / flank pain & hematuria. Bladder & bowel habits normal. There was no history of trauma, previous surgery & medical illness.

2.1 On Examination

The patient is averagely built and nourished, conscious, co-operative, and well oriented. His vitals were normal. Neurological examination revealed muscle strength of 0/5 below the knee with absence of sensation and 3/5 for the proximal lower limbs. Per abdomen examination: Soft, non-tender, and no organomegaly. No renal angle fullness or tenderness. Per rectal examination: prostrate flat, anal tone normal.

2.2 Investigations

On evaluation using magnetic resonance imaging (MRI) lumbar spine, a solitary lesion of L4 vertebra collapse with altered marrow signal and retropulsion of posterior fragments with severe canal stenosis & cauda equina compression was seen suggesting either plasmacytoma or metastasis. Computed

tomography (CT) guided biopsy done from L4 vertebra for microscopic study of the lesion confirmed metastasis from renal cell carcinoma with the help of immunohistochemical studies - CD10, PAX8, CD3, Vimentin & CKAE1/AE3-positive. Further imaging of the patient revealed a small right renal mass. It was further characterized with CECT and MRI.

Magnetic resonance imaging (MRI) abdomen & pelvis demonstrated a suspicious T1, T2, STIR iso-intense with restricted diffusion (DWI hyper-intense, ADC hypo-intense) lesion seen in inter polar region of right kidney measuring 12*12*14mm.

Computed Tomography (CT) abdomen showed well defined heterogeneous isodense solid lesion arising from lower inter polar region of right kidney measuring 2.1*1.9*2.2cm. Post contrast imaging showed mild to moderate heterogeneous enhancement, no significant regional lymph node enlargement with normal renal artery & vein both sides.

2.3 Diagnosis

Considering the history and presentation, a provisional diagnosis of renal cell carcinoma with synchronous spinal metastasis was made.

2.4 Treatment

The patient underwent initial emergency spinal fixation for the vertebral collapse followed by right radical nephrectomy one month later. The diagnosis of renal cell carcinoma was confirmed on histopathological examination which shows clear cell carcinoma with WHO grade II with tumor size of 2.5*2*3.5cm. Tumor invasion of the renal sinus was noted. No lymphovascular invasion was seen & the cut ends of vessels, ureter and perinephric fat were free of tumor.

The patient was treated postoperatively with targeted therapy Sunitinib, an orally administered tyrosine kinase inhibitor TKI.

2.5 Follow Up

The patient is on bed rest and unable to walk. Muscle power has improved to 2/5 below the knee in both lower limbs but no significant improvement in sensation was noticed. Bladder and bowel habit normal, no sign & symptoms of lungs and visceral metastasis.



Fig.1. X-ray show L4 vertebra collapse



Fig. 2. MRI lumbar spine done, shows L4 vertebra collapse with retropulsion of posterior fragments



Fig. 3. X-ray LS spine after vertebral fixation



Fig. 4. CT abdomen showed well defined heterogeneous isodense solid lesion arising from lower interpolar region of right kidney



Fig. 5. A suspicious lesion T1, T2, STIR iso-intense with restricted diffusion (DWI hyper-intense, ADC hypo-intense) seen in interpolar region of right kidney

3. DISCUSSION

Renal cell carcinomas (RCC) are very well known for their unpredictable and aggressive metastatic potential & pattern. Jasper Decoene et al concluded that the diagnosis of metastases precedes the diagnosis of RCC in 5% cases [8]. Till now only a handful of cases have been reported in literature [8,9]. Two cases of biopsy proven metastatic RCC with no demonstrable renal primary mass despite several imaging using CT and MRI have been reported [10]. In contrast to these case reports, this patient had no urological complaints like haematuria, abdominal & flank pain in the past and no

previous history of spinal trauma & surgery. Yet after the spinal metastasis was proved originating from the kidney a renal mass was detected and treated. In India RCC is being more frequently reported in younger patients of < 39 years and had less survival rate [11]. In the present case too, the patient belongs to the younger age group.

5-14% of patients with spinal metastasis may present with pathological fracture as a primary presentation [4] and with spinal cord compression [12]. However in our case, the patient presented with lumbar vertebra collapse. Various studies concluded that young patients

with solitary spinal metastasis, no visceral metastasis and undergoing early radical surgical treatment for spinal metastasis had longer disease free & overall survival [13-15]. In the present case the factors associated with improved survival are the younger age of patient, no major comorbidities, the absence of visceral and extra spinal bony metastases, solitary spinal metastasis fixed as an emergency and radical nephrectomy done for the primary. In contrast, Ulmar et al. reported no significant relationship between patient age, presence of extra spinal bony and visceral metastases and survival [16]. In present case report, the patient underwent spinal fixation for vertebral collapse. Many studies have concluded that the gold standard treatment for a solitary spinal metastasis is a total en bloc vertebrectomy with spinal fixation [17,18]. After the spine is stabilised by surgery and maintained, these patients are able to remain ambulant, continent, pain-free [19,12], with local tumor control [18] and expected to have long disease-free survival [13].

In present case report, the patient underwent cytoreductive nephrectomy followed by targeted therapy in the form of Sunitinib, an orally administered tyrosine kinase inhibitor. Since several studies have demonstrated that immunologic dysfunction present in metastatic RCC [20,21], which could be alleviated the immunologic dysfunction in the form decreased inflammatory response, improved natural killer activity and increased immune activation [22] & Para neoplastic syndromes (i.e., hypercalcemia) by removal of the primary tumor.

There is debate on upfront cytoreductive nephrectomy followed by targeted therapy versus targeted therapy alone, *Renner et al.* reported that Cytoreductive nephrectomy still plays an important role in the management of metastatic RCC, despite the morbidity and mortality associated with the procedure & concluded that. Patients with low metastatic burden and good performance status should be offered cytoreductive nephrectomy, while patients with poor performance status and advanced age will probably not benefit from surgery [23].

RCC has long been acknowledged as an immunogenic malignancy and the mainstay of treatment of metastatic RCC is presently immunotherapy, selecting drugs with less toxicity & higher survival benefit to the patient. Sunitinib, an orally administered tyrosine kinase inhibitor has been used as a first -line systemic treatment

for metastatic RCC [24]. This patient was also treated initially with sunitinib. Since many studies have demonstrated that immune checkpoint therapy has better immune response to cancer than targeted therapies, various immune checkpoint inhibitors (ICIs) have been tried as new first-line treatments for mRCC recently. Pembrolizumab plus Axitinib (combination of anti-PD-1 monoclonal antibody and VEGF receptor (VEGFR) TKI) was approved by FDA in March 2019 as initial therapy across risk groups and regardless of PDL1 expression in mRCC [25]. Several studies revealed that Pembrolizumab plus Axitinib combination (other combinations like Atezolizumab plus Bevacizumab & Avelumab plus Axitinib) established significant overall survival (OS) or progression free survival (PFS) benefit for mRCC compared to sunitinib [25-27]. While in case of adverse events (AE) these ICI-based combination treatments (Nivolumab plus Ipilimumab, Pembrolizumab plus Axitinib, Avelumab plus Axitinib, and Atezolizumab plus Bevacizumab) have shown fewer or similar results in comparison with sunitinib [28].

4. CONCLUSION

This report presents an unusual presentation of metastatic renal cell carcinoma as lumbar vertebra collapse. This case report aims to increase the awareness of this entity and suggests that every case in which symptoms from the metastasis precedes the detection of primary carcinoma, careful history, thorough examination and evaluation will facilitate early diagnosis & management of such cases thus reducing the neurological deficits & ensuring better functional outcome of the patient.

This case is being reported for several reasons:

1. Renal cell carcinoma presenting with metastases are less common but the presentation as metastasis preceding the detection of the primary mass is occasionally seen. The possibility needs to be kept in mind. Metastases proved histologically as renal cell carcinoma in the absence of detectable renal mass have also been reported.
2. Traditionally spinal metastasis has been treated by irradiation and chemotherapy. Recent literature has shown that in a young patient free of visceral metastasis and co-morbidities, an aggressive surgical

fixation stabilises neurological function and improves unbelievably the health related quality of life.

3. When spinal metastases present with an undiagnosed primary carcinoma timely management becomes a challenge and significantly delays and obstructs the survival and quality of life of the patient, hence early & correct diagnosis of the primary is needed to achieve more effective & quality palliative treatment.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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