CASE REPORT

Isolated clival metastasis: a rare presentation of renal cell carcinoma

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SUMMARY

Renal cell carcinoma accounts for 3% of all adult malignancies. Usual sites of metastasis are lymph nodes, lungs, bone, liver and brain. We describe a patient who presented with complaints of holocranial headache and diplopia. MRI of the head showed a clival-based lesion with associated bony erosion. With suspicion of a metastatic lesion, an ultrasonogram of the abdomen was done which showed a left renal mass that enhanced on contrast-enhanced CT. There were no other metastatic foci. Patient underwent radiotherapy for the clival lesion. This case report emphasises on the evaluation of clival lesion with cranial neuropathies for a possibility of a renal primary tumour.

BACKGROUND

Renal cell carcinoma is a relatively uncommon malignancy accounting for around 3% of all adult malignancies.¹ While one-third of them present with metastasis, another third develop metastasis in due course.^{2,3} Common sites of metastasis are lymph nodes, lung, bones and liver. Brain is an uncommon site for metastasis. Isolated clival metastasis from renal cell carcinoma is a very uncommon presentation which is being presented in this report.

CASE PRESENTATION

A 55-year-old man presented to the Neurology OPD with complaints of holocranial headache and diplopia for 2 months and photophobia of right eye for 1 month. He was a non-diabetic

and a non-hypertensive. On examination, he was well oriented with intact memory and normal higher mental function. His olfactory sensation was normal. Both pupils were normal in size and reacting to light. There was ptosis of the right eye with impaired lateral gaze although the visual acuity was normal. The left eye was normal on examination. There was no facial asymmetry or hypoaesthesia. Motor and sensory system examination was normal.

INVESTIGATIONS

The patient underwent MRI of the head which showed a well-defined enhancing mass lesion with irregular margins and associated bony erosion in the clivus (figures 1 and 2). For evaluation of suspected metastasis to the clivus, he underwent an ultrasonography of the abdomen which revealed a hetero-echoic mass in the lower pole of the left kidney. He further underwent contrast-enhanced CT scan of the abdomen which showed a 6.5×6.0×5.5 cm enhancing mass in the lower pole of the left kidney (figure 3) with a tumour thrombus in the left renal vein (figure 4). There was no retroperitoneal lymphadenopathy. CT thorax did not reveal any pulmonary metastasis.

DIFFERENTIAL DIAGNOSIS

Secondary tumours are the most common lesions involving the clivus which are followed by primary neoplasms and dysplastic lesions. The following could be the differential diagnoses:

1. metastasis—seen on imaging as ill-defined, non-sclerotic or lytic mass with scalloped margins;
2. clival chondroma—soft tissue mass with enhancement and lytic bone destruction which shows calcified area;
3. clival chondrosarcoma—soft tissue mass with variable enhancement and characteristic calcification and bone erosion/destruction;
4. intraosseous lymphoma—isodense mass with moderate homogenous enhancement;
5. meningioma—variable bone involvement, hyperdense mass with homogenous enhancement.

TREATMENT

The patient was planned for left radical nephrectomy with transsphenoidal resection of the clival mass. But he declined surgery due to personal reasons. Biopsy was done from the renal mass which was suggestive of clear cell carcinoma. He

Figure 1 Axial T2-weighted images at skull base showing mass lesion at the clivus.

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Figure 2 Contrast-enhanced MR (T1-weighted images) of the head at skull base (axial plane) showing enhancing clival-based lesion.

was subsequently planned for external beam radiation therapy (EBRT) for the clival lesion (2 Gy/fraction $\times$ 30 fractions) and supportive palliative care for the renal mass.

OUTCOME AND FOLLOW-UP

The patient underwent two fractions of EBRT and then defaulted as his family migrated to a distant place. He subsequently presented 6 months later with complaints of fever

Figure 3 Contrast-enhanced CT scan on the abdomen (coronal view) showing heterogeneously enhancing mass in the lower pole of the left kidney.

Figure 4 Contrast-enhanced CT scan on the abdomen (axial view) showing tumour thrombus in the left renal vein*.

and cough. Chest X-ray was suggestive of multiple metastatic lesions in both lung fields and consolidation in left lower lung field. Ultrasonography suggested multiple liver metastases. He was treated with antibiotics but rapidly progressed to respiratory failure and required mechanical ventilation. After 5 days of mechanical ventilation, he deteriorated and succumbed to the metastatic disease.

DISCUSSION

Renal cell carcinoma (RCC) accounts for 2%–3% of all adult malignant neoplasms.¹ It frequently presents with symptoms such as haematuria, flank pain or lump in the abdomen. Owing to early diagnosis due to the extensive use of imaging techniques, most of the lesions are localised at presentation although around 33% of the patients have synchronous metastasis.^{2,3}

The most common locations of metastasis of RCC are lungs (45.2%), bone (29.5%), lymph nodes (21.8%), liver (20.3%), adrenal (8.9%) and brain (8.1%).³

Clival metastasis as the first clinical feature is a rare presentation of renal cell carcinoma (RCC) (table 1). Cranial neuropathies are seen in most cases with abducens nerve involvement being the most common. Accurate incidence of metastasis of RCC to the clivus is unknown. Tumours of the clivus itself are extremely rare. Differential diagnosis of a clival mass includes chordoma, chondrosarcomas, plasmacytoma and metastasis. Metastasis to the clivus is most common from cancers in the prostate (23%), followed by kidney (9%), liver (9%), lung (7%), thyroid (7%) and stomach (7%).⁴

The exact mechanism of spread of cancer cells to the clivus is not entirely known. Probable explanation is that during Valsalva, venous blood bypasses the caval system and is shunted through the Batson's plexus into the internal vertebral venous plexus system which communicates superiorly with the basilar plexus at the clivus.⁵ The clivus is critically located near the brainstem and thus is present in the vicinity of important cranial nerves. Particularly, the sixth cranial nerve is very prone to involvement from clival tumours due to its long serpentine course. In nearly two-thirds of clival metastasis from any primary, abducens nerve palsy occurs alone or in presence of other nerve palsies.⁶

On MRI, the normal adult clivus is best seen on mid-sagittal view and shows different proportions of low and high intensities on T1-weighted images while it is isointense relative to the pons

Table 1 Case reports describing isolated clival metastasis at presentation in renal cell carcinoma

Author	Year	Presenting complaints	Treatment
Sagoh <i>et al</i> ¹⁵	1996	Abducens nerve palsy	Transsphenoidal partial removal of tumour
Fumino <i>et al</i> ¹⁶	1998	Diplopia	Radiotherapy to the clival lesion and radical nephrectomy
Kelley <i>et al</i> ¹⁷	1999	Diplopia and facial pain	Transsphenoidal biopsy
Endo <i>et al</i> ¹⁸	2001	Occipital pain, dysarthria, twelfth cranial nerve palsy	Radiotherapy for the clival lesion
Sepúlveda <i>et al</i> ¹⁹	2013	Sixth nerve palsy, dysarthria, right tongue deviation and right facial paralysis	Radiotherapy and palliative care
Mendelson <i>et al</i> ¹³	2015	Headaches and drooping of left eye with double vision	Endoscopic decompression of clival lesion and palliative radiotherapy for renal mass
Okudo and Anusim ²⁰	2016	Diplopia	Radiotherapy and palliative care

on T2-weighted images.^{7 8} Most clival lesions are associated with low-signal intensity on T1-weighted images and high-signal intensity on T2-weighted images which can be explained by the replacement of fatty bone marrow by tumour cells.⁷

RCC is an aggressive tumour. Unlike other metastatic tumours, RCC has a greater risk of intratumoural haemorrhage and the surrounding oedema is also greater.⁹ With isolated metastasis, the treatment of choice is resection of the renal mass and metastasectomy. Since RCC is inherently resistant to radiotherapy, stereotactic radiosurgery may be used for the tumour and adjacent oedema.¹⁰ Clival metastasis from RCC may respond to radiation therapy, especially when combined with systemic therapy with tyrosine kinase inhibitors such as sunitinib.⁹ Sunitinib, one of the most effective systemic therapeutic agents for RCC, has a prohibitive cost along with significant side effects such as hypertension, hypothyroidism, gastrointestinal intolerance, asthenia and myalgia.^{11 12} Recently, minimally invasive techniques have been described for resection of clival masses including transsphenoidal and transoral approaches, with possible complete resolution of symptoms.^{13 14}

Learning points

- Isolated clival metastasis is an extremely rare presentation of renal cell carcinoma.
- It manifests as sudden cranial neuropathy, most commonly involving the abducens nerve.
- Early diagnosis is the key to successful management and surgical resection of the primary renal mass, and the metastatic lesion is the preferred approach.
- Unresectable clival masses can be offered radiotherapy.

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