Intradural spinal metastasis from renal cell carcinoma: A case report

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ABSTRACT

Intradural spinal metastasis is rare. This is the third case ever reported on the finding of intradural spinal metastasis from a renal cell carcinoma that had been removed surgically. The patient had a history of epidural metastasis for which excision and anterior stabilization were done 3 years before the new presentation with cauda equina lesion. Seeding from the involved osseous structure to the cerebrospinal fluid through the dura was believed to be the course that tumour had taken to reach the intradural space.

Key words: intradural spinal metastasis, renal cell carcinoma, cauda equina metastasis

CASE REPORT

The patient was a 59 year-old man presented with back pain and paraesthesia of the left lower limb about 4 years after a radical left nephrectomy for renal cell carcinoma. It had been a localised tumour without involvement of the renal capsule or the renal pelvis. The para-aortic lymph nodes, the left adrenal gland and renal vein were spared.

MRI scan of the spine was done on admission and identified a large focal lesion occupying the midline, as well as the left side of the vertebral body and the left pedicle of L2, reaching as far as the posterior facet joint. It also involved the adjacent portion of soft tissue, including the left paraspinous space so that the adjacent psoas muscle was outwardly pushed. There was extension of the tumour mass into the lateral aspect of the epidural space with compression and displacement of adjacent dural sac. L1/L2 Neuroforamen on the left side was partially obliterated by the mass (Fig. 1 & 2). Removal of tumour tissue from L2 vertebral body, decompression of the dural sac anteriorly and fusion of L1 to L3 were done through an anterior approach, followed by internal stabilization. There was no breach of the dura on exploration and it was left intact at the end of the procedure. Postoperatively the patient could walk unaided and was referred to radiotherapy.

The patient was admitted through the Accident and Emergency Department about 3 years later because of recurrence of back pain, left lower limb weakness and retention of urine. There was diminished sensation of his lower limbs. Lumbar puncture was attempted but yielded a dry tap. On MRI scanning, apart from artifact produced by the presence of metallic implants in the vertebral body, a large epidural soft tissue mass was noted on the left posterior region of L1 and L2 vertebral bodies. There was involvement of the left superior facet, pedicle and lamina of L2 with upward extension. The thecal sac was compressed (Fig. 3). Cortical bone graft impacted between L1 and L3
Figure 1  Destruction of the left pedicle and the lower vertebral end-plate of the L2 vertebra.

Figure 2  MRI revealed tumour mass eroded the left pedicle of L2, involving the epidural space.

Figure 3  The pedicle on the left of L2 was expanded by the tumour and there was epidural impingement of the dural sac. The left L2 nerve root was embedded in tumour tissue. Interference on the image by the stainless steel screw on the body of L1 was acceptable.
previously was well incorporated and its architecture was preserved. L2 root on the left side was intact. The pedicles of the L1 and L3 were normal. The diagnosis was bony metastasis in the left pedicle and posterior vertebral body of L2 with epidural extension and cauda equina compression.

Hemilaminectomy of L2 and L3 vertebrae, removal of the epidural and peripedicular tumour tissue, and posterior instrumentation of L1 to L3 were done. Clinically there was no involvement of the dura sac and it had never been opened.

When he was discharged about one month postoperatively, he could walk with a frame. The lower limb muscle power had improved and the sphincter control had returned. A pathologist confirmed metastatic adenocarcinoma with overall morphology similar to the original renal tumour.

The patient was readmitted about four months later because of increasing left lower limb weakness and progressive foot drop. There was no change in sensorium, no myelopathic signs or sphincter disturbance. A lumbar puncture performed at L4/L5 and L5/S1 interspaces yielded a dry tap.

Myelogram via cisternal puncture was done and showed an intradural space-occupying lesion behind L3 and L4 downwards, producing complete blockage of contrast intrathecally. There was no blockage behind L1 and L2 vertebral bodies (Fig. 4). On catscanning, only homogeneous soft tissue shadow was demonstrated in the dural sac and there was complete absence of intradural contrast behind L4 and L5 (Fig. 5). CT scan of the brain was normal.

A neuro-surgeon was consulted. He opened the dural sac after laminectomy on L4 and L5 and found all the nerve roots were displaced posteriorly by an intradural mass (Fig. 6). A biopsy was taken and confirmed metastatic renal cell carcinoma with similar histology to the previous lesions. Piecemeal removal of the tumour tissue was done. There was improvement in the lower limb function and return of the sphincter function after the surgery, probably related to decompression. He remained conscious and orientated on follow-up 20 months after the last operation. However, he lost active movement of the lower limbs and had to depend on a wheelchair.

Figure 4  Myelogram performed through cisternal puncture revealed a clear epidural space behind L1 and L2; without evidence of local recurrence around the L2 body. Intradural blockage was located below L3 and above L5.

Figure 5  CT myelogram: The dural content behind L3/L4 was filled up with metastatic tumour tissue with complete absence of intradural contrast. There was no suggestion of epidural growth.
In general, intradural spinal metastases are rare and only occasionally found in patients suffering from primary tumours in the brain such as medulloblastoma. Intradural metastasis from non-neurogenic tumour tissue is uncommon. Cases have been reported on adenocarcinoma of the lungs, breast and rarely the oesophagus. The first report of intradural spinal metastases from a renal cell carcinoma was in Japanese literature from Takahashi et al in 1990. Following the second report by Maxwell in 1999, this is the third case.

The most possible route by which the tumour tissue reaches the spine is believed to be seeding via the cerebrospinal fluid, dropping metastases to the dural sac. Lesions in the posterior cranial fossa are therefore at a higher risk. Of the ten cases of intradural spinal metastases reported by Chow and McCutcheon eight of them had antecedent intracranial lesions.

Frey et al. collected 30 patients with spinal metastases on MRI. Most of them were in either the conus medullaris or the cauda equina. Eighteen of them had cerebral metastases, and fourteen of them had osseous metastases.

Direct invasion of the dural sheath and hence the intradural space might explain some of the cauda equina lesions. Chow and McCutcheon found intradural spinal metastases from some primary lung cancers at the thoracolumbar levels and they might be due to direct tumour extension. Borovich et al. reported three cases of intradural metastases and assumed that they really were metastases of the dura mater itself growing inward. Alternatively, the tumour cells could as well reach the subarachnoid space by a haematogeneous route or through perineural lymphatics. Mosdal and Bang reported 2 cases of cauda equina metastases, one from a carcinoma of the oesophagus and the other from the breast, and suggested that tumour cells had reached the spinal cord and the subarachnoid space through the bloodstream or lymphatics.

The present case had presented with epidural tumour that narrowed down the spinal canal and surrounded the L2 nerve root on the left. There was no suggestion of cerebral metastases on CT scan of the brain. Although direct invasion of the spinal column and erosion of the dural space by the epidural tumour was possible, there was no evidence of involvement of the L3 and L4 vertebral bodies. The epidural space at L3 to L4 levels was free of tumour tissue on CT scan. The epidural metastases at L1 and L2 levels, however, might have breached the neural sheath of the L2 nerve root that they had encroached upon, entered the periradicular space and became seedings in the cerebrospinal fluid. The tumour cells might have then gravitated in the cauda equina and started an intradural growth.

Intradural spinal metastases can develop in adenocarcinoma of the lungs, the breasts and rarely the kidneys in the absence of cerebral lesions. The present report on the presence of epidural metastases prior to the development of a cauda equina tumour suggests another mechanism by which tumour tissue can be seeded in the cerebrospinal fluid and reaches the subarachnoid space.

**DISCUSSION**

**CONCLUSION**
REFERENCES