Case Report

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A Rare Case Report of Intramedullary Spinal Cord Metastasis (ISCM) from A Known Prostatic Primary

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Intramedullary Spinal Cord Metastases (ISCM) is rare as they represent 8.5% of all central nervous system metastases and account for 5% of all intramedullary lesions. Lung cancer is the most common primary malignancy which causes spinal mets followed by other malignancies like Breast, Lymphoma, Leukemia, Malignant Melanoma etc. Only two cases of ISCM from Prostatic primary were reported in the literature previously. Our case represents one such rare occurrence, hence, reported here.

Key Words: adenocarcinoma, intramedullary spinal cord metastases (ISCM), metastasis, prostate

Prostatic adenocarcinoma is the second most common disease causing cancer related deaths in men & affects almost up to 70% of men over the age of 80.[4] Though, skull and spinal metastases occur in up to 10% of patients with prostate cancer, intramedullary spinal cord metastases are unheard of. Previously, Jalali et al[5] in 2004 reported the first case of Intramdullary Spinal Cord Metastasis (ISCM) with primary likely from Prostate where as Lieberson et al[7] in 2012 reported the first biopsy proven case of ISCM from Prostate Carcinoma. Hence, this rare case of Intramedullary Spinal Cord Metastasis (ISCM) from a known Prostatic Primary is reported here which happens to be the only third such reported case.

Case Report

A 64-year-old man diagnosed with Adenocarcinoma of prostate two years back and partial prostatectomy with pelvic node dissection was completed for the same. He had completed four cycles of chemotherapy. Now, he presented to the medicine OPD of this hospital with complaints of bilateral lower limb weakness since two months due to which he had difficulty in standing and brisk walking. He also had fever on and off for last 15 days. He had no other significant past & family history.

On CNS examination, he had normal power & sensations in the upper extremity but power was 2/5 in both the lower limbs and reflexes were absent.

In view of above signs and symptoms, the patient was referred to our Dept. of Radio-Diagnosis for further work up. We started imaging the patient with X-Ray chest which was normal followed by X-Ray Lumbo-Sacral spine to rule out osteoblastic mets from CA prostate which did not show any metastatic deposits to the visualized bones. In view of bilateral lower limb weakness, MRI LS spine was advised to the patient. Multiplanar MRI of lumbar spine was performed using T1 weighted spin echo, T2 weighted fast spin echo sequences & MR myelogram. Post contrast images were also obtained.

Following findings were noted on MRI **(Figure 1, 2)**.

Grade I Anterolisthesis of L5 over S1 with bilateral Spondylolysis was seen.

Mild annular disc bulge was seen at L2-L3 indenting on ventral subarachnoid space without compressing the nerve roots.

Moderate posterior disc protrusion and posterior annular tear was seen at L5-S1 indenting on ventral subarachnoid space without causing significant compression of the nerve roots at these levels.

Mildly enhancing oval lesions were noted on the nerve roots in spinal canal at L1 and L4 of size around 15 x 10mm. Similar such enhancing lesions with focal thickening of nerves were also noted in vicinity & in view of underlying prostatic malignancy, diagnosis of ISCM from prostatic primary was done.

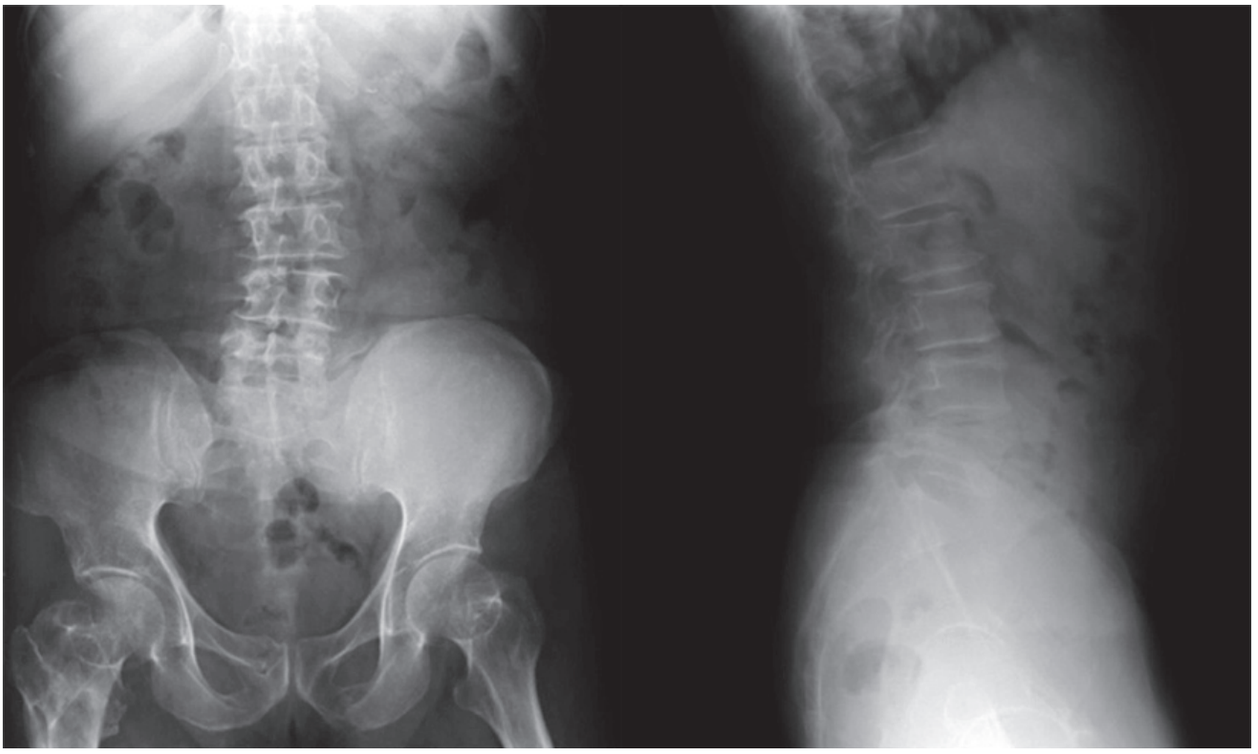

Figure 1: Plain radiograph of lumbo-sacral spine (AP and Lateral views) did not reveal any obvious bony mets. Mild lumbar scoliosis was noted

Discussion

Intramedullary Spinal Cord Metastases (ISCM) are rare, occurs nearly in 1% of autopsied cancer patients. They represent 8.5% of central nervous system metastases and account for 5% of all intramedullary lesions. Intramedullary spinal cord metastasis only rarely seen as the first presentation of malignancy and most commonly occurs in the setting of advanced disease.[1]

Patients of primary intramedullary spinal neoplasms are typically symptomatic for long duration where as almost up to 75% of patients with a spinal cord metastasis have symptoms for less than one month before diagnosis.[6]

The most common presenting symptom is motor weakness as it was in our case. Other common presenting features are pain, bowel or bladder dysfunction, paraesthesia or a rapid deterioration of neurological status in elderly patients.

Most common primary which causes ISCM is the Lung carcinoma which accounts for nearly 50% of cases.[9] Other primary malignancies are breast cancer, lymphoma, leukaemia, malignant melanoma, renal cell cancer and colorectal cancer.

Cervical cord is the most commonly involved location in ISCM, followed by the thoracic cord and then the lumbar cord. These lesions are usually solitary and involve 2-3 vertebral body segments.One-third of patients of ISCM have concomitant cerebral metastasis and 25% have leptomeningeal metastases.[11]

Three pathologic mechanisms have been suggested for ISCM.

First, Haematogenous spread. This is the most common route of dissemination. The common coexistence of pulmonary metastasis and brain metastasis supports the idea of spread through the arterial route. It can spread through the vertebral venous plexus (Batson's venous plexus), extending from the pelvis to the cranial venous sinuses and enabling retrograde transportation to the spinal cord.

Second mechanism is related to meningial carcinomatosis. Tumor cells originating from carcinomatous meningitis may infiltrate the Virchow-Robin spaces of vessels, penetrating the spinal cord and pial membrane and may invade the spinal cord parenchyma.

Third mechanism is direct invasion from adjacent structures. Although the dura protects the cord from invasion by malignant neoplasms, eventual direct extension of a metastatic tumor from the spinal extradural space or CSF or nerve roots, through the dura and into the cord, and spread along perineural space to subarachnoid space and to cord parenchyma have been suggested.

Intramedullary Spinal Cord Metastasis from prostatic primary is almost unheard of. Adenocarcinoma of the prostate affects up to 70% of men over 80 and is the

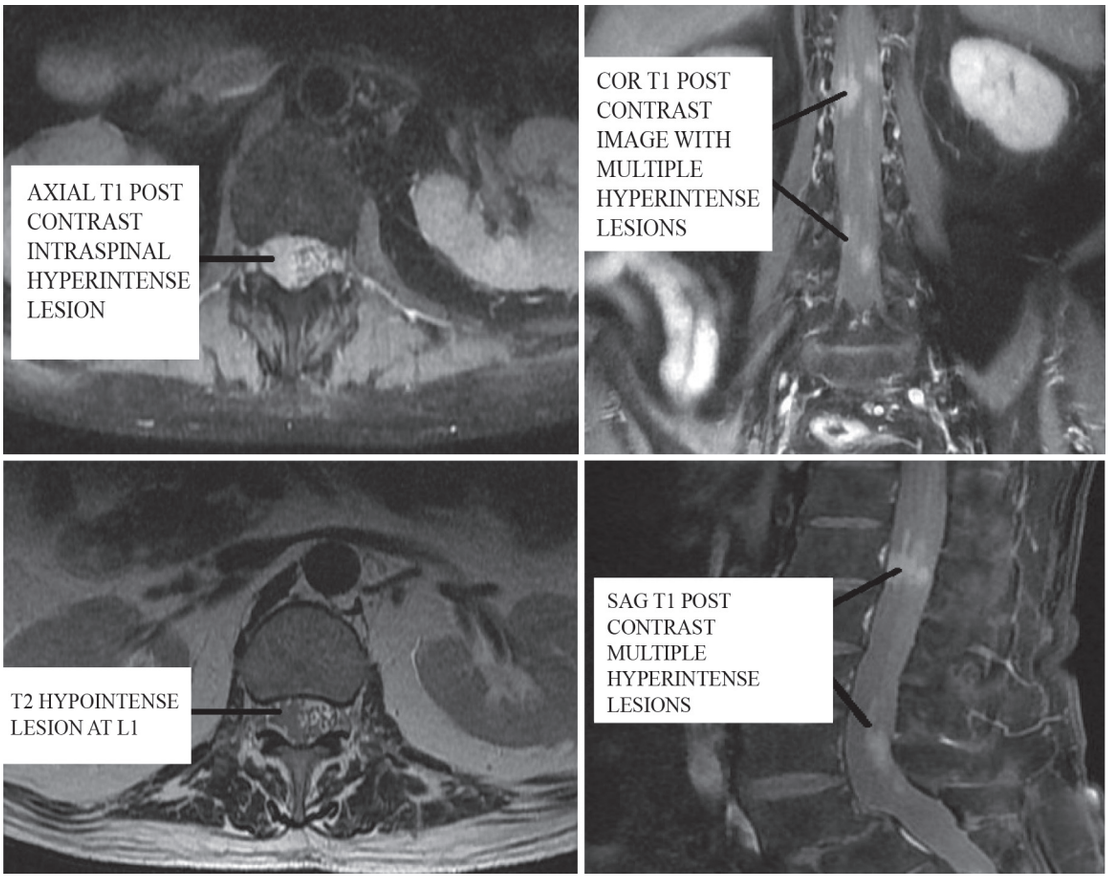

Figure 2: Plain & Post contrast MRI study showed multiple mildly enhancing oval lesions on the nerve roots in spinal canal mainly at L1 and L4 vertebral level

second leading cause of cancer related death in men.[4] Meningeal carcinomatosis, brain metastases and intradural extramedullary spinal lesions are uncommon. One prior case report discussed a possible prostate ISCM[5] and another biopsy proven prostate cancer metastatic to the spinal cord was reported previously.[7]

Theoretically, prostate cancer cells can spread anywhere in the body. In practice, though, most cases of prostate cancer metastasis occur in the lymph nodes and the bones. Prostate cancer metastasis occurs when cells break away from the tumor in the prostate. The cancer cells can travel through the lymphatic system or the bloodstream to other areas of the body. More commonly prostate cancer metastasis can occur in the: Bones, Lymph nodes, Lungs, Liver and Brain.

The diagnosis of ISCMs is usually done radiologically. Myelography will show a fusiform enlargement of the cord but is non-diagnostic in 40% of cases. Schaller et al. suggested in a case report that PSA in the CSF may be a useful diagnostic tool for detecting intradural prostate metastasis.[10] There are currently no published treatment guidelines for ISCM, but options include conventional radiation, SRS, surgery, steroids and chemotherapy.

Conventional radiation is effective for radiosensitive ISCMs but not in cases of radio-resistant tumors, such as prostate tumors.[2] Surgery is considered for the palliation of pain or the prevention of paraplegia when the medical condition of the patient is suitable.[3] Stereotactic radiosurgery (SRS) has been discussed as a primary treatment by some for ISCMs.[8, 12] Steroids can also be used as an adjunct. Chemotherapy has been used in combination with surgery or radiation for sensitive tumors, such as small-cell carcinomas, while now a days SRS is also considered as a treatment option for ISCMs.

Management of intramedullary metastases generally consists of fractionated radiotherapy, which usually maintains but does not improve the pretreatment level of neurologic function. As with the treatment of brain metastases and epidural spinal cord compression, corticosteroids are used to diminish the effects of radiation-induced edema.

Surgical resection can be performed in selected cases. General medical condition of the patient, the stage of the primary tumor, the presence of leptomeningeal metastasis or more than one metastasis are the main factors influencing the decision for surgery.

At present, there is no available study in the literature comparing the success rates of RT and surgery when administered alone or in combination in cases of ISCM. A radical resection of an ISCM must be considered as primary treatment in every patient who presents with rapid progressive neurological deficits.[13]

Conclusion

Metastases in the central nervous system from a carcinoma are a common phenomenon. However, intramedullary spinal cord metastasis (ISCM) is a rare instance.

With the ever improving imaging modalities in today's era, especially Magnetic Resonance Imaging (MRI), there has been a progressive increase in the accurate diagnosis of ISCM from various primaries.

Though, Prostatic metastasis mostly occur in the bones and lymph nodes, possibility of Intramedullary Spinal Cord Metastasis needs to be kept in mind when patient presents with unusual symptoms like motor weakness, paraesthesia, bowel and bladder complaints.

ISCM should be considered as a neurosurgical emergency in such patients. In a patient with a history of malignancy, gadolinium MRI examination should be performed whenever there is a suspicion of a spinal lesion. Although there is limited life expectancy, together with early diagnosis and early surgical resection, important improvements can be achieved both in the neurological deficits and in the quality of life of these patients.

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