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A Rare Case of Mature Cystic Teratoma of Spinal Cord

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Abstract **Case Report**

Intraspinal teratomas are uncommon tumors that arise from embryonic germ cells and can contain elements from all three germ layers. They are usually located in the dorsal or ventral aspect of the spinal cord, and may be associated with spinal dysraphism or other congenital anomalies. MRI is a valuable tool for the diagnosis and characterization of these tumors, as it can demonstrate their location, extent, and composition. We report a rare case of an intramedullary teratoma in a 54-year-old male who presented with progressive paraparesis and sensory loss. MRI revealed a large, heterogeneous intensity solid cystic mass occupying the spinal cord at L1 to L2 vertebral level with cystic and solid components, fat and calcification. The tumor was surgically removed and confirmed to be a mature teratoma by histopathology. The patient had a good postoperative recovery and no recurrence at 6 months follow-up. This case illustrates the MRI features and surgical management of a rare and challenging spinal tumor.

Keywords: Intraspinal intramedullary teratoma, MRI, Dermoid.

INTRODUCTION

- Spinal teratomas are a type of multipotential cell tumor that contain a mixture of multiple germinal layers formed by normal organogenesis and reproductive tissues and they are congenital in origin.
- Based on the degree of differentiation, teratomas may be classified as mature, immature or malignant and they are uni or multilocular cystic tumors lined by squamous epithelium containing skin appendages (hair follicles, sweat glands, sebaceous glands.
- The incidence of spinal teratoma is rare

CASE PRESENTATION

- A 54-year-old male came to AIIMS, Rishikesh with complaints of back pain that was radiating to bilateral lower limbs, especially thigh (Right > Left) along with difficulty in walking for about a month.
- The patient had no history of fall, trauma or any straining like weight lifting.
- On examination: Paraspinal muscle spasm was present along with tenderness over L3-L4 vertebral level. Neurological examination was normal.

IMAGING FINDINGS

- The patient was referred to the radiology department for further evaluation by X-RAY and MRI.
- **On X-ray:** Early degenerative changes in the form of end plate irregularities and marginal osteophytes were noted along with unfused posterior elements in lower sacral vertebral levels. No evidence of any mass lesion was noted
- **On MRI:** A well-defined, non-enhancing, solid cystic, intramedullary altered intensity lesion was noted at the level of conus at L1-L2 vertebral level. It appeared heterogeneously on T1 WI (Hyperintense with internal hypointense solid component) and heterogenous on T2WI (Iso to hyperintense with internal isointense solid component). The hyperintense component in T1WI and T2WI images suggests an internal fat component that showed suppression of fat-suppressed images. It showed no significant post-contrast enhancement.
- The imaging findings were suggestive of intramedullary mature cystic teratoma.

HISTOPATHOLOGICAL FINDINGS

- The patient was operated in the neurosurgery department and the lesion was excised and sent for histopathological examination

- HPE sections showed stratified squamous epithelium and transitional epithelium with adnexal structures including sebaceous glands and sweat glands. There was presence of mature adipose tissue, muscle tissue, glial tissue, respiratory-type mucosal glands and blood vessels. Keratin flakes were also seen, and findings were suggestive of Mature Cystic Teratoma.

DISCUSSION

- Teratomas are tumors of multipotential cells which develop into two or more germinal layers of ectoderm, endoderm and mesoderm. Based on the degree of differentiation, teratomas may be classified as mature, immature or malignant [1].
- They are unilocular or multilocular cystic tumors lined by squamous epithelium containing skin appendages (hair follicles, sweat glands, sebaceous glands).
- Spinal teratomas are extremely rare and are usually congenital in origin which occur in the midline [2, 3].
- The incidence of spinal teratoma is only 0.2 to 0.5%. 40 % percent are intramedullary, and 60% are extramedullary [4].
- In pediatric patients, ~5–10% of spinal tumors are intraspinal teratomas however, the incidence in adult patients is significantly lower [5].
- The most accepted embryogenetic theory in development of intraspinal teratomas is the displacement of primordial germ cells into the dorsal midline during their normal migration from primitive yolk sac to gonadal ridges [6].
- Evaluation using imaging studies is an important diagnostic tool. X-ray and CT can show changes in the bony structure of the spine due to the tumors [7].
- MRI (with and without gadolinium) allows for specific evaluation of the degree of parenchymal involvement and remains the imaging modality of choice that can provide information on several characteristics of the tumor such as location, size, soft tissue differentiation, mass effect on the neuronal structures and differentiation between dermoid and epidermoid cysts.
- Surgical resection is the primary treatment of choice. Histopathology of the resected tissue ultimately determines the definitive diagnosis of teratoma and identifies mature and immature lesions [8].
- In long-term follow-up, the main indicator of prognosis is recurrence, which is closely related to the nature of the tumor, that is, whether it is a mature or immature teratoma [9].

FINAL DIAGNOSIS

- Mature cystic teratoma of the spinal cord.

DIFFERENTIAL DIAGNOSIS LIST

- Spinal arachnoid cyst: CSF intensity on all sequences with signal suppression on FLAIR sequence and no diffusion restriction.
- Spinal epidermoid cyst: Does not contain fatty elements and more likely to demonstrate diffusion restriction on DWI images. It usually present in second to fourth decade of life.
- Spinal neurenteric cyst: CSF intensity lesion found ventral to the spinal cord associated with vertebral anomalies.
- Spinal lipoma: Homogeneously hyperintense lesion on T1 and T2 images with suppression on STIR images.
- Spinal teratoma: Heterogeneous appearance on T1 & T2 with heterogeneous enhancement.

FIGURES

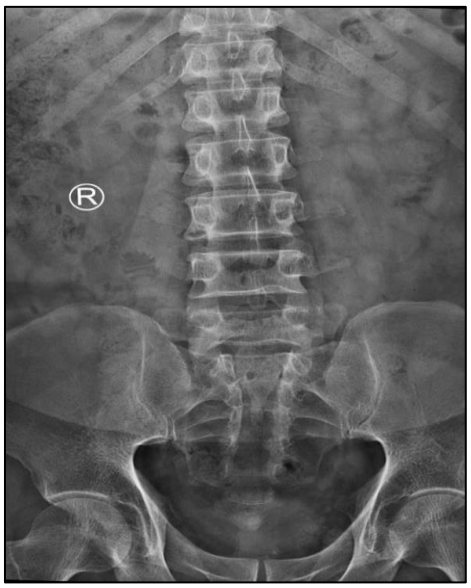

Fig 1 a: AP view of the lumbosacral spine shows early degenerative changes and no evidence of any spinal mass

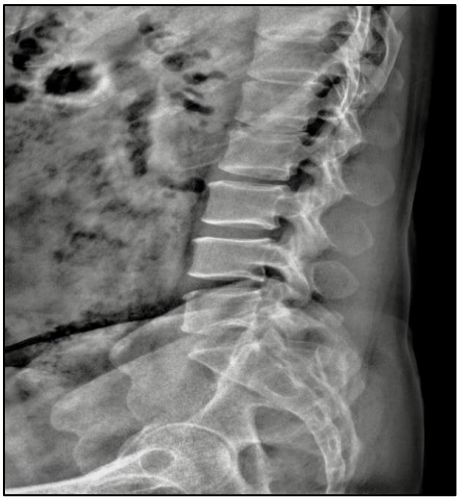

Fig 1b: Lateral radiograph of the lumbosacral spine shows degenerative changes in the form of marginal osteophytes, end plate irregularities. Note is also made of unfused posterior elements in the lower sacral vertebral levels

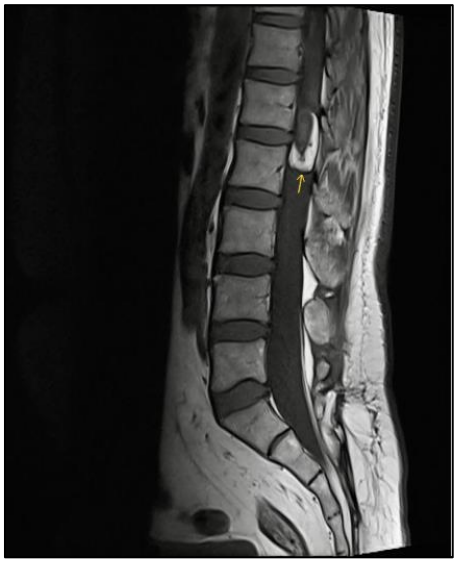

Fig 2a: Sagittal T1 weighted sequence shows a well-defined mixed intensity lesion (Hyperintense with internal hypointense solid component) at the yellow arrow at the level of conus at L1-L2 vertebral level

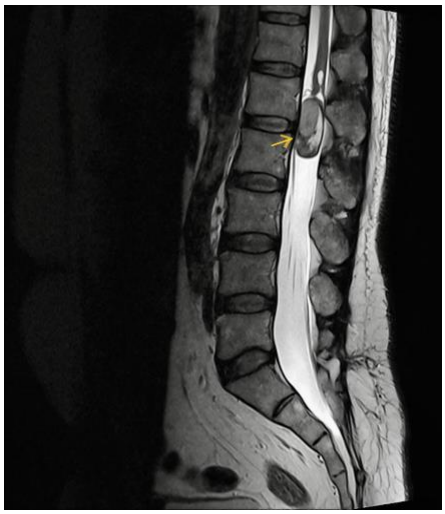

Fig 2b: Sagittal T2 weighted sequence shows a well-defined heterogeneously mixed intensity (Iso to hyperintense with internal isointense solid component) lesion at yellow arrow at the level of conus at L1-L2 vertebral level. It is causing mass effect and is displacing the spinal cord

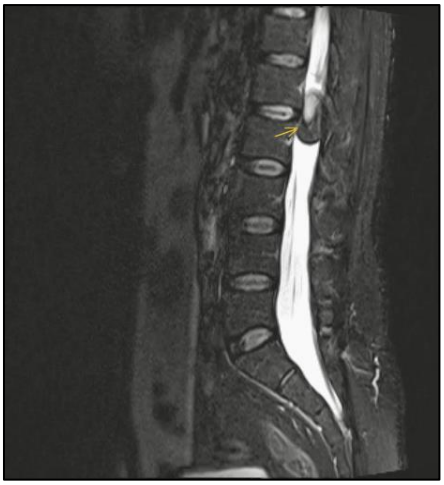

Fig 2c: Sagittal STIR sequence shows suppression of the hyperintense component that was seen in T1 and T2 images suggests internal fat component (yellow arrow)

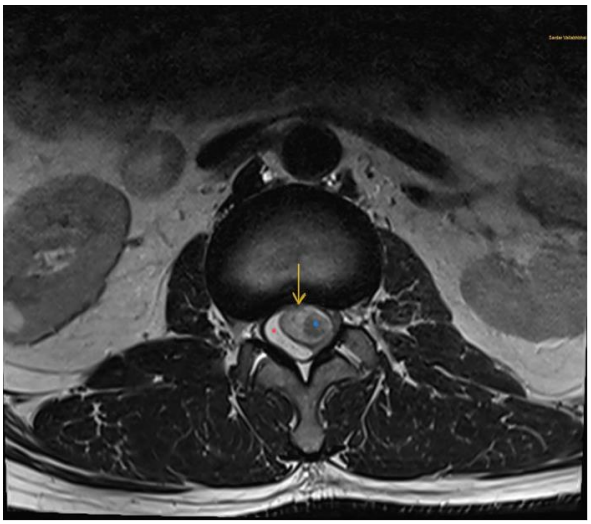

Fig 3a: T2WI Axial section at L1-L2 IVD level shows a solid cystic lesion at yellow arrow, causing displacement of the spinal cord. Hyperintense fat is seen on the right lateral aspect represented by the red dot and hypointense solid component represented by the blue dot

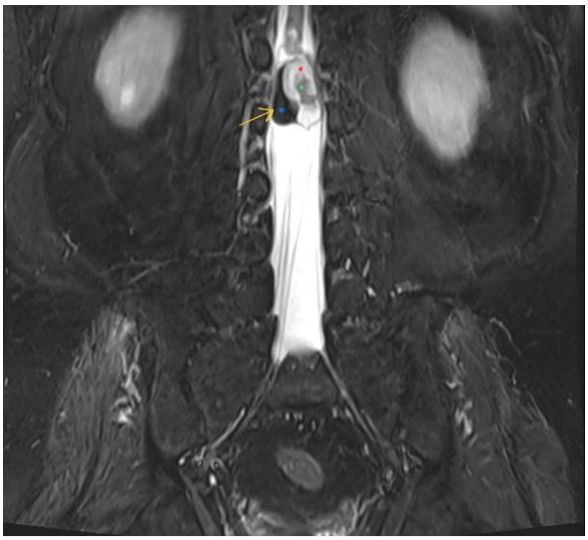

Fig 3b: STIR image coronal sequence shows fat suppression. The low signal intensity corresponds to the fat component represented by the blue dot and the high signal intensity corresponds to the cystic component represented by the red dot. The intermediate component corresponds to the solid component of the tumor, represented by the green dot

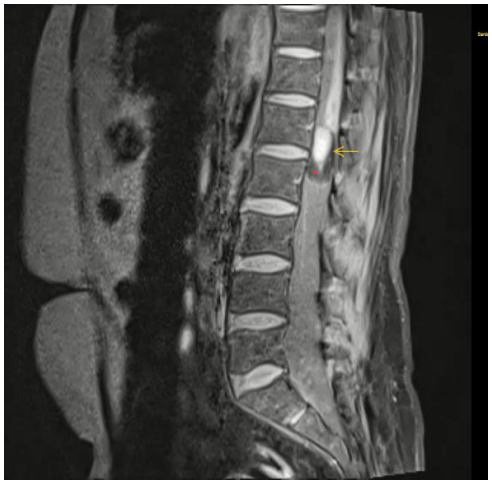

Figure 4a: T1 weighted fat-suppressed images sagittal section shows a well-defined lesion (yellow arrow) with fatty component of the lesion which is hypointense (shown by red dot in the image)

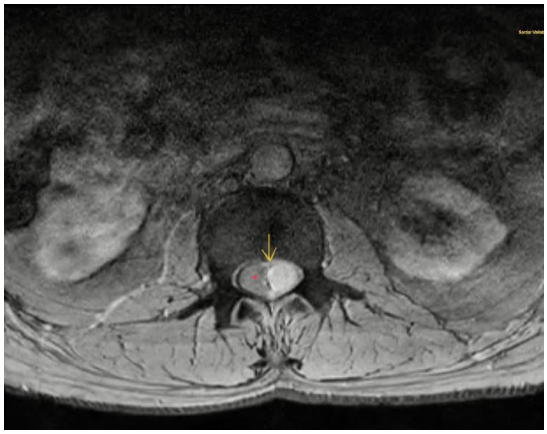

Figure 4b: T1 weighted fat-suppressed images axial section show a well-defined lesion (yellow arrow) with fatty component of the lesion which is hypointense (shown by red dot)

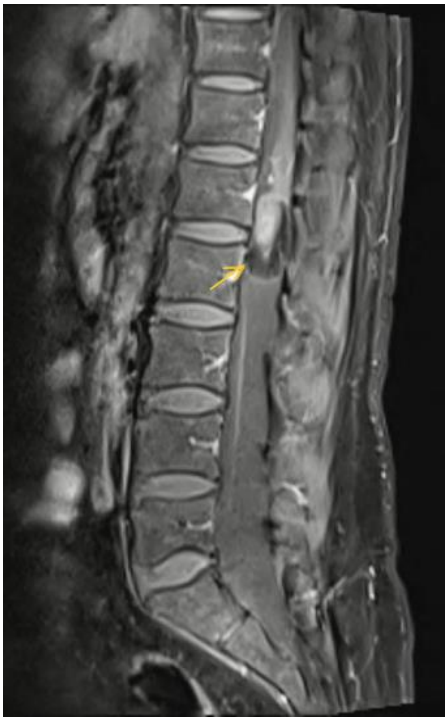

Figure 5a: Sagittal T1 post contrast fat-suppressed images show no significant post contrast enhancement (yellow arrow)

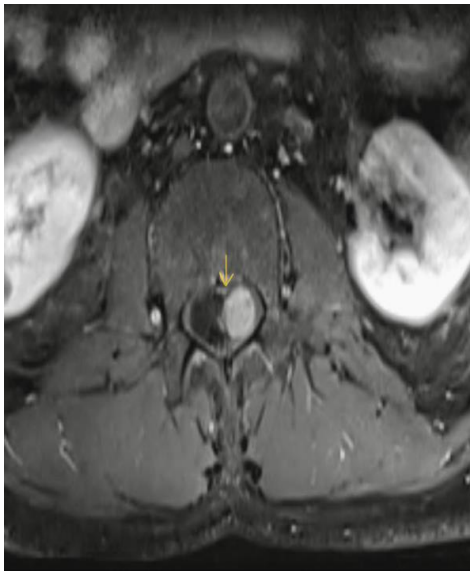

Figure 5b: Axial T1 post-contrast fat-suppressed images show no significant post-contrast enhancement (yellow arrow)

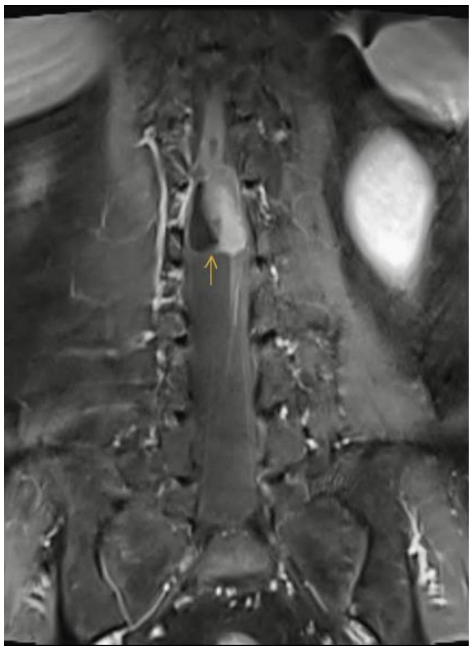

Figure 5c: Coronal T1 post-contrast fat-suppressed images show no significant post-contrast enhancement (yellow arrow)

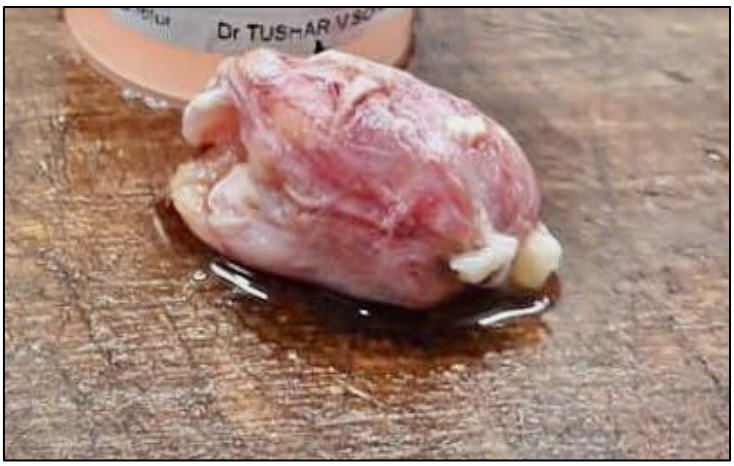

Figure 6a: Gross surgical specimen

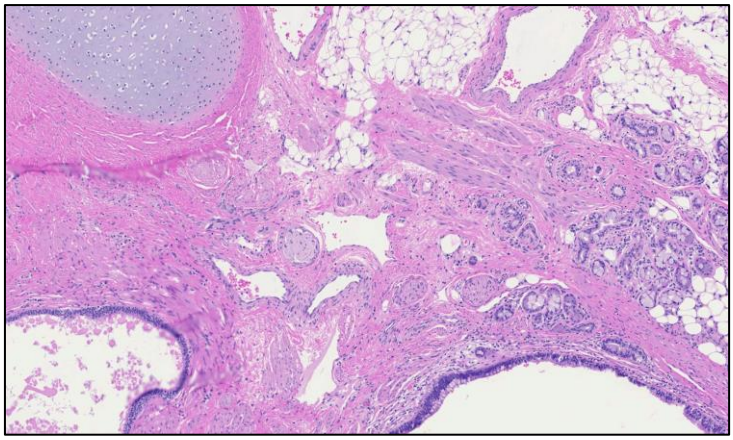

Figure 6b: Section shows stratified squamous epithelium and transitional epithelium with adnexal structures including sebaceous glands and sweat glands. There is presence of mature adipose tissue, muscle tissue, glial tissue, respiratory-type mucosal glands and blood vessels. Keratin flakes are also seen, and findings are suggestive of Mature Cystic Teratoma

CONCLUSION

- When an adult presents with lower back pain and bilateral radiculopathy, it needs to be evaluated with MRI imaging. Even though a rare differential, the possibility of mature teratoma of spinal cord should be considered.

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Conflict of Interest

- No conflict of interest exists between author and co-authors.
- No financial conflict exists between author and co-authors and the institution.
- The case has not been sent for publishing elsewhere.

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