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Review Article

Spinal Tumors- A Case Series of 5 Cases with Clinicopathological Review

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Abstract

Background: Spinal tumors are tumors that can occur within or adjacent to the spinal cord. It can be primary tumors or secondary/ metastatic tumors. Primary tumors of the spine are rare and most of these lesions are asymptomatic. Primary spinal cord tumors account for 2 to 4 percent of all primary central nervous system (CNS) tumors. Spinal tumors are classified based on their location as extradural and intradural. Intradural tumors can be intramedullary spinal cord tumors (IMSCT) or intradural extramedullary (IDEM). ***Objective*:** To review the clinicopathological features of 5 histologically confirmed spinal tumor cases. ***Material & Methods:*** This study includes 5 cases of spinal tumors diagnosed by histopathological examinations. ***Result:*** Out of 5 cases we got 2 meningiomas, 1 spinal angiolipoma,1 schwannoma, and 1 myxopapillary ependymoma. Conclusion: The study can contribute to epidemiologic knowledge of Spinal cord tumors

Keywords: Spinal tumor, Histopathological examination, Central nervous system (CNS).

INTRODUCTION

Spinal tumors are tumors that can occur within or adjacent to the spinal cord. It can be primary tumors that originate from the spine itself and its adjacent structures and secondary/ metastatic tumors from distant organs. Metastatic tumors are the most common (97%) tumors of the spine [1]. Primary tumors of the spine are rare and most of these lesions are asymptomatic. Primary spinal cord tumors account for 2 to 4 percent of all primary central nervous system (CNS) tumors.

Primary spinal tumors commonly occur in young adults and commonly present with the following symptoms. Back or neck pain. • Pain that does not improve with rest and worse at night • Pain accompanied by neurologic symptoms such as numbness or weakness of arms or legs or change in bowel or bladder routine.

Spinal tumors are classified based on their location as extradural and intradural. Intradural tumors can be intramedullary spinal cord tumors (IMSCT) or intradural extramedullary (IDEM).

Most of the intramedullary tumors are malignant and belong to the glioma group [2]. In the glioma group, ependymoma is the most frequent among adults constituting 60% of intramedullary tumors while astrocytoma is common in children. Among the extramedullary tumors, schwannoma and meningioma are frequently encountered.

Spinal cord tumors occur predominantly in 21-40 age groups and are less common in childhood and old age.

Our study entailed a retrospective review of the clinicopathological features of 5 histologically confirmed cases of spinal tumors.

CASE REPORTS

Our study entailed a retrospective review of the clinicopathological features of 5 histologically confirmed cases of spinal tumors.

Case-1

A 52 years old male came to neurosurgery OPD and presented with complaints of stiffness and weakness of both lower limbs and clumsiness of both hands for 2months. On examination he had spastic quadriparesis grade 4+/5 with brisk reflexes and extensor plantar bilaterally. MRI cervical spine showed enhancing intradural and extradural dumbbell tumors along with left C7 nerve roots with cord compression.

The patient was subjected to C6-C7 laminectomy and excision of the lesion. The tumor tissue was sent for histopathological examination.

Grossly, received multiple grey-brown soft tissue fragments measuring 4cc in the aggregate which was all embedded.

Histopathology revealed fragments of spindle cell neoplasm composed of elongated cells with vesicular nuclei arranged in interlacing bundles and fascicles. Focally showing palisading of nuclei and some area showing microcytic degeneration.

The final diagnosis was schwannoma

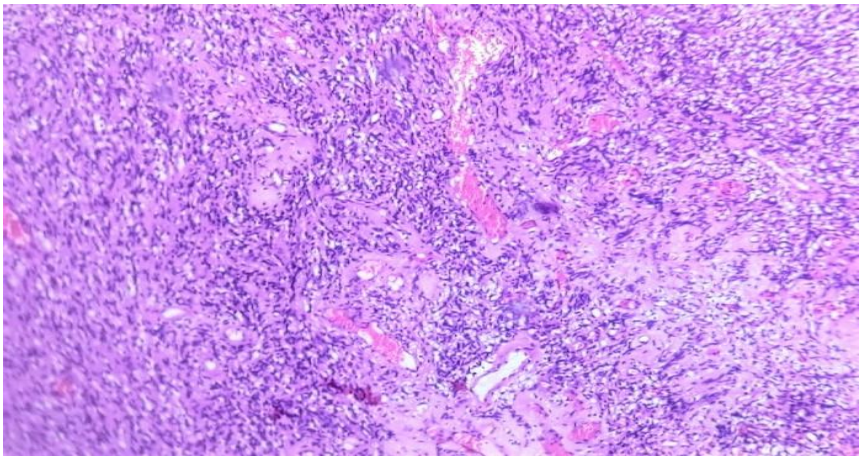

Fig-1: Antoni A & B areas seen Verocay bodies present

Case-2

A 30 years old male came to neurosurgery OPD and presented with complaints of lower backache for 1year which increased in the past 2 weeks. The pain was radiating to both lower limbs and had difficulty in standing/walking. On examination deep tendon reflexes are normal and flexion of plantar. He had no motor deficits.

MRI lumbar spine showed enhancing intradural tumor at L4-S1 level.

The patient was taken for surgery and at L3-L5 level laminectomy and excision of the lesion was performed. Tumour tissue was sent for histopathological examination.

Grossly, received multiple grey-brown soft tissue fragments measuring 4cm in the aggregate which was all embedded.

Histopathology revealed the proliferation of blood vessels and surrounding myxoid substance rimmed by slightly elongated ependymal cells. At places, cells are seen in loose sheets. No atypical mitosis and anaplasia seen. Blood clots are noted, and some cells show vacuolated cytoplasm.

The final diagnosis was myxopapillary ependymoma.

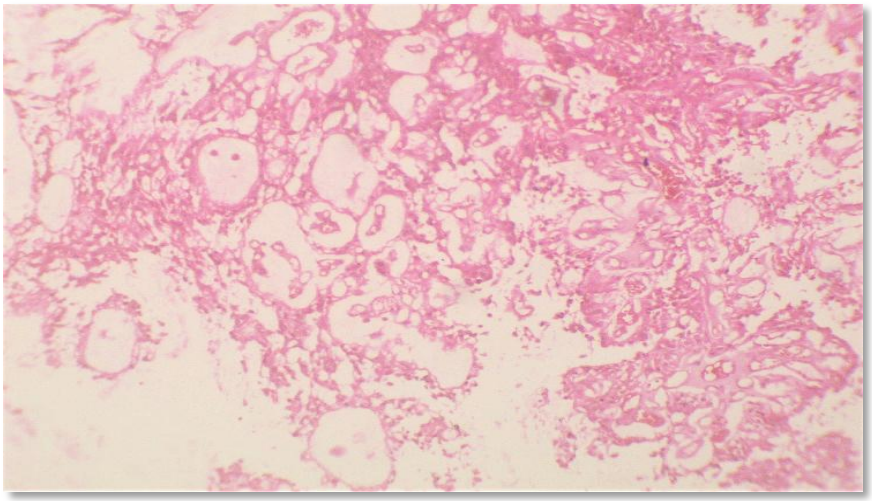

Fig-2: Papillary structures lined by ependymal cells. Many capillaries are present

Case 3

54 years female came to neurosurgery OPD and presented with complaints of gait disturbance and numbness in the upper and lower extremities on both sides for 5 months. The neurological examination revealed slight muscle weakness of the left upper and lower extremities, sensory deficit below the C5 level on the right side, and hyperexcitability of the deep tendon reflexes in the upper and lower extremities. Bowel and bladder disturbances were also present.

MRI spine showed a dumbbell tumor at the upper cervical level C2-C3.

The tumor was exposed via right hemilaminectomy of C1– C3 and excision of the tumor were done.

Histopathological examination revealed medium-sized epithelioid tumor cells arranged in lobules and syncytium pattern. The tumor cells are largely uniform with oval nuclei having delicate chromatin. Some nuclei show nuclear holes and pseudo inclusions. Cells have abundant eosinophilic cytoplasm.

The final diagnosis was meningothelial meningioma.

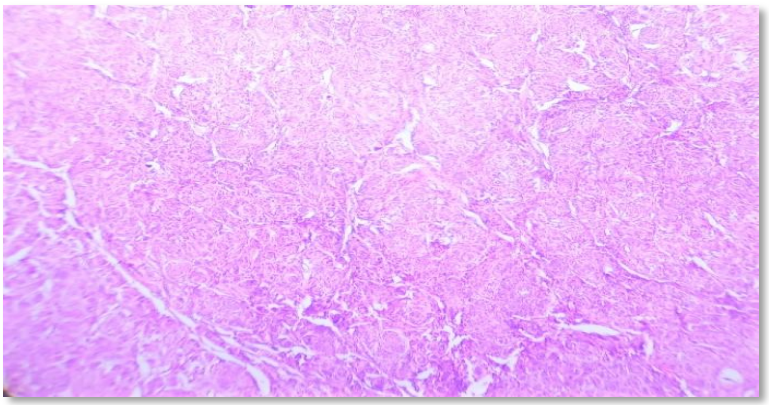

Fig-3: Shows lobules of cells with syncytial arrangements.

Case-4

A 47 yrs. an old female came to neurosurgery OPD and presented with a history of backache for the past 2years. She had difficulty walking due to pain. No weakness of upper and lower limbs.no bladder and bowel disturbances. The Spinomotor system was normal with no motor deficits. Lower limb reflexes were brisk. MRI dorso lumbar spine showed D9-D11 extradural contrast-enhancing lesion suggestive of? Meningioma.

The patient was taken for surgery and laminectomy and excision of the tumor were performed at the D9-D11 levels.

Grossly a single pinkish-white soft tissue mass measuring 4x1x0.5cm. The external surface was congested, and the cut surface was soft to firm in consistency and shows grey white with tiny grey-brown areas.

Histopathology revealed a vascular lesion composed of proliferating capillaries and cavernous blood space admixed with mature adipose tissue which was divided by hyalinized fibrous septa. Tiny spicules of bone and the incomplete fibrous capsule are seen surrounding the lesion. No evidence of necrosis or mitosis. No infiltration of the tumor was made out.

The final diagnosis was a spinal angiolipoma.

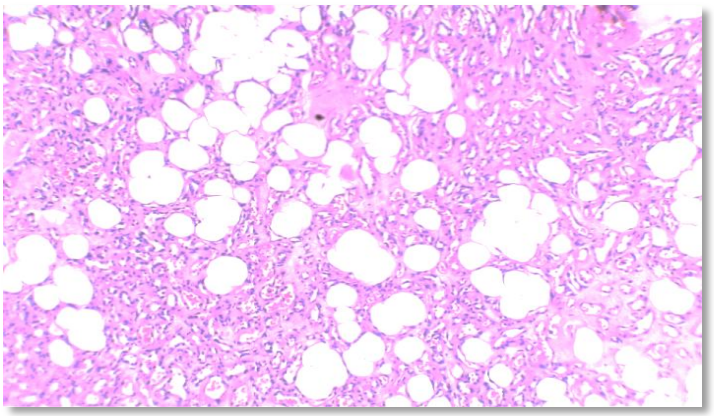

Fig-4: Showing adipose tissue with capillaries

Case-5

A 50-year-old female came to neurosurgery OPD and presented with a 4-year history of chronic back pain. She complained of numbness in the left anterior thigh. The bladder or bowel function was normal. On physical examination, interspinous tenderness was evoked at the T4–5 level without radical pain or paraesthesia.

Magnetic resonance imaging showed an intradural extramedullary mass pushing the spinal cord dorsally.

The tumor was exposed via right hemilaminectomy of T3-T5 and excision of the tumor was done.

Grossly, the tumor was firm measuring 1.3 × 1 × 0.7 cm.

Histopathology revealed a tumor composed of numerous calcified psammoma bodies with immature bone formation. The meningothelial cells were inconspicuous and lacked mitotic activity and necrosis.

The final diagnosis was psammomatous meningioma.

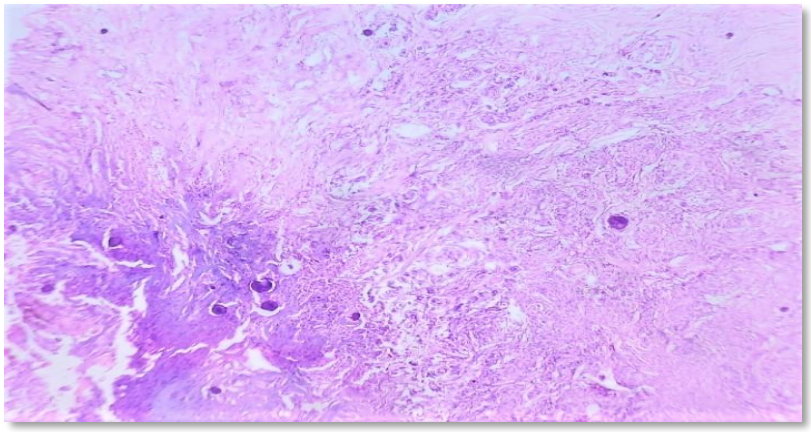

Fig-5: Numerous psammoma bodies are seen.

DISCUSSION

A retrospective study of 5 cases of the spinal tumor was carried out. In our study, the youngest patient was 33 years old and the eldest was 54 years. The average affected age was 46.6 years. The male to female ratio of spinal tumors in our study is 2:3. The most patient presented with back pain.

Spinal tumors are tumors that can occur within or adjacent to the spinal cord.

Spine tumors are examined under two subtitles called primary tumors which originate from the spine itself and its adjacent structures and secondary (metastatic) tumors of distant organs that spread hematogenous and lymphatically and are located in the spine and its surrounding tissues.

Primary tumors of the spinal cord are ten to fifteen times less common than primary intracranial tumors.

Spinal tumors are classified based on their anatomical location as extradural, intradural intramedullary, and intradural intramedullary.

Primary spinal tumors are typically intradural in a location whereas extradural tumors are typically due to metastatic disease [3].

Primary spinal cord tumors account for 2 to 4 percent of all primary central nervous system (CNS) tumors, one-third of which are located in the intramedullary compartment [4].

Metastatic tumors are the most common (97%) tumors of the spine [1]. It is known that the adenocarcinomas which mostly originate from the lung, breast, prostate, kidney, gastrointestinal tract, and thyroid tend to metastasize especially to the spine [5].

Intramedullary Neoplasm

Intramedullary tumors account for 5-10% of all spine tumors and are more common in children [6]. The most common primary intramedullary neoplasms are ependymoma, astrocytoma, and hemangioblastoma. The majority of which are low grade and slow-growing tumors.

Ependymoma

Ependymomas are the most common intramedullary neoplasm in adults and are the second most common in children [7]. The mean age of presentation is in the 4th- 5th decades of life and no gender predilection is seen [8]. It arises from ependymal cells lining the central canal, therefore is typically centrally located. The most common location is the cervical cord [9]. It carries a better prognosis and gross total resection results in extremely low recurrence

rates [6]. Five histologic subtypes of ependymoma are cellular, clear cell, papillary, tanycytic, and myxopapillary.

The myxopapillary variant represents around 30% of all intraspinal ependymomas [10]. Peak incidence is seen in the 3rd to 5th decades of life and slight male predominance is present [6]. Histologically it shows papillary structures formed by cuboidal ependymal cells surrounding extensive extracellular deposits of perivascular mucin [11]. Typically, fibro hyaline thickening of blood vessel walls is seen probably due to long-standing anoxia [12].

Our study shows similar findings as the 3rd-decade male was affected, tumor location was in the lumbar region and similar clinical features and histological features were seen. PRL Sonneland *et al*., study also shows similar findings as ours [13].

Intradural Extramedullary Neoplasms

IDEM tumors are more frequently seen in adults. Schwannomas and meningiomas are the most common, together representing 45% of all primary spinal cord tumors [14]. The differential diagnosis includes neurofibroma, malignant nerve sheath tumor, and myxopapillary ependymoma.

Schwannoma

Schwannomas arise from the support cells of the nerve sheath. It is the most common IDEM spinal neoplasm. Nerve sheath tumors account for 25% of all intradural spinal tumors in adults, the majority being schwannomas [15]. They may occur in any spinal compartment, but they are most commonly seen in an intradural and extramedullary location within the thoracic or lumbar spine [16]. The classical "dumbbell" shape lesion extending through the neural foramen is considered both intra and extradural, occurring in 10-15% of cases [17]. The tumor can occur at any age, with a peak incidence at 40 to 60 years of age without any gender predilection [18]. Schwannomas are mostly solitary and sporadic.

It can have syndromic associations which include NF2, Carney complex, and schwannomatosis. Schwannomas are typically WHO grade I (low grade) tumors. Total resection is considered curative of an intradural schwannoma. Histologically, it is composed of two components, Antoni A and Antoni B areas, Antoni A is cellular and consists of spindle-shaped Schwann cells which show nuclear palisading. Antoni B is less cellular with Schwann cells suspended in a loose myxoid matrix.

In our study, a similar age group is affected and a dumbbell shape tumor is present in the cervical region. Similar findings are present histologically.

Meningioma

Meningiomas are the second most common IDEM spinal tumor. They arise from arachnoid cap cells within the dura. It is most commonly seen in females in the 5th to 7th decades of life [15]. They are mostly solitary and sporadic. It may be associated with multiple syndromes, the most common of which is NF2. Thoracic cord involvement is typical and cystic degeneration is uncommon. They are most commonly WHO grade I tumors and total resection are usually curative.

Histologically meningothelial meningioma shows large lobules of cells with poorly defined cell borders and the formation of characteristic whorls. The cells have nuclei with finely distributed chromatin and inconspicuous nucleoli. Psammomatous meningioma shows tumor cells arranged in whorls with hyalinised and calcified centers called psammoma bodies

In our study females in her 5th decade is affected. The tumor is present in a thoracic and cervical location similar to the other study [19, 20]. Histological findings are similar to the above.

Angiolipoma

Spinal angiolipomas are benign tumors composed of both abnormal vascular elements and mature fatty tissue. Angiolipoma usually occurs in subcutaneous vessels, muscle, bone, and kidneys [21]. Spinal epidural angiolipomas are rare. This preferentially affects the dorsal aspect of the thoracic spine. Lumbar angiolipomas and intracranial angiolipomas are extremely rare [22]. Mostly occur in middle-aged women. Spinal epidural angiolipomas are benign lesions and have a good prognosis. These tumors are slow-growing and they do not undergo malignant transformation.

Tumor location and time of development may vary the neurological symptoms and signs. Most commonly long-standing pain and progressive neurological symptoms secondary to spinal cord compression occur in angiolipoma patients. Rarely, thrombosis, haemorrhage or steal phenomena may cause sudden deterioration in angiolipoma patients [23, 24]. The course often progresses over months and the diagnosis is typically established in less than 1 year. Onset or deterioration may occur during pregnancy like other vascular lesions.

Magnetic resonance imaging is the most important diagnostic tool for angiolipoma [25]. Surgery is considered to be the treatment of choice, and complete excision in most cases appears to be curative. One case of lumbar angiolipoma was treated with surgery and radiotherapy by Gonzalez–Crussi *et al*., [26].

Histologically, angiolipoma is composed of mature adipose tissue and blood vessels, features of which are described as being either normal or mimicking capillary angioma, cavernous angioma, or arteriovenous malformations. The adult type of fatty tissue is present and shows no remarkable findings. The ratio of fat to vessels ranges from 1:3 to 2:3. Our case shows a similar microscopic picture.

CONCLUSION

Spinal tumors are rare tumors. Spinal cord tumors occur predominantly in 21-40 age groups. These tumors are more common in females than in males. Back pain was the commonest presentation. Benign tumors are more common than malignant tumor. Proper diagnosis of spinal cord lesions is required for the management of patients which depends on the clinical manifestation, radiography and its correlation with the histological type and grade.

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