

Case Report

Mid Thoracic Spine Meningioma in A 15-Year-Old Boy: A Case Report and Review of Literature

Usman Bello O¹, Oyewole Fatai A¹, Umar Abdulaziz², Abdullahi O. Jimoh².

Departments of ¹Radiology, ²Medicine and Surgery, Faculty of Clinical Sciences, College of Medical Sciences, Ahmadu Bello University, Zaria.

***Correspondence:** Dr. Usman Bello, Department of Radiology, College of Medical Sciences, Ahmadu Bello University, Zaria, Nigeria, **Email:** muhammedbello111@yahoo.com. **Tel:** +2348052333866

Submitted: 2 March 2023. **Published:** 5 May 2023

ABSTRACT

Meningiomas usually are benign, slow growing tumours, although in rare cases they may be malignant and invade surrounding tissues. spinal meningiomas occur more frequently in women because of a possible dependence on sex hormones. Imaging has an important role in identifying the lesion, detecting tumor related complications and pre-surgical workup, which are essential for treatment. In this report a case of spinal meningioma is presented to reinforce the importance of accurate diagnosis of this lesion in this age group from its differentials.

Keywords: Mid Thoracic, Spine Meningioma.

INTRODUCTION

Meningiomas usually are benign, slow growing tumours, although in rare cases they may be malignant and invade surrounding tissues. Meningiomas are the second most common tumor in the intradural extramedullary location, second only to tumors of the nerve sheath.¹ Meningiomas account for approximately 25% of all spinal tumors.¹ Approximately 80% of spinal meningiomas are located in the thoracic spine, followed by cervical spine (15%), lumbar spine (3%), and the foramen magnum (2%).^[1] Most intradural spinal tumors are benign and potentially resectable. The prognosis after surgical resection is excellent.^[1] Spinal meningiomas are located lateral to the spinal cord or have a component that extends laterally. A posterior location is more frequent than an anterior one.^[1,2] Spinal meningiomas are typically intradural and extramedullary (83-94%).^[2] Meningiomas have an increased incidence in patients with neurofibromatosis type II, and those who have been exposed to ionizing radiation as during therapy for cancers.^[3,4] Spinal meningiomas most often affect middle-aged women. The female/male ratio is higher compared with intracranial meningiomas.

It has been suggested that spinal meningiomas occur more frequently in women because of a possible

Access to the article



Website: www.jmsr.com.ng

eISSN: 2971-7833

pISSN: 2971-7108

10.5281/zenodo.10445517

How to cite this article

Usman B.O., Oyewole F.A., Umar A., Abdullahi O.J. Mid Thoracic Spine Meningioma In A 15-Year-Old Boy: A Case Report And Review Of Literature. *J Med & Bas Sci Res.* 2023;4(3-4):33-42. DOI: 10.5281/zenodo.10445517

dependence on sex hormones.^[4] Imaging has an important role in identifying the lesion, detecting tumor related complications and pre-surgical workup, which are essential for treatment.

In this report a case of spinal meningioma in adolescent male is presented to reinforce the importance of accurate diagnosis of this lesion from its differential.

CASE REPORT

E.K. is a fifteen-year-old male who was referred from Military Hospital Kaduna on account of 18 months history of mid back pain which radiated to the lower limbs. He later developed progressive numbness and weakness of the lower limbs and had some difficulties with ambulation. He has no associated bowel or bladder symptoms. He denied any history of exposure to ionizing radiation, antecedent trauma to the back, or surgery to the spine. There was no history suggestive of pulmonary tuberculosis or other underlying systemic malignancies. Review of systems was contributory.

On general physical examination he was afebrile, anicteric, not pale and no lymphadenopathy was seen. He had a GCS of 15 with normal higher cerebral functions. No cranial nerve palsies. There was muscular hypotonic, reduced muscle bulk and the muscle strength of 5/5 in the upper extremities while in the lower limbs it was 4/5 bilaterally. Sensory testing was poor and deep tendon reflexes of the lower extremities were hyperreflexic. He had mid thoracic spine tenderness at a level of T5/T6.

The initial clinical impression was Potts disease and he was radiological investigated for paraparesis? cause.

Magnetic resonance imaging T₁ (pre and post contrast) and T₂ weighted images were performed. Thoracic MRI demonstrated an intradural extramedullary well defined oval shaped mass measuring 3.0 x 2.4 cm, anterolateral and to the right side of the spinal cord at the level of T5-T6 vertebrae.

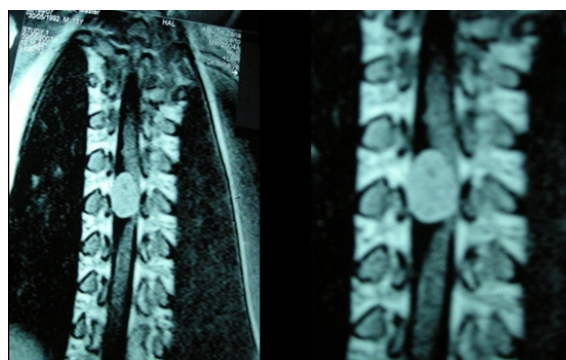


Figure 1: Coronal T1-weighted post gadolinium enhanced MRI scans showing right sided brilliantly enhanced well defined oval shaped mass lesion compressing and displacing the adjacent spinal cord to the contralateral side. A focal hypointense area (calcification) is also noted in its upper part.

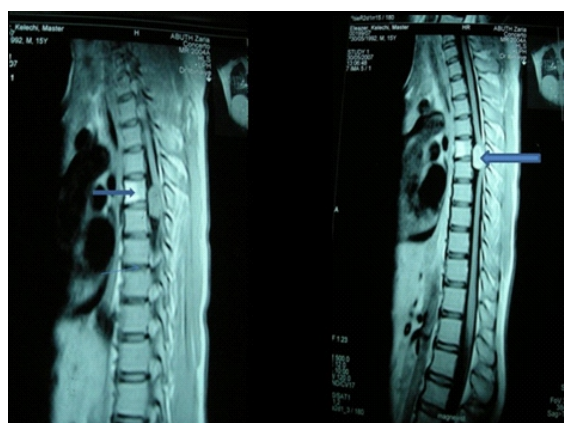


Figure 2: Sagittal T1-weighted nonenhanced (a) and post gadolinium enhanced (b) MRI images showing a brilliantly enhanced well defined anterior oval shaped isointense intradural extramedullary mass lesion in the mid thoracic region at the level of T5-T6 vertebrae compressing the adjacent spinal cord (Thick arrow). A reactive hyperintense area on the adjacent T5 vertebral body consistent with bony hyperostosis/sclerosis noted (Thin arrow).

The mass was of iso/mixed signal intensity to spinal cord on T1 and T2 weighted images and brilliantly enhanced with gadolinium on T1 weighted image (Figure 2b). There was no invasion of adjacent soft tissue or bone but there was stenosis of spinal canal, marked compression of the

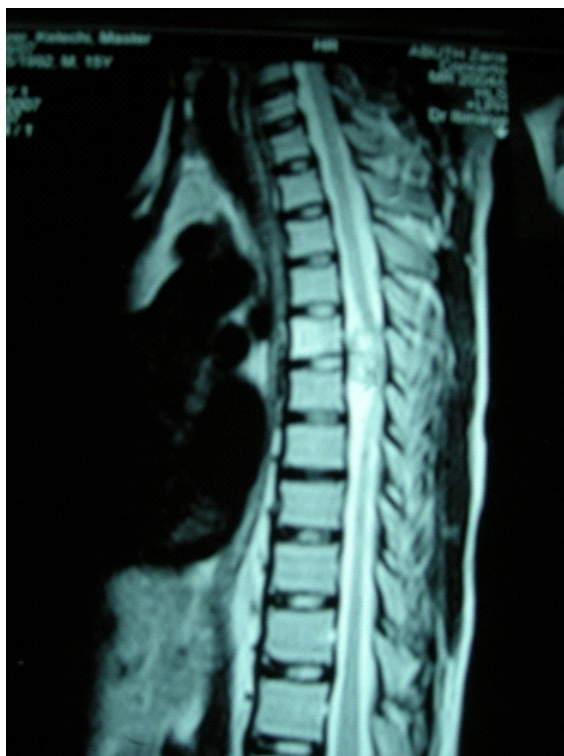


Figure 3: Sagittal T2-weighted nonenhanced MRI image showing anterior oval shaped iso/mixed intense intradural extramedullary mass lesion in the mid thoracic region at the level of T5-T6 vertebrae compressing the spinal cord/theca and obstructing flow of csf (Long arrow). There is also previously noted area of hyperintensity on the T5 vertebral body (Small arrow).

spinal cord at the level of T5–T6 vertebrae and obstruction to the free flow of cerebro-spinal fluid. Radiological diagnosis was that of meningioma, with differential diagnosis of schwannoma and neurofibroma.

The patient was worked up and subsequently had a T5-T6 laminectomy with tumour excision. Intraoperative findings were those of a well circumscribed intradural extramedullary tumor that was completely excised. Histology report confirmed a meningioma. The patient had an uneventful postoperative course with improvement in lower extremity paresthesias. He was discharged home with significant improvement in power, the muscular strength was

also improved through physiotherapy and being followed up in clinic for period of two years.

DISCUSSION

Meningiomas arise from the arachnoid cap cells of meninges and are benign in 90% of the time. By definition they do not involve the parenchyma of the CNS although they may cause symptoms by compression. They are more often located intracranially (90% of the time), but account for as much as 25% of all primary spinal tumors.^[1,3] Three quarters of spinal meningiomas are found at thoracic vertebral levels, similar to the finding in the present patient. And usually in the posterior spinal canal although it was anterior to the spinal cord in the present patient.^[3,4]

The tumors are found in women in about 80% of the time with a mean age of 53 years. The female preponderance and adult age preference were not demonstrated in this patient who is adolescent boy.^[3,4] Comparatively, spine meningiomas are rare in children/adolescents, more common in males as in this case.

Spinal meningiomas are located in the intradural extramedullary space, grow slowly, spread laterally in the subarachnoid space, and are usually symptomatic. It is similar to our MRI finding in this index patient that revealed the tumor in the intradural extramedullary space.

Woltman *et al*^[5] found that the mean delay in diagnosis of intradural extramedullary tumors was 2.9 years. The symptoms of a typical thoracic meningioma are secondary to an insidious course of gradual tumor growth and cord or nerve root compression. This benign nature of the tumor accounts for the late presentation of the case when the pressure symptoms have set in.

Clinical symptoms can be due to cord or nerve root compression, with localized back pain more commonly reported (56%) than radicular symptoms (21%) in one study.^[3,4] Typically, back or radicular pain preceded weakness, and sensory changes, and bowel or bladder dysfunction are always late findings.^[3,4] The symptoms in the present case were radicular, weakness and mild

sensory changes which were all due to pressure effect of the tumor mass on the adjacent spinal cord.

The clinical picture is often vague with insidious onset owing to the slow growth of the tumor: retrospective studies have reported rates of initial misdiagnosis from 24-32%.^[3,4] The index patient have similar experience for 18 months before reaching the definitive diagnosis.

Radiographs are ineffective for detecting meningiomas, as abnormalities are only detected 21% of the time in patients with the disease.^[3,4] In the past, plain radiography was used to detect calcified meningiomas, but calcifications are only visible on 2 to 5% of plain radiographs.^[1]

Myelography, was the imaging modality of choice to define spinal lesions before routine use of cross sectional imaging was available. However, myelography was not done for the current patient because he benefited from MRI. Computerised tomography (CT) could demonstrate the tumor, presence of calcification, edema and spinal bone changes. They appear as hyperdense brilliantly enhancing mass. Calcification is present in 10-20%, while 1-2 % are multiple.^[6] Solitary calcification was however seen in the current patient. Meningiomas may be associated with peritumoral edema and bony erosion or hyperostosis which was seen on the body of T5 vertebra adjacent the mass lesion in this patient. Calcifications may be found within the tumor but are rarely visualized on imaging.^[3,4]

Samii^[7] reported that MR imaging led to earlier diagnosis of spinal meningiomas by 6 months and, on average, patients suffered less severe neurological deficits at the time of surgery. Meningiomas, which are isointense to spinal cord on T1 and T2 weighted images (Figures 2a and 3) and enhance with gadolinium, can be distinguished from neurinomas which demonstrate a hyperintense signal on T2W image.^[3,4] Although MRI has a poor detection rate for calcifications, it could be seen as area of low signal intensity as noted in the current case.

They enhance avidly and homogenously following

administration of contrast medium as seen in this patient, except cystic and heavily calcified lesions which were not found in the present case. About 70% are associated with dural tail which was also not demonstrated in this patient images but this is not specific for meningioma as it may also occur in schwannomas, lymphomas and peripheral gliomas.^[8-10]

The treatment of choice for intraspinal meningiomas is total resection, or adjunctive radiation in cases of subtotal resection. The prognosis is excellent for patients undergoing surgery, 85% of patients from one study had clinically stable or improved neurological function after surgery.^[3,4] The present patient also had successful total excision of the tumor mass. There was however mild lower limbs weakness, paresthesias for months during follow up probably due to previous pressure effects on the spinal cord by the tumor before the surgery that significantly improved after two years.

Recurrence rates in spinal disease are low (6% in one series) compared with intracranial lesions (30%). As above, the disease is typically benign, and patients often die of other causes in follow-up studies. Overall survival at 5 years from spinal tumours is estimated at 70% for benign meningiomas and 55% for malignant tumors.^[3,4]

CONCLUSION

A rare case of spinal meningioma in adolescent male is presented to reinforce the importance of accurate diagnosis of this lesion from its differential. The clinical features as well as radiological diagnosis and histological confirmation was discussed. Imaging has an important role in identifying the lesion, detecting tumor related complications and pre-surgical workup, which are essential for treatment.

REFERENCES

1. Arnautovic A, Arnautovic KI. Extramedullary intradural spinal tumors. *Contemporary Neurosurgery*. 2014 Mar 15;36(5):1-8.
2. Raco A, Pesce A, Toccaceli G, Domenicucci

- M, Miscusi M, Delfini R. Factors leading to a poor functional outcome in spinal meningioma surgery: remarks on 173 cases. *Neurosurgery*. 2017 Apr 1;80(4):602-9.
3. Solomon DA, Pekmezci M. Pathology of meningiomas. In *Handbook of Clinical Neurology* 2020 Jan 1 (Vol. 169, pp. 87-99). Elsevier.
 4. McDermott MW, editor. *Meningiomas, Part II*.
 5. Miller DC. Surgical pathology of intramedullary spinal cord neoplasms. *Journal of neuro-oncology*. 2000 May;47(3):189-94.
 6. Pemov A, Dewan R, Hansen NF, Chandrasekharappa SC, Ray-Chaudhury A, Jones K, Luo W, Heiss JD, Mullikin JC, Chittiboina P, Stewart DR. Comparative clinical and genomic analysis of neurofibromatosis type 2-associated cranial and spinal meningiomas. *Scientific reports*. 2020 Jul 28;10(1):1-0.
 7. Maiti TK, Bir SC, Patra DP, Kalakoti P, Guthikonda B, Nanda A. Spinal meningiomas: clinicoradiological factors predicting recurrence and functional outcome. *Neurosurgical focus*. 2016 Aug 1;41(2):E6.
 8. Huang RY, Bi WL, Griffith B, Kaufmann TJ, la Fougère C, Schmidt NO, Tonn JC, Vogelbaum MA, Wen PY, Aldape K, Nassiri F. Imaging and diagnostic advances for intracranial meningiomas. *Neuro-oncology*. 2019 Jan 14;21(Supplement_1):i44-61.
 9. Smith AB, Horkanyne-Szakaly I, Schroeder JW, Rushing EJ. From the radiologic pathology archives: mass lesions of the dura: beyond meningioma—radiologic-pathologic correlation. *Radiographics*. 2014 Mar;34(2):295-312.
 10. Nagai Yamaki V, de Souza Godoy LF, Alencar Bandeira G, Tavares Lucato L, Correa Lordelo G, Fontoura Solla DJ, Santana Neville I, Jacobsen Teixeira M, Silva Paiva W. Dural-based lesions: is it a meningioma?. *Neuroradiology*. 2021 Aug;63(8):1215-25.