

Case Report

Spinal Psammomatous Meningioma with Ossification and Extramedullary Hematopoiesis

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ABSTRACT

Spinal canal meningioma is a rare tumor which is mostly benign and slow growing. Psammomatous calcification is commonly seen in meningioma but only few cases of ossified meningioma have been reported. Extramedullary hematopoiesis in the ossified meningioma is even rarer with very few case reports. Surgical excision is the treatment of choice. We describe case of a 70 year old female with spinal intradural hard mass, diagnosed to be meningioma with ossification and extramedullary hematopoiesis along with review of literature about its histogenesis.

Key words: Meningioma, extramedullary hematopoiesis, spinal

INTRODUCTION

Spinal canal tumors are rare, amongst which meningioma ranks second only to the schwannoma. They commonly occur at thoracic region in middle aged women. [1] In 1 % of the cases meningioma can get ossified hence very few cases of ossified meningioma has been reported. Extramedullary hematopoiesis in the ossified meningioma is even rarer with very few case reports. [2] Meningiomas are mostly benign and slow growing. Surgical excision is a treatment of choice.

We describe a case of elderly female with symptomatic intradural spinal meningioma with ossification with extramedullary hematopoiesis.

CASE HISTORY

70 year old female presented with back pain of 3 months duration. The pain was radiating in both the lower limbs. On examination she also had lower limb weakness with power 4. MRI was done which showed a well defined intradural

mass at D9-D10 level causing spinal cord compression and cord edema [Figure 1].



Figure 1: MRI showing well defined intradural mass at D9-D10 level causing spinal cord compression and cord edema

There was a disc bulge at L4-5 and L5-S1 level with narrowing of neural foramina and compression of nerve root. Radiologist suggested differential diagnosis

of nerve sheath tumor or meningioma with prolapsed intervertebral disc at L4-5 and L5-S1 level. Resection of the tumor was done by posterior midline approach and we received a nodular bony mass measuring 2 cm in diameter. Histopathological examination revealed a well circumscribed tumor comprising of bland elongated cells with indistinct cell borders, bland vesicular nuclei with focal whirling [Figure 2].

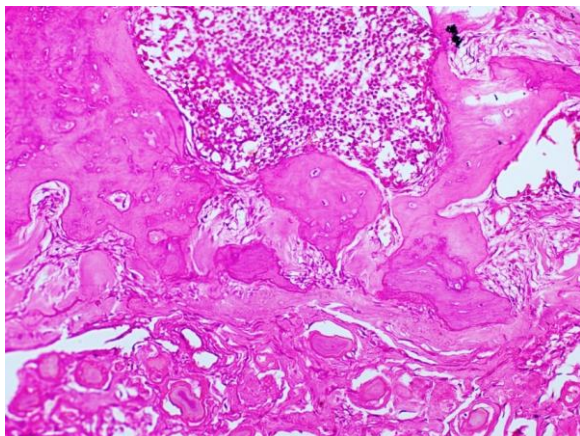


Figure 2: Tumor comprising of bland elongated cells with indistinct cell borders, bland vesicular nuclei with focal whirling, H and E, 10 X

Many psammoma bodies were seen [Figure 3].

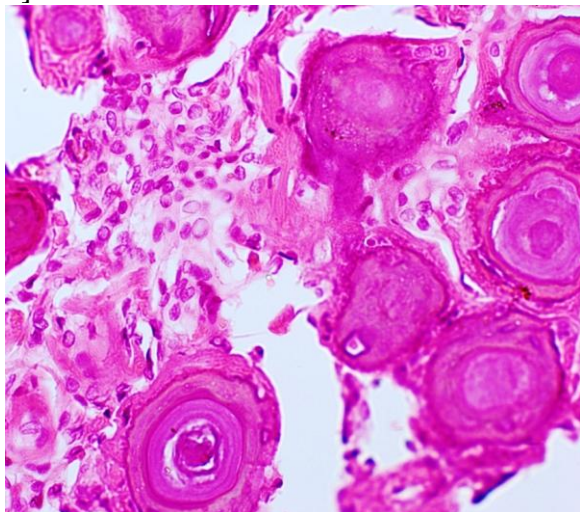


Figure 3: Meningeothelial cells with psammoma bodies, H and E, 40 X

Ossification with extramedullary hematopoiesis was noted in areas [Figure 4].

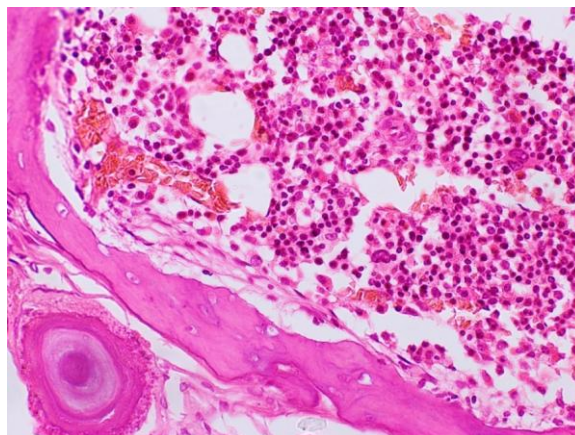


Figure 4: Tumor showing ossification with extramedullary hematopoiesis, H and E, 40 X

No atypia, increased mitosis or necrosis was seen. Based on these findings diagnosis of psammomatous meningioma with ossification and extramedullary hematopoiesis was given.

DISCUSSION

Spinal meningioma is a rare tumor and it is typically intradural and extramedullary in location. However, approximately 3-15% of all cases of spinal meningioma are extradural.^[3] They are thought to arise intradurally from the arachnoid villi related to an emerging nerve root. The most common symptoms of spinal meningioma are pain, followed by muscle weakness such as paresis or plegia, and sensory loss such as hypoesthesia, paresthesia, or anesthesia. In the cases of spinal ossified meningioma, muscle weakness is more frequent¹ which was also noted in our patient.

The histopathological examination showed cellular areas composed of plump to spindly elongated cells in syncytial sheets and whorls. The individual tumor cells had indistinct cell borders and round to oval nuclei with vesicular chromatin. In the stroma showed scant lymphoplasmacytic infiltrate. In areas the tumor showed mineralization in the form of psammoma bodies, bony specules with hematopoietic cells.

Though psammoma body is a common finding with spinal meningioma, ossification and extramedullary

hematopoiesis are rarely encountered. Approximately 50-90% of spinal meningioma has psammoma bodies compared with only 10% in intracranial meningioma. [4] Till date only 16 such cases are being reported in PubMed with the age range of 15-78 years and with female predominance. [5]

Licci et al. stated that lamellar bone can be seen in the meningioma but formation of hematopoietic tissue in the marrow space is rarely encountered. [2] The histogenesis of the ossification in meningiomas is not clear. There are some hypotheses about ossification given by few authors. Barresi et al. suggested two pathways. First pathway states that the bone formation is a final step of longstanding calcification, as considered in psammomatous meningioma. The other hypothesis suggested was that the neoplastic cells surrounding nearby bony trabeculae develop osteoblast-like properties, expressing osteopontin, leading to enchondral ossification with remodeling by osteoclasts. [6]

Uchida et al. suggested that premature arachnoid cells which are the origin of the meningioma cells with their characteristic pluripotency, differentiate into the metaplastic cells leading to bone formation. [7]

Mathew et al. suggested two mechanisms for de novo extramedullary hematopoiesis within meningiomas. First, the induced neoplastic growth of meningeal cells may cause erythroid differentiation in the multipotent stem cells. Second, the quiescent heterotopic cell rests that were isolated during development may develop proliferative changes and differentiation by the increased oxygen and nutritional demands of the tumor cells. [8] Licci et al. mentioned that a third mechanism of mesenchymal multipotentiality of meningeal or meningiomatous cells could cause hematopoietic differentiation. [2]

Kubota et al. [9] ultrastructurally investigated the initial mineralization site and mode of calcification in psammoma

bodies. They stated that hydroxyapatite crystals repeatedly get precipitated and aggregate forming psammoma bodies. Collagen fibers surrounding the calcified bodies then accumulated deposits of apatite crystals, forming huge psammoma bodies. [9] However, Kitagawa et al. concluded that the ossification of meningioma is secondary to the metaplasia of the arachnoid cells rather than psammomatous features. [10]

Complete surgical excision of the lesion is the treatment of choice but ossification makes excision difficult. Prognosis after complete surgical excision is good.

CONCLUSION

In conclusion, spinal ossified meningioma with hematopoietic bone marrow is extremely rare. Many hypotheses have been put forward but the histogenesis of the bone and hematopoiesis is still unknown. The hardness of the tumor makes surgery more difficult, but a good outcome is expected with total resection of the tumor.

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