

Ginkgo Leaf Sign: A Classical Imaging Finding in Spinal Meningiomas

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Abstract

Keywords

- spinal meningiomas
- ginkgo leaf sign
- dentate ligament
- intradural extramedullary tumors
- spinal nerve sheath tumors.

The common imaging features surgeons use to distinguish spinal meningiomas from spinal nerve sheath tumors on magnetic resonance (MR) scans include the presence of the “dural tail sign” on contrast-enhanced MR images, hypointensity of the lesion on T2 sequences, presence of calcifications, lack of extraspinal dumbbell extension, and the lack of cystic changes in the lesion. We highlight the rarely described finding—the “Ginkgo-Leaf” sign that is caused by the stretched denticulate ligament as it extends laterally, through the tumor, from the compressed spinal cord.

A 75-year-old lady presented with progressive ataxia, weakness and sensory deficits in both lower limbs, difficulty in holding urine and constipation of 3 months duration. Magnetic resonance imaging (MRI) of the spine (► **Fig 1A–D**) revealed a right-sided T1 isointense and T2 mildly hyperintense intradural extramedullary lesion-enhancing homogeneously on contrast at D11–D12 levels compressing the spinal cord to the left. Axial imaging showed the lesion to be ventral and lateral to the spinal cord with a hypointense band traversing it (► **Fig 1E,F**). Intraoperatively, the tumor was moderately vascular, attached to the anterior and lateral dura and easily separable from surrounding nerve roots and SC. It was traversed by the dentate ligament, sectioning of which enabled easy access to the anteriorly located part of the tumor and ventral dura. Complete removal with coagulation of the attachment was done with no postoperative deficits.

Dentate ligaments are pial condensations extending outwards bilaterally from the lateral aspect (between the ventral

and dorsal roots) of the SC to the dura and stabilize the SC in the spinal canal.¹ While the medial attachment to the SC is continuous, laterally they condense into thin triangular extensions at their attachment to the dura.¹

Yamaguchi et al² first described the “Ginkgo leaf” sign as being highly specific for spinal meningiomas. They found it in seven cases of spinal meningiomas and later Zhai et al³ too found this sign in two of their cases of lateral or ventrolateral meningiomas. We have encountered only two papers^{2,3} describing this sign in the literature though others have quoted them and mentioned that this sign is specific for meningiomas. It must be stressed that only a laterally arising spinal meningioma, which extends both anterior and posterior to the dentate ligament will “deform the spinal cord like a fan” even as the lateral aspect of the cord remains tethered to the dura by the dentate ligament.^{2,3} The spinal cord thus represents the leaf of the Ginkgo plant, while the ligament represents the stalk of the leaf (► **Fig 1G,H**). Unlike meningiomas nerve sheath tumors never show this finding^{2,3}

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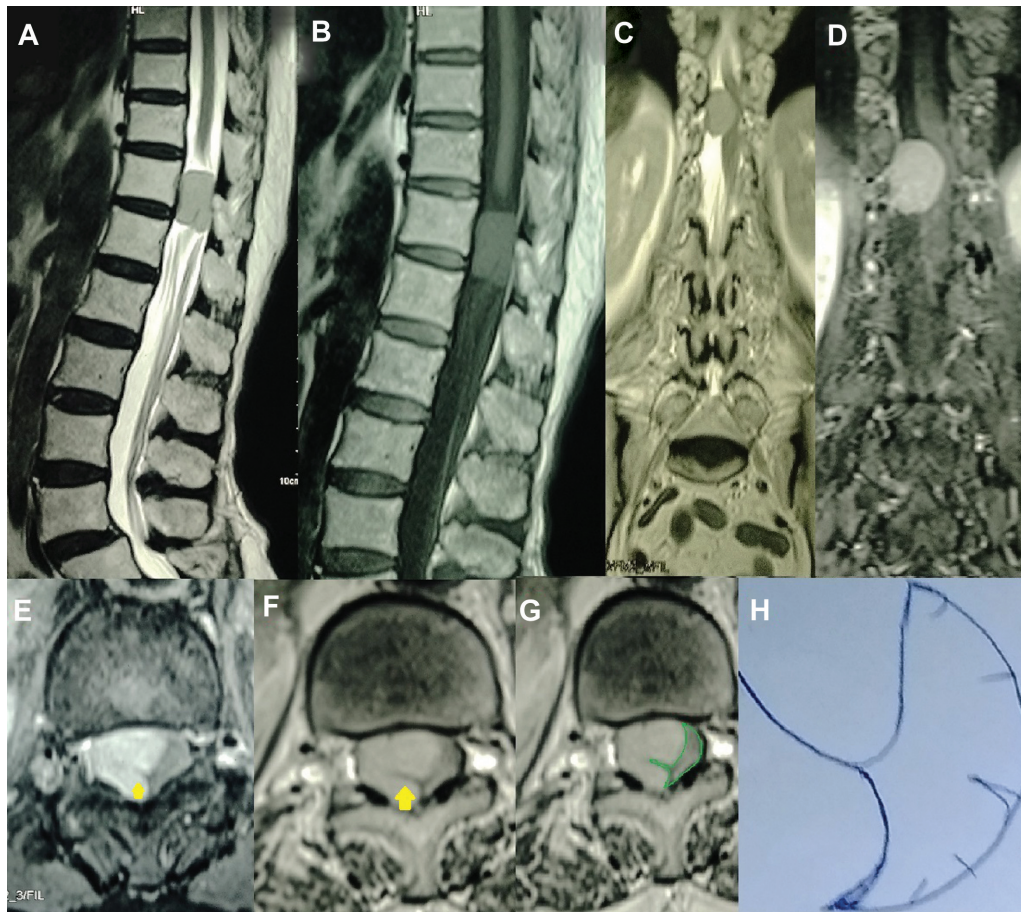


Fig. 1 Magnetic resonance imaging of the spine showing on sagittal T2 section (A) a mildly hyperintense mass at D11-D12 levels. This is hypointense on the T1 sagittal section (B). T2 coronal section (C) shows the intradural extramedullary lesion compressing the cord to the left and post contrast T1 coronal section (D) shows homogenous enhancement of the lesion. Post contrast T1 axial (E) and plain T2 axial (F) sections show a hypointense band (yellow arrows) representing the dentate ligament traversing through the tumor. The fan-shaped compressed cord with the stalk as dentate ligament is highlighted by superimposing a green line on the T2 axial section (G) and (H) shows a schematic drawing of the “Ginkgo leaf.”

because they originate from dorsal or rarely ventral rootlets and not the dura and thus either push the dentate ligament either forward or backward. A similar displacement will occur when meningiomas too arise completely from either the dorsal or ventral dura and this probably accounts for the rarity of this finding in the majority of cases.

While diffuse homogenous enhancement, “dural tail” sign, hypointensity on T2 sequences are characteristic radiological findings in spinal meningiomas, the Ginkgo leaf sign caused by the stretched dentate ligament traversing the tumor is another useful adjunct in identifying the tumor preoperatively. Knowledge of this sign helps in preoperative planning as sectioning of the dentate ligament will be needed to mobilize the cord and access the anterior component of the lesion.

Conflict of Interest

None declared.

Informed Consent

Patient's consent has been taken for the study.

References

- 1 Nicholas DS, Weller RO. The fine anatomy of the human spinal meninges. A light and scanning electron microscopy study. *J Neurosurg* 1988;69(02):276–282
- 2 Yamaguchi S, Takeda M, Takahashi T, et al. Ginkgo leaf sign: a highly predictive imaging feature of spinal meningioma. *J Neurosurg Spine* 2015;23(05):642–646
- 3 Zhai X, Zhou M, Chen H, et al. Differentiation between intraspinal schwannoma and meningioma by MR characteristics and clinic features. *Radiol Med (Torino)* 2019;124(06):510–521