39. Primary Neoplasms

Schwannomas and neurofibromas share a similar MRI appearance and are both common lesions in thoracic spine MR. Schwannomas typically demonstrate heterogeneously high SI on T2WI with a moderate or low SI on T1WI. Foci of lower SI on T2WI may correlate with pathologically denser tissue in which there is a diminished amount of free water. In Figure 39.1 A, the extramedullary intradural mass—a location suggested by the relative broadening of the subarachnoid space at its margin with the tumor and the clear delineation of tumor from cord—compresses the spinal cord displacing it to the left. Both schwannomas and neurofibromas may occur less commonly extradurally or extend both intra- and extradurally leading to a dumbbell shape. As in the post-contrast T1WI of Figure 39.1 A, B these neoplasias often enhance heterogeneously, and small lesions may not be detected without contrast administration. The non-enhancing region of the tumor in Figure 39.1 B correlated with a region of high SI on T2WI, suggesting cystic degeneration and thus the diagnosis of schwannoma over neurofibroma. Other clues to distinguishing the two include the tendency of neurofibromas to be multiple and more homogenous in their enhancement. They are also associated with NF 1, although even the presence of a solitary neurofibroma makes a NF1 diagnosis likely. In contrast, spinal schwannomas are found more commonly, along with meningiomas, in NF 2. Schwannomas also tend to arise eccentric to a given nerve, compressing it, whereas neurofibromas tend to enlarge the nerve itself. Malignant schwannomas are rare, demonstrating more infiltrative borders and a larger overall size than their benign counterparts.

Schwannomas and neurofibromas also comprise the most common cause of posterior mediastinal neoplasia along with—in increasing order of prognosis, age of onset, and degree of cellular maturation—neuroblastomas, ganglioneuroblastoma, and ganglioneuromas. The latter three entities are of neural crest cell origin, thus occurring along the sympathetic chain and within the adrenal medulla. Tumors arising at the former location may extend to involve the spine or surrounding structures. These tumors tend to affect patients younger than 20 years old with neuroblastomas pathologically classified as one of the small round blue cell tumors of childhood. Consequent hypercellularity may contribute to a lower SI on T2WI than that seen with nerve sheath tumors; although, this distinction is unreliable given the potential in the latter for areas of lower SI secondary to densely packed cellularity (termed Antoni A in schwannomas). Given its high and low SI on T2 and T1WI, in Figure 39.1 C, D respectively, combined with its homogenous enhancement with contrast (not shown), the posterior mediastinal mass in this figure (asterisk) could potentially represent any of the aforementioned entities with benign nerve

sheath tumors (schwannomas and neurofibromas) representing statistically the most common pathology, especially in an older (83 years in this case) patient.

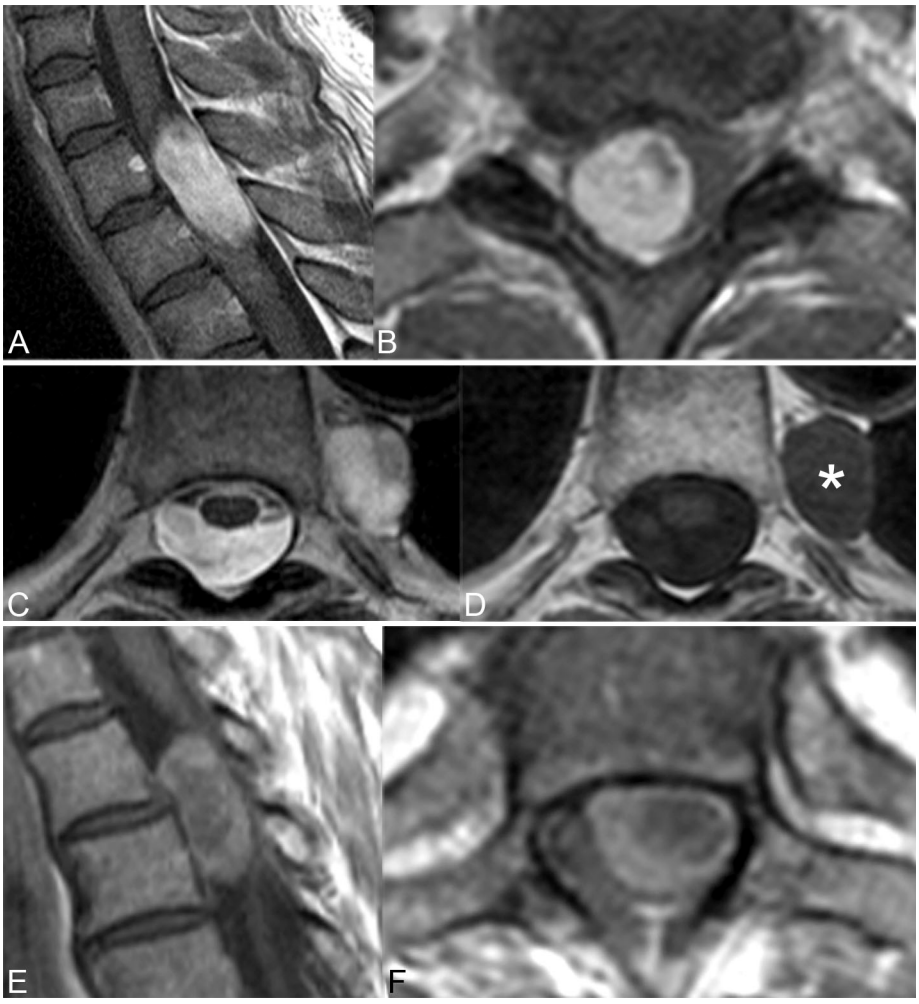

Fig. 39.1

Meningiomas are the second most common intrathecal tumor after those of the neural sheath. As with intracranial varieties they tend to be histologically benign and slow-growing, demonstrating a broad dural base. Meningiomas tend to occur in an anterolateral location relative to the cervical spinal cord and posterolaterally at all other levels. Multiple paraspinal meningiomas (as with bilateral lesions involving the internal auditory canals) are nearly pathognomonic for NF2. Although multiple in this rare condition, meningiomas, like schwannomas and in contrast to neurofibromas, tend to occur as solitary lesions. With the latter two, dural adherence is less commonly seen. The meningioma in Figure 39.1 E, F, as is typical for this type of lesion, is intradural and extramedullary in location—which is again suggested by the broadened subarachnoid space near the tumor margin (well illustrated in this instance on the sagittal image, E)—displacing and compressing the spinal

cord to the right (F). Acquisition of the (F) CE T1WI was delayed following contrast administration, and because of this, lesion enhancement is less prominent than that typically seen with these highly vascular lesions. Also in this case, the central area of decreased SI seen on both sagittal (Fig. 39.1 E) and axial (F) images was of similar low SI on all pulse sequences and correlated with an area of dense calcification on CT. The tendency to calcify is relatively characteristic of spinal meningiomas, occurring in approximately three-fourths of cases.