

52. Leptomeningeal Carcinomatosis

(and the differential diagnosis of nerve root enhancement)

The presence of metastatic disease to the leptomeninges is a poor prognostic indicator, occurring most commonly with primary CNS neoplasms—so-called drop metastases, most frequently from medulloblastoma, ependymoma, and germinoma. Non-CNS tumors that can cause leptomeningeal metastases include breast cancer, followed by lung cancer in frequency. Due to the effects of gravity, the lumbar spine is most commonly involved. The appearance of such lesions is variable on MRI. Findings in a patient with primary breast carcinoma are illustrated in Figure 52.1 A-C. (A) Sagittal T2WI demonstrate multiple, small, moderate SI nodules involving the cauda equina. (B) Axial CE T1WI just above the level of termination of the conus demonstrate multiple prominently enhancing lesions, typical of such metastases. At the (C) level of the tip of the conus, axial CE T1WI displays additional, small, enhancing nodules, here more distinct rather than confluent. More superiorly in the cord, in the cervical spine of the same patient, an enhancing intramedullary lesion is seen on the CE T1WI of Figure 52.1 D, E (white arrow). Enhancement indicative of involvement of the dorsal pia-arachnoid is present as well on both the (D) sagittal and (E) axial CE T1WI. Whether this particular tumor represented a primary metastasis to the dura now involving the cord or alternatively a primary intramedullary metastasis now involving the dura cannot be determined.

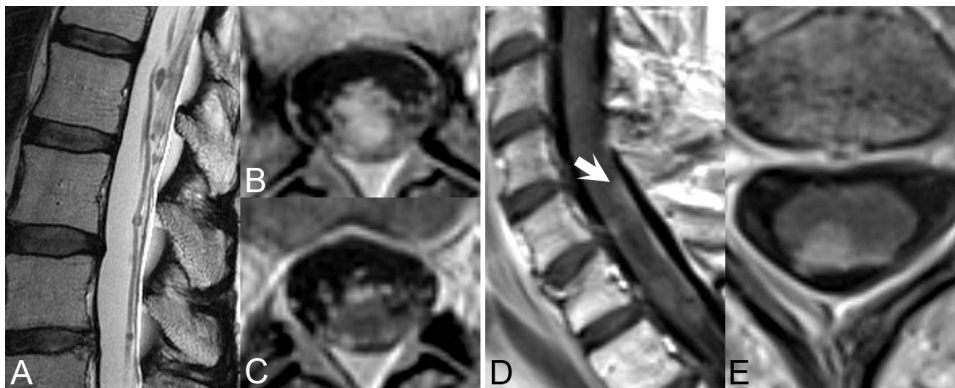


Fig. 52.1

The epidural (extradural) space may also be involved in metastatic disease. Figure 52.2 A, B demonstrates a case of lymphoma metastatic to the epidural space on axial T2 and CE T1WI, respectively. Marked compression of the thecal sac by this (B) enhancing process is present, as is extent to the bilateral neural foramina.

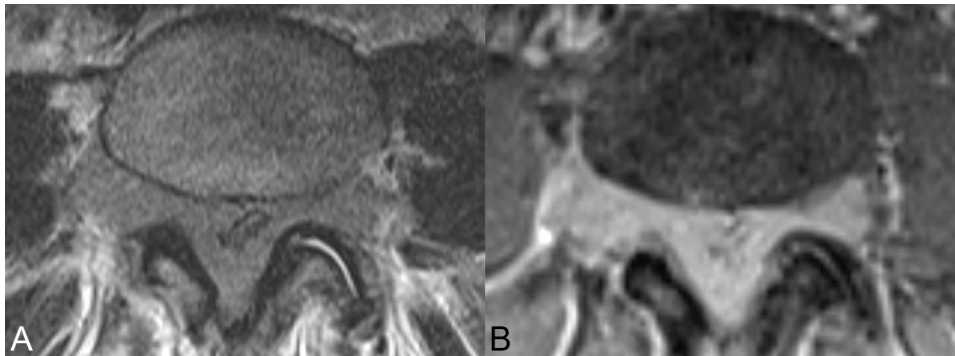


Fig. 52.2

In addition to intramedullary and extradural metastases, subarachnoid spread of metastases may occur (as also shown in Figure 52.1). Figure 52.3 demonstrates, on FS CE T1WI of the (A) cervical spine, a nodular enhancing lesion, subarachnoid in location, at the C3-4 level (white arrow). However, in addition, there is diffuse subarachnoid spread of the tumor more inferiorly, leading to an appearance of “icing” of the cord (black arrows). Unenhanced MR is particularly poor in detection of this pattern of leptomeningeal involvement, with contrast administration greatly improving sensitivity. Images in the (B) lumbar spine of this patient demonstrate a large intrathecal mass of moderate SI on T2WI. Associated nerve root thickening, indicative of leptomeningeal metastases, is present from the level of the mass to the conus, with prominent nerve root enhancement on CE T1WI (not shown).



Fig. 52.3

The differential diagnosis of nerve root enhancement includes benign infectious and inflammatory conditions, in addition to leptomeningeal metastatic disease. The presence of nodularity should however suggest neoplastic involvement. Guillain-Barré classically demonstrates preferential involvement of the ventral nerve roots, as illustrated in the axial FS CE T1WI of Figure 52.4. Chronic inflammatory demyelinating polyneuropathy (CIDP) presents with enlargement and hyperintensity on T2WI of nerve roots, ganglia, and peripheral nerves, as illustrated on the sagittal STIR image in Figure 52.5. The hereditary motor and sensory neuropathies, which include Charcot-Marie-Tooth disease, can be indistinguishable on imaging from CIDP. In the presence of appropriate clinical findings, neural sheath tumors and plexiform neuromas—associated with NF1—are another consideration. Cystic dilatation of nearby structures may appear similar on unenhanced MR but are distinguished from the lesions above by a lack of enhancement. A small lateral meningocele or perineural root sleeve cysts (Tarlov cysts), for example, will demonstrate bright CSF-like SI on T2WI. Associated widening of the neural foramina from thinning of the adjacent pedicles may also be seen.

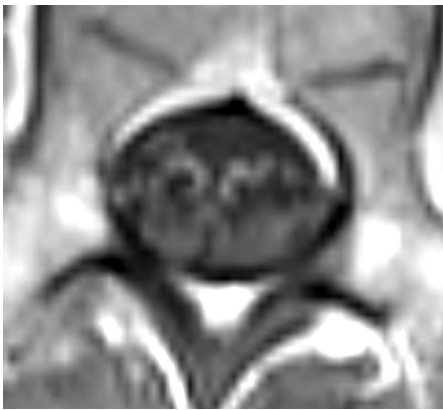


Fig. 52.4

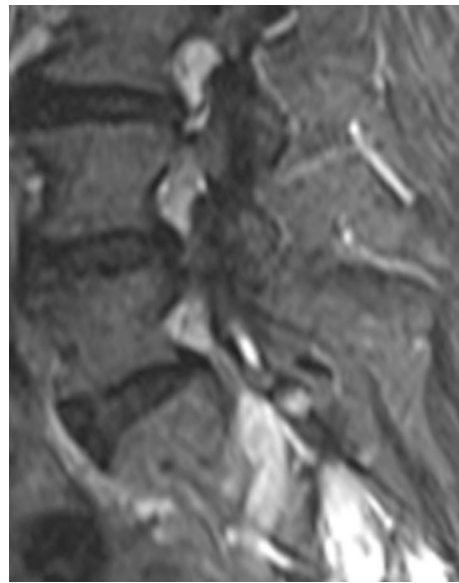


Fig. 52.5