



(areolar tissue),

(areolar tis -

sue),

(magnetic resonance imaging, MRI) (Table).

MR

(Primary bone tumor)

(hemangioma), (osteoid

osteoma), (osteoblastoma), (giant cell

tumor), (osteochondroma),

(aneurysmal bone cyst), (eosinophilic granu -

loma)

(spinal

ligament),

(neural foramen)

(Fig. 1A,B).

가

(1). MR

T1 -, T2 -

(dorsal aspect) 가

(Metastasis)

(cauda equina)

5%

8% - 69%

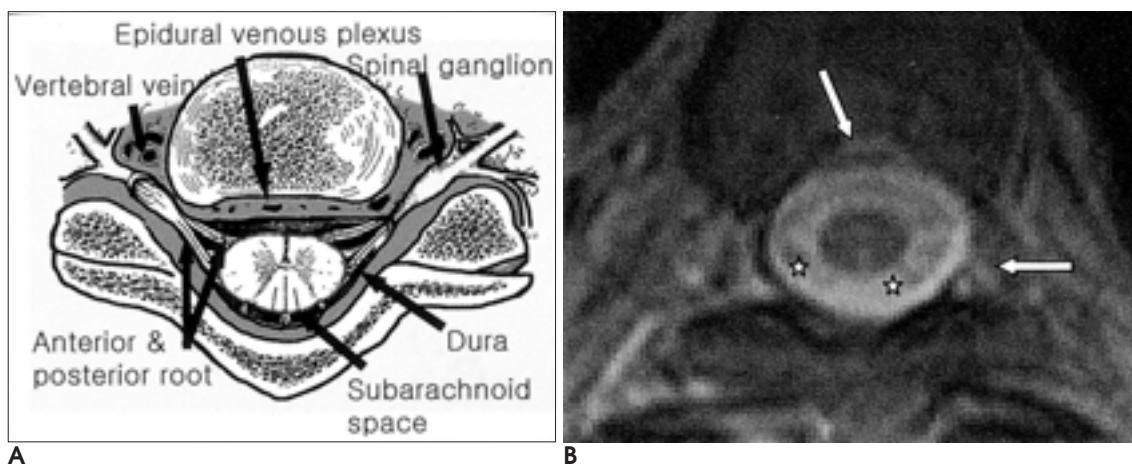


Fig. 1. Normal anatomy of the vertebral canal.

A. A schematic drawing of the vertebral canal shows anatomic structures.

B. Axial T2-weighted image at the level of T4 exhibits extradural (arrows), subarachnoid space (asterisks).

Table. Various Pathologies of the Spinal Epidural Space

Neoplastic
Primary bone tumor
Metastasis
Hematopoietic malignancy
Nerve sheath tumor
Meningioma
Hemangioma
Extraskelatal Ewing 's sarcoma
Infectious / Inflammatory
Pyogenic abscess
Tuberculous abscess
Fungal abscess
Postoperative infection
Postoperative scar or granulation
Trauma
Hematoma
Traumatic emphysema
Miscellaneous
Herniation of invertebral disc(HIVD)
Ossification of posterior longitudinal ligament
Epidural lipomatosis
Extradural arachnoid cyst

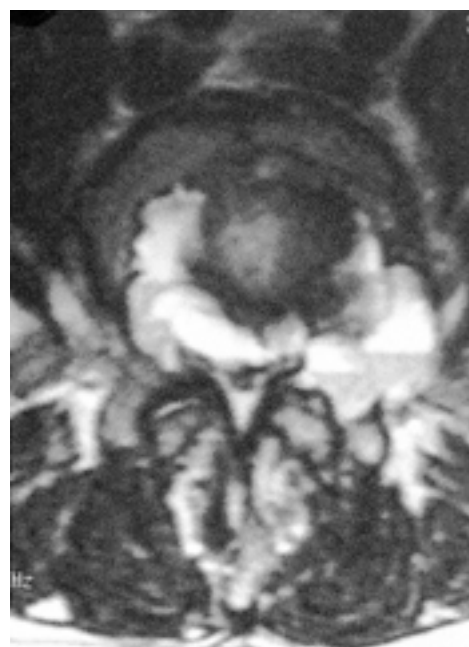


Fig. 2. A 47-year-old man with lumbar aneurysmal bone cyst. Axial T2-weighted image shows an expansile vertebral body mass with heterogeneous high signal, compressing the spinal cord. The mass has multiseptated cysts with fluid - fluid levels.

가 (Fig. 3).

(Hematopoietic malignancies)
(multiple myeloma)

(pedicle of vertebral arch)

. T1 -

T2 -

(2) (Fig. 4). (lym -

phoma)

(3). T1 -

T2 -

(leukemia)

(chloroma)

(Fig. 5A, B).

가

T1 -, T2 -

MRI가

(Nerve sheath tumor)
(schwannoma, neurilemmoma)
(neurofibroma)

가

30

가

Schwann

가

가

(4).



Fig. 3. A 65-year-old woman with lumbar metastasis from renal cell carcinoma.

Contrast enhanced sagittal T1-weighted image shows epidural extension of vertebral body metastasis with strong enhancement.

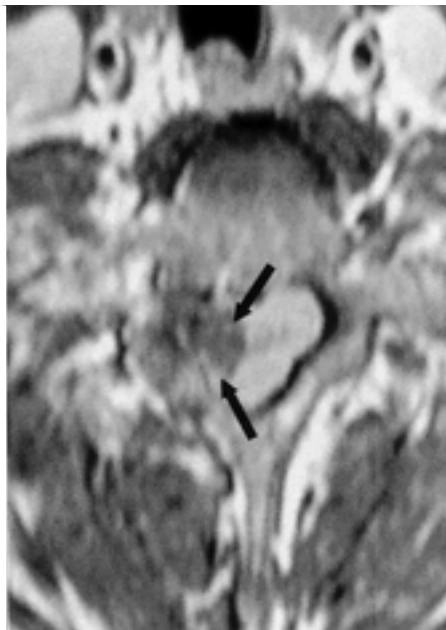


Fig. 4. A 39-year-old man with cervical plasmacytoma.

Contrast enhanced sagittal T1-weighted image shows a lentiform mass with homogeneous enhancement in the dorsal aspect of the cervical spine. Spinal cord is compressed by the mass.



A



B

Fig. 5. A 64-year-old man with cervical non-Hodgkin's lymphoma

Contrast enhanced sagittal (A) and axial T1-weighted (B) images show lentiform epidural mass with homogeneous enhancement. The spinal cord (arrows) is displaced to the right by mass.

가 . 10% 가 .
MRI T1 - . 2
T2 - 15% , 15%
(Fig. 6). (collagen)
T2 - (Fig. 7A, B).
(Meningioma)
(90%)



Fig. 6. A 43-year-old woman with thoracic schwannoma. Contrast enhanced axial T1-weighted image shows a dumbbell shaped, enhancing mass extending through the right neural foramen.

가 . MRI T1 -
,T2 - T2 -
가
“ (dural tail sign) ”가
(Fig. 8A, B) (5).
(Epidural hemangioma)
가 . MRI가
(hemosiderin)
T1 -
(6)
,T2 -
(Fig. 9A, B, C).

(Extraskeletal Ewing sarcoma)

10

가

가



Fig. 7. A 13-year-old boy with cervical neurofibromas. Contrast enhanced coronal-(A) and axial T1-weighted (B) images show multiple neurofibromas with homogeneous enhancement. The epidural mass encases the left vertebral artery (arrow).

A

B

가 . T1 -
, T2 -
(Fig. 10A, B).

(Pyogenic abscess)
(Staphylococcus aureus) 가
(60%) ,
(Enterobacter)

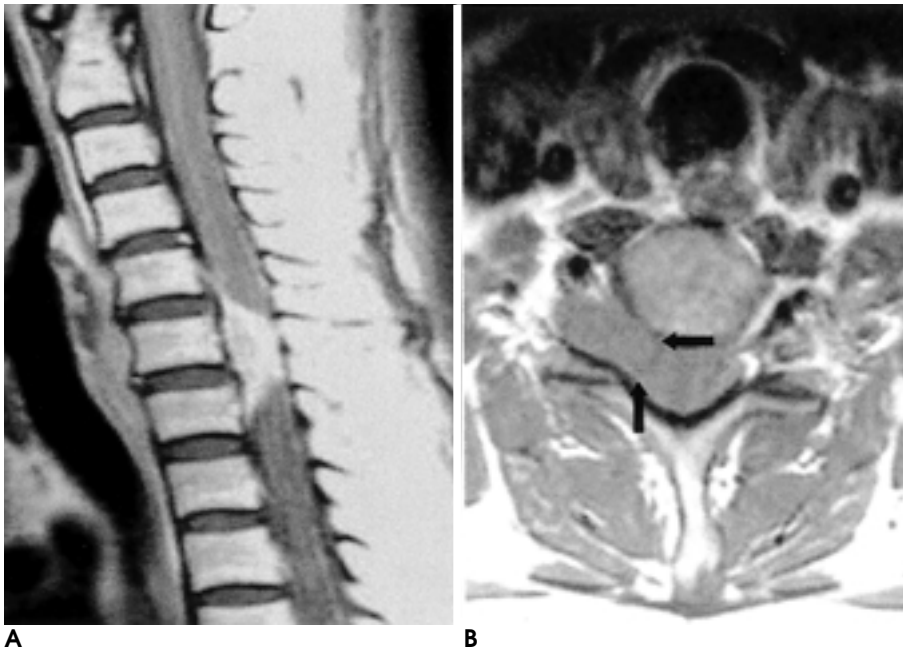


Fig. 8. A 45-year-old woman with cervical meningioma

A. Contrast enhanced sagittal T1-weighted image shows an enhanced mass with broad-based dural attachment in the lower cervical spine.

B. Precontrast axial T1-weighted image shows enlarged neural foramen with an intra- and epidural soft tissue mass[arrows].

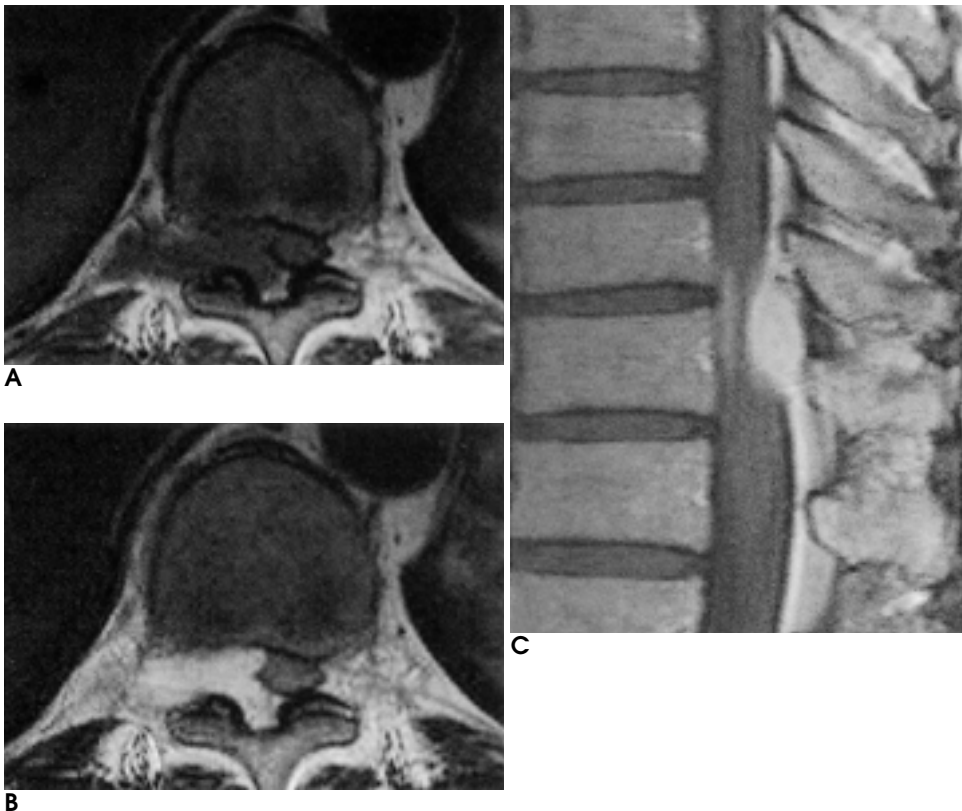


Fig. 9. A 55-year-old man with thoracic epidural cavernous hemangioma.

Axial T1-(**A**) and T2-weighted (**B**) images show a mass with low signal on T1WI and high signal on T2WI.

C. Contrast enhanced sagittal T1-weighted image shows homogeneous enhancement.

가 T1 - MR . 50 (Tuberculous abscess)
 가 50 - 60 (Mycobacterium tuberculosis)
 T1 - , T2 - T1 - (8).
 70%
 (7).
 가 , 가 가
 (Fig. 12A, B).
 11A, B). (Fungal abscess)

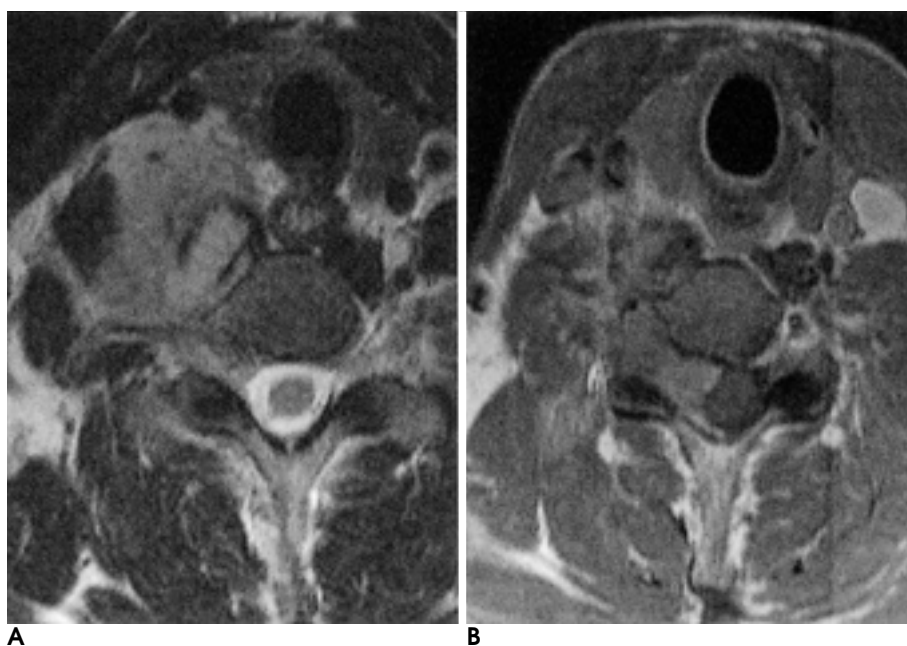


Fig. 10. A 39-year-old man with extraskelatal Ewing's sarcoma. Axial T2-weighted (A) image shows epidural and paraspinal mass. The mass enhances on contrast enhanced T1-weighted (B) image, encasing vertebral artery.

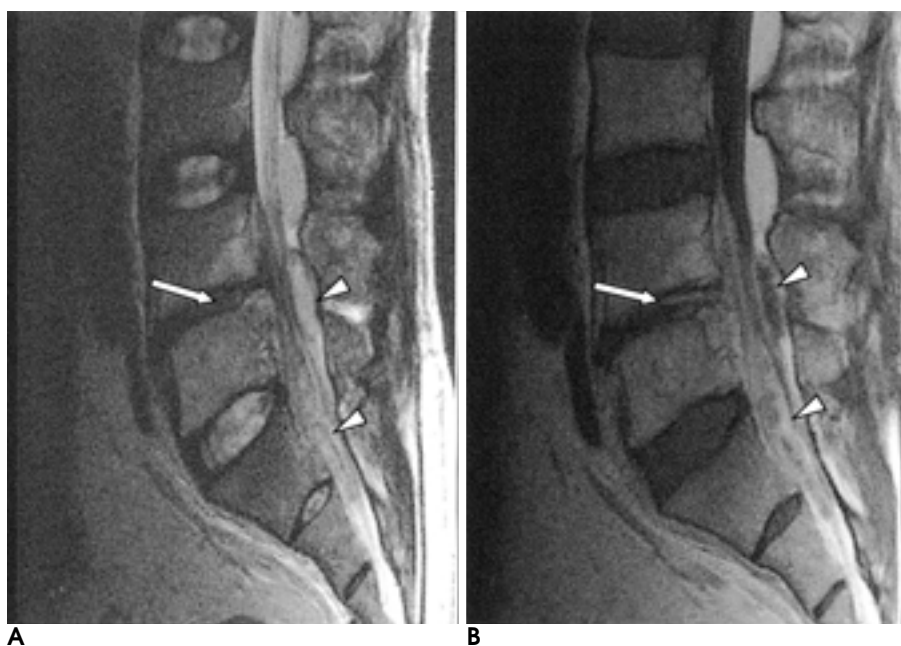


Fig. 11. A 58-year-old man with lumbar pyogenic abscess. Sagittal T2- (A) and contrast enhanced sagittal T1-weighted (B) images show L4/5 discitis (arrow), spondylitis and epidural abscess (arrow heads) compressing the thecal sac.

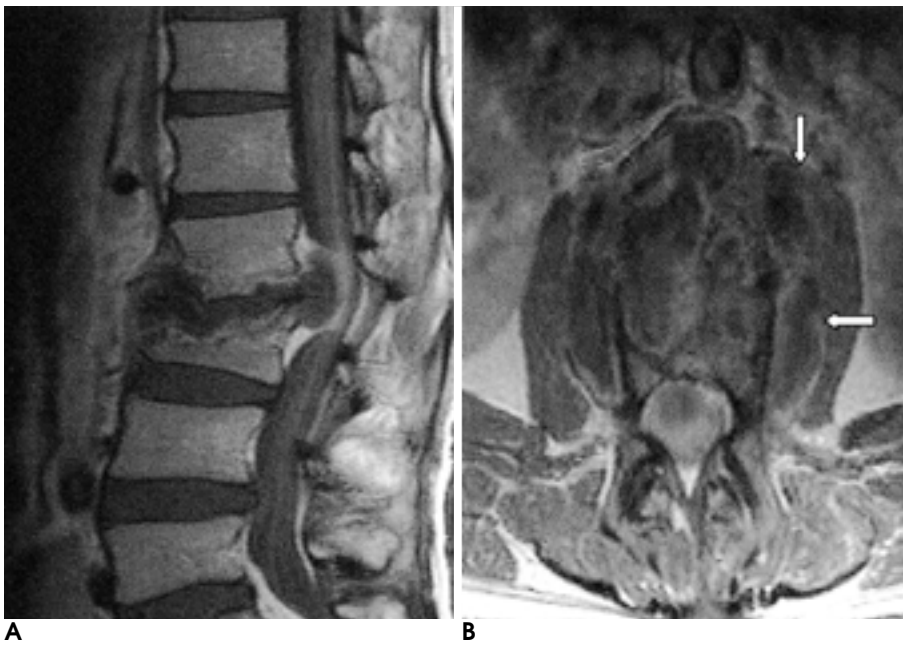


Fig. 12. A 48-year-old woman with lumbar tuberculous abscess. Contrast enhanced sagittal (A) and axial (B) T1-weighted images show a large epidural and paraspinal abscess with heterogenous enhancement. Psoas abscess is present(arrows).



Fig. 13. A 62-year-old man with thoracic epidural hematoma following a motor vehicle accident. Sagittal T1-(A) and T2-weighted (B) images show heterogeneous signal epidural lesion in the posterior aspect of the spinal canal with cord compression.

(aspergillosis) 6
 mycosis), (cryptococcosis), (actino -
 cidiodomycosis) 가 (coc -
 (Postoperative infection) 가 (Postoperative scar or granulation)
 가
 MRI가 , (thecal sac) T1 -, T2 -

(segmental artery)

(Fig.

가

(9).

13A, B).

(Traumatic emphysema)

(Hematoma)

가



Fig. 14. A 45-year-old man with lumbar sequestered disc.

A. Sagittal T2-weighted image shows sequestered herniated disc at L4-5.

B. On contrast enhanced sagittal T1-weighted image, marginal contrast enhancement is seen.



Fig. 15. A 42-year-old man with cervical ossification of the posterior longitudinal ligament. Sagittal T2-weighted image shows OPLL with heterogeneous low signal intensity.



Fig. 16. A 60-year-old man with lumbar epidural lipomatosis. Sagittal T1-weighted image shows markedly increased epidural fat at the lower lumbar-sacral level.

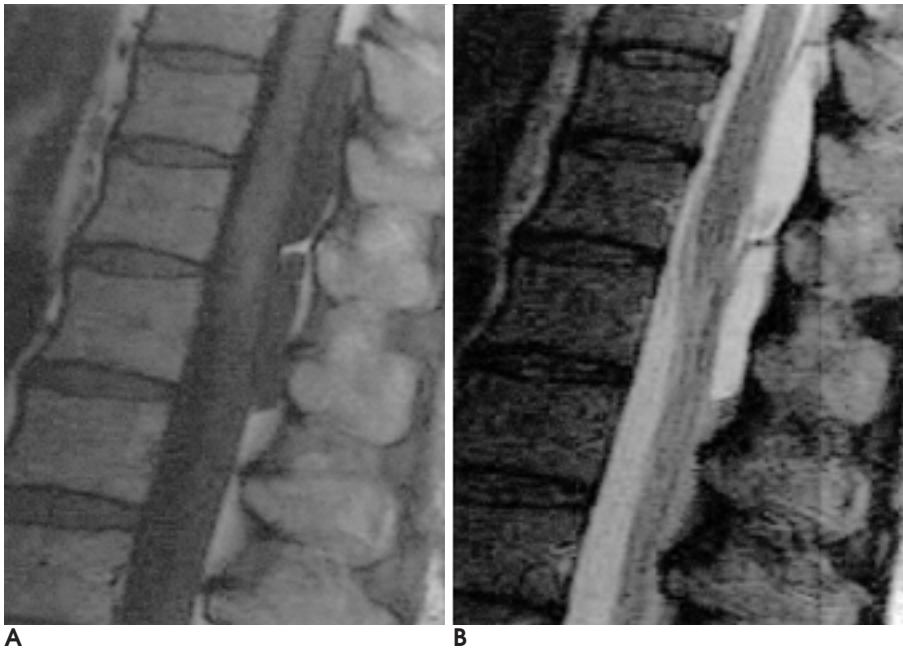


Fig. 17. A 40-year-old man with thoracic extradural arachnoid cyst. Sagittal T1-(A) and T2-weighted (B) images show a lobulated mass with isosignal intensity relative to CSF.

가

(Extradural arachnoid cyst)

(Fig. 17).

(Herniated disc and Sequestered disc)

가

1

가

가

T2 -

(Fig. 14A, B).

(synovial cyst),

(Ossification of posterior longitudinal ligament)

(C3 -

C5)

(T4 - T7)

T1 -,

(Fig. 15).

(Epidural lipomatosis)

MRI

(Fig. 16).

. CT

1. Taveras JM. Spine and spinal canal. *Neuroradiology*. 3rd ed. Pennsylvania: Williams & Wilkins, 1996 : 785-787
2. Palmbach M, Hoffmann W, Grodd W, Postler E, Voigt K. Extraosseous, epidural tumour spread of multiple myeloma. *Eur J Radiol* 1996 ;22:146-148
3. Li MH, Holtas S, Larsson EM. MR imaging of spinal lymphoma. *Acta Radiol* 1992;33: 338-342
4. Kim HJ, Ryu KN, Choi WS, Choi BK, Choi JM, Yoon Y. Spinal involvement of hematopoietic malignancies and metastasis: differentiation using MR imaging. *Clin Imaging* 1999;23:125-133
5. Christopherson LA, Finelli DA, Ashmead JW, Likavec MJ. Ectopic extraspinal meningioma: CT and MR appearance. *AJNR Am J Neuroradiol* 1997;18:1335-1337
6. Padolecchia R, Acerbi G, Puglioli M, Collavoli PL, Ravelli V, Caciagli P. Epidural spinal cavernous hemangioma. *Spine* 1998;23:1136-1140
7. Sandhu FS, Dillon WP. Spinal epidural abscess: evaluation with contrast-enhanced MR imaging. *AJNR Am J Neuroradiol* 1991;12: 1087-1093
8. Shanley DJ. Tuberculosis of the spine: imaging features. *AJR Am J Roentgenol* 1995 ;164: 659-664
9. Dina TS, Boden SD, Davis DO. Lumbar spine after surgery for herniated disk: imaging findings in the early postoperative period. *AJR Am J Roentgenol* 1995 ;164: 665-671

MR Findings of the Spinal Epidural Lesions¹

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The spinal canal takes the form of a series of cylinders designated by their relationship to the meninges and is divided by the dura mater into the epidural or extradural space and the intradural space. The epidural space is composed of spinal ligaments, connective and areolar tissue, the epidural venous plexus, lymphatic channels and supporting elements, and various pathologic entities are found there. MR imaging can accurately depict the extent and characteristics of lesions, and in some cases specific diagnosis is possible. In this pictorial essay, we illustrate a variety of spinal epidural lesions and their MR findings.

Index words : Spine, MR
Spinal canal
Spine, disease

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