

# Epidural cystic masses associated with interspinous bursitis, synovial and discal cysts\*

*Formações císticas epidurais relacionadas a bursite interespinhosa, cisto sinovial e cisto discal*

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**Abstract** The authors describe some cases of epidural cysts, namely synovial, discal, ligamentum flavum cysts, and cysts secondary to interspinous bursitis, all of these conditions determining radicular, dural sac compression or spinal canal stenosis. Magnetic resonance imaging findings and localization of these entities are described. *Keywords:* Magnetic resonance imaging; Spinal cord compression; Spinal cord disease.

**Resumo** Os autores apresentam casos de cistos epidurais, dentre eles os cistos sinoviais, disciais, do ligamento amarelo e relacionados a bursite interespinhosa, todas essas condições determinando compressão radicular, do saco dural ou estenose do canal vertebral. Descrevem as características de imagem e localização na ressonância magnética nessas diferentes afecções.

*Unitermos:* Imagem por ressonância magnética; Compressão medular; Afecção medular.

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## INTRODUCTION

The differentiation between pathological intramedullary conditions (originated in the spinal cord) and extramedullary lesions (external to the thecal sac [extradural] or restricted to the thecal sac [intradural]) is generally simple. Although many lesions can develop simultaneously in more than one compartment, their precise positioning in relation to the medullary canal and the evaluation of the signal characteristics at magnetic resonance imaging (MRI) may be useful for the diagnosis.

MRI is the method of choice for evaluating the spinal cord and surrounding tissues because of its high spatial resolution, allowing optimum visualization of internal structures and anatomic detail for more accurate detection and characterization of spinal lesions<sup>(1)</sup>.

Epidural cystic masses represent one of the causes for vertebral canal stenosis or lumbar sciatic pain. Although not frequently found, these lesions should be differentiated from neurogenic tumors and disc herniation.

The present pictorial essay discusses imaging findings and describes the characteristics of an array of extradural cystic lesions with the utilization of MRI.

## CYSTS RELATED TO INTERSPINOUS BURSITIS

Autopsy studies demonstrate an increase in the incidence of cysts secondary to bursitis between lumbar spinous processes in elder individuals. Symptoms are characterized by localized pain in the lower portion of the lumbar spine exacerbated by hyperextension. In young athletes, these symptoms may mimic spondylolysis.

MRI is useful in the detection of thickening and hyperintense signal of interspinous and supraspinous ligaments, as well as the formation of adventitial bursae secondary to attrition. Epidural cysts present the same characteristics of synovial cysts, but are localized in the midline. Radioscopy- or computed tomography (CT)-guided bursography can be utilized for diagnosis confirmation. Besides determining

the connection with the epidural cyst, this method allows the pain management with corticoid infiltration<sup>(2)</sup>.

## CYST OF LIGAMENTUM FLAVUM

Cysts of ligamentum flavum are rare entities and, like synovial cysts and cysts of the posterior longitudinal ligament, are classified as juxtafacet cysts. Because of the absence of synovial membrane on their walls, they are considered as pseudocysts<sup>(3)</sup>, resulting from degenerative alterations and spondylolisthesis, arising from the anterior margin of the ligamentum flavum<sup>(4)</sup>. Anterior projection of the lesion may determine dural sac compression or vertebral canal stenosis, resulting in sciatic pain<sup>(5)</sup>.

At MRI, the mass is seen with hypointense signal on T1-weighted, and hyperintense signal on T2-weighted sequences, with peripheral contrast-enhancement, and usually located in the midline. These lesions should be differentiated from synovial cysts by the topographic relation with the interapophyseal joint<sup>(6)</sup>.

## SYNOVIAL CYSTS

These cysts may develop from any joint lined by synovial membrane or tendinous sheath, and are rarely seen on the vertebral

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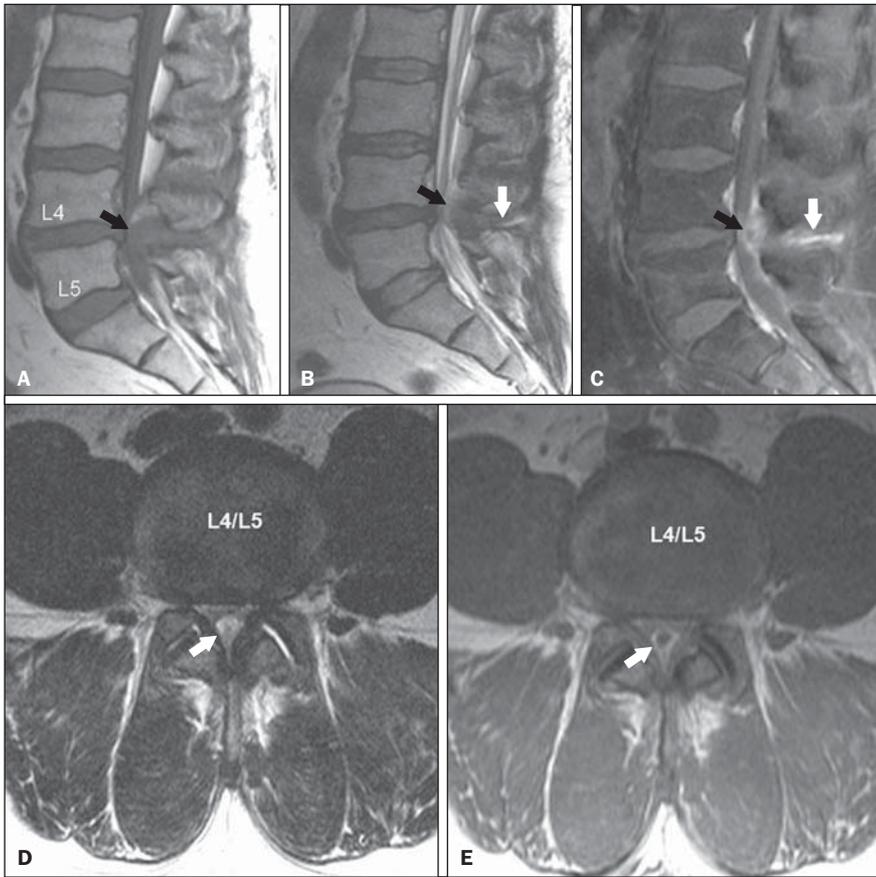
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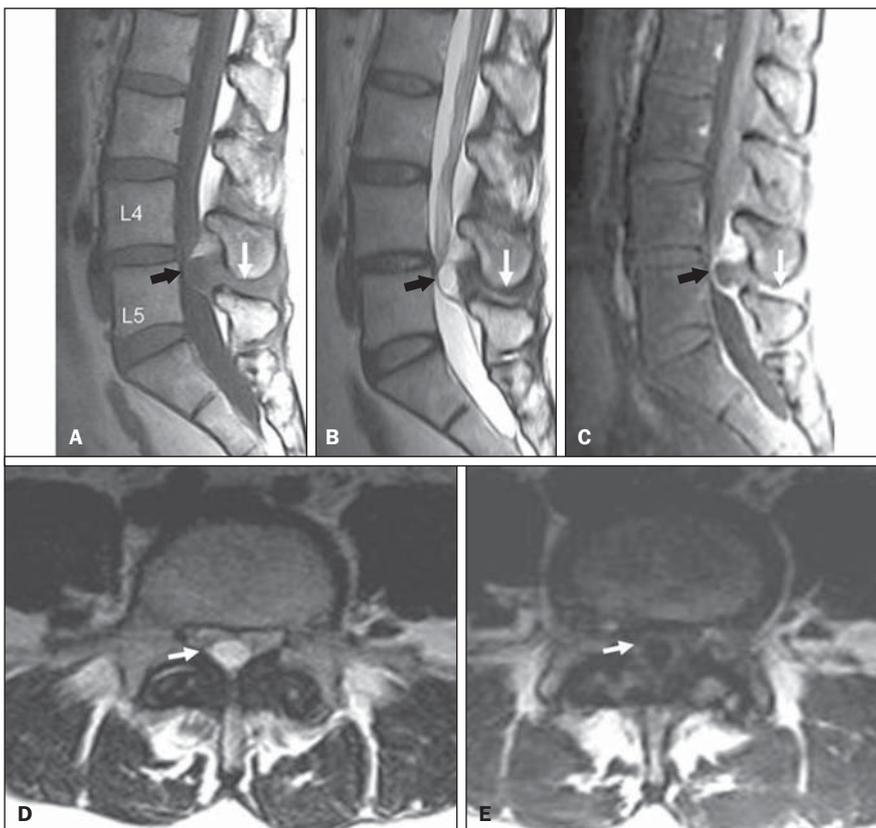
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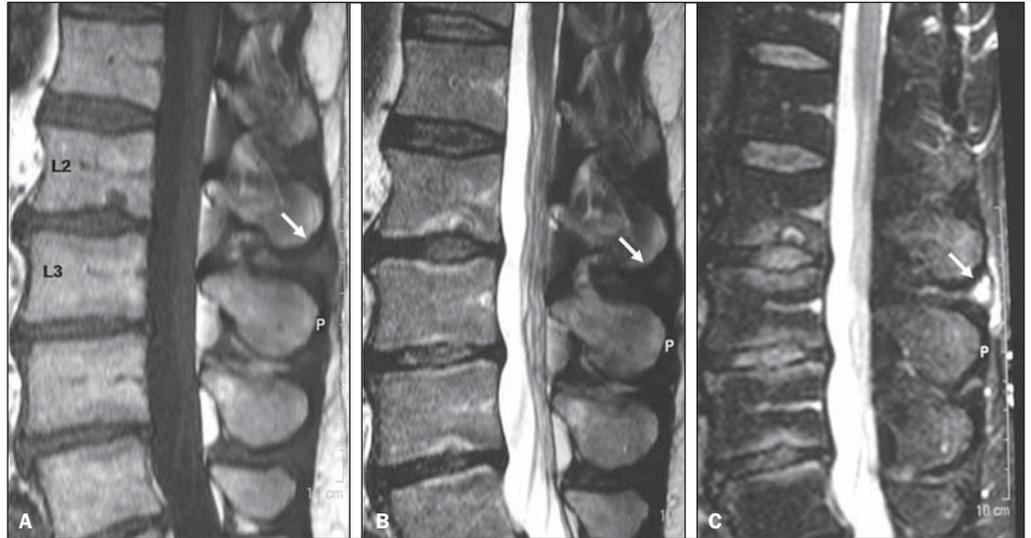


**Figure 1.** Interspinous bursitis at the L4/L5 level with epidural cyst. Female, 42-year-old patient with sudden perineal paresthesia. Sagittal, T1-weighted MRI (A), T2-weighted sequence (B) and contrast-enhanced T1-weighted sequence with fat saturation (C). The interspinous ligament presents edema and contrast-enhancement (white arrows). An epidural cystic mass is observed with intermediate signal intensity on T1-weighted sequence, hyperintense signal on T2-weighted sequence, and peripheral contrast enhancement (black arrows) with anterior displacement of the dural sac. Epidural cyst in the midline (D,E – arrows) characterized by hyperintense signal on T2-weighted (D) and peripheral contrast-enhancement (E) determining marked dural sac compression. Interopophyseal arthrosis, ligamentum flavum hypertrophy, and concentric and diffuse discal protrusion at the L4/L5 level with consequential vertebral canal stenosis can also be observed.

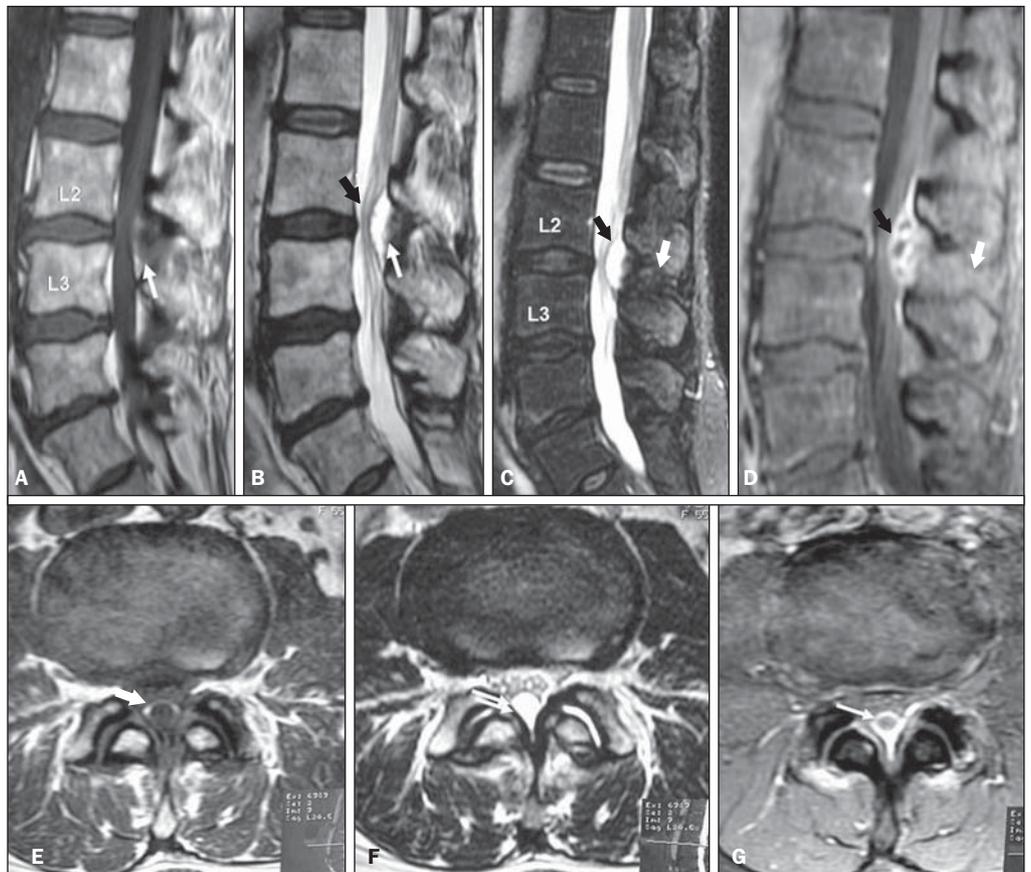


**Figure 2.** Interspinous bursitis associated with epidural cyst. Female, 53-year-old patient with intense, bilateral lumbar pain and claudication. Sagittal MRI demonstrates thickening and fluid in the interspinous ligament at the L4/L5 level (white arrows), associated with the epidural cystic mass (black arrows) with intermediate signal intensity on T1-weighted sequence (A), hyperintense signal on T2-weighted sequence (B) and peripheral contrast-enhancement (C). On axial T2-weighted image (D) and contrast-enhanced T1-weighted images (E) an epidural cystic mass can be observed in the midline (arrows) with marked dural sac compression.

**Figure 3.** Inter- and supraspinous bursitis. Female, 58-year-old patient with focal lumbar pain and pain at digital palpation. Sagittal, T1-weighted MRI (A), FSE T2-weighted sequence (B) and FSE T2-weighted section with fat saturation (C). Thickening of inter- and supraspinous ligaments at the L2/L3 level (arrows), with clear inflammatory signs only on the FSE T2-weighted sequence with fat saturation.



**Figure 4.** Cyst of ligamentum flavum. Female, 55-year-old patient with signs of vertebral canal stenosis. Sagittal MRI demonstrates a cystic mass (white arrow) with lobulated margins, anteriorly displacing the cauda equina roots (black arrow), with intermediate signal intensity on T1-weighted sequence (A), hyperintense signal on T2-weighted sequences (B,C) and heterogeneous gadolinium uptake (D) (black arrows). At the L2/L3 level, the interspinous ligament (C,D – white arrows) is normal, with no sign of bursitis, edema of contrast-enhancement. MRI, axial T1-weighted (E), T2-weighted (F) and contrast-enhanced T1-weighted sequence with fat saturation (G). The cyst (arrows) is localized in the midline and determines a marked dural sac compression.



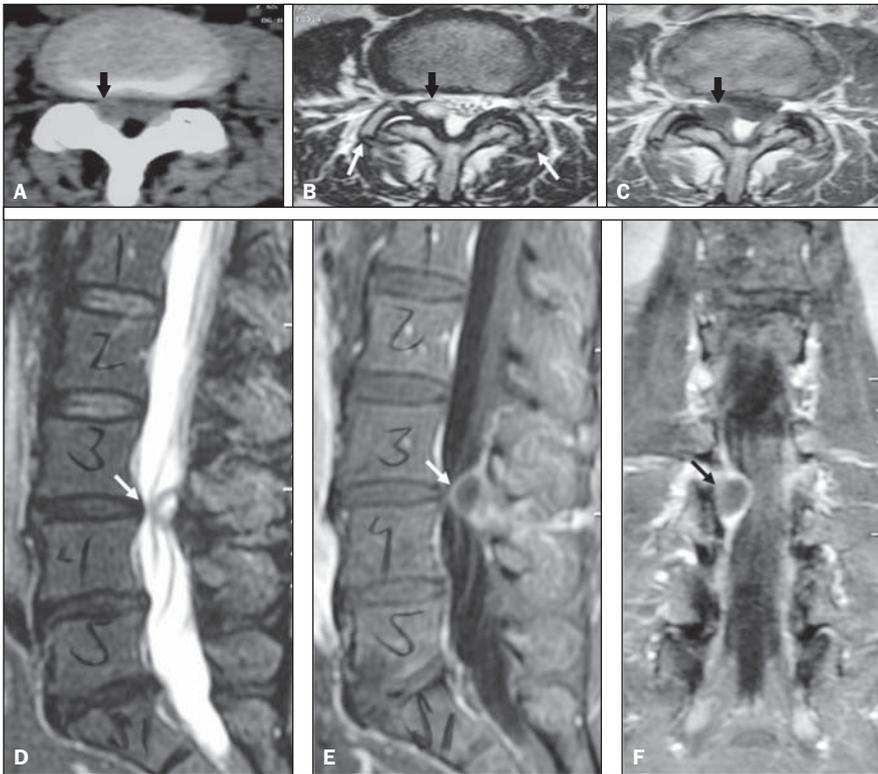
spine, the L4-L5 transition being the preferential site of these lesions. There is a subtle predominance of these lesions in women, rarely appearing before the age of 30<sup>(7)</sup>.

Synovial cysts are associated with osteoarthritis, spondylolisthesis and abnormal displacement of interapophyseal

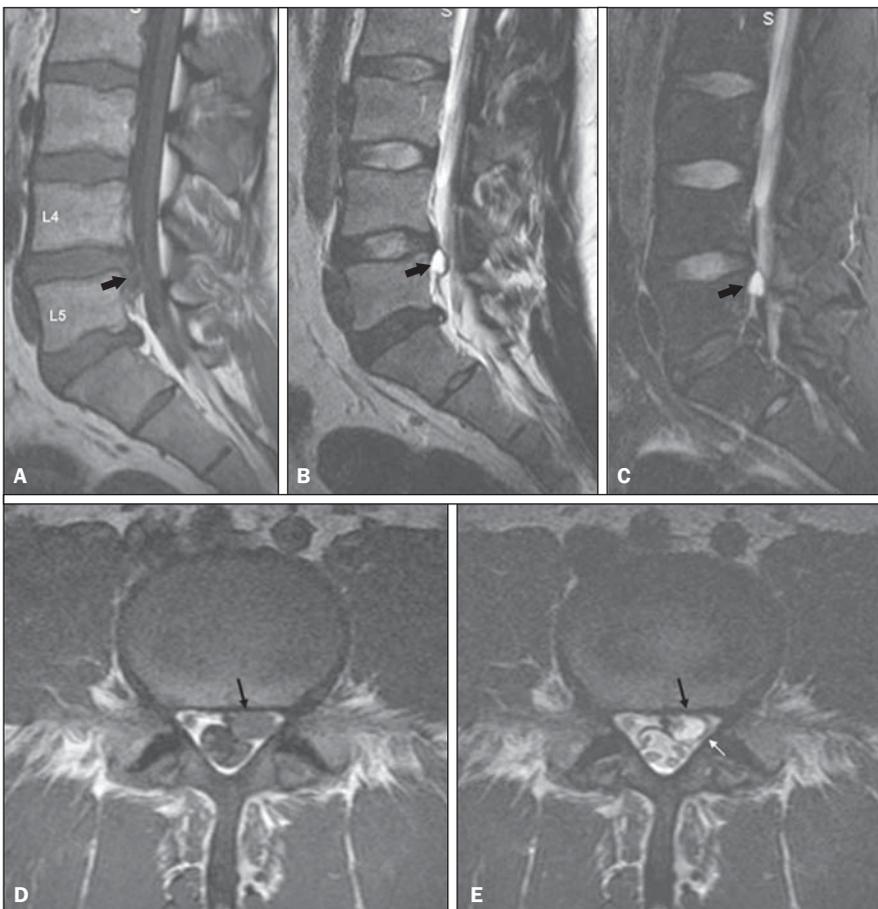
joints. These lesions result from a herniation of the joint tissue through a defect of the capsule<sup>(7,8)</sup> and present a layer of synovial cells at histologic<sup>(9)</sup>.

Synovial cysts may be asymptomatic or, depending on their size and site, may cause symptoms of nervous compression, sciatic

pain, simulating disc herniation. At CT, synovial cysts are seen as hypoattenuating lesions adjacent to the joint facet, protruding into the epidural space and determining radicular and dural sac compression. In 30% of cases, peripheral calcification and intracystic gas can be observed<sup>(9)</sup>.



**Figure 5.** Synovial cyst. Female, 65-year-old patient with right-sided sciatic pain. CT (A) demonstrates hypodense mass (black arrow) adjacent to the right interapophyseal joint at the L3/L4 level. Axial MRI demonstrates bilateral interapophyseal arthrosis (white arrows), with intra-articular fluid at right. A synovial cyst can be observed with hyperintense signal on T2-weighted sequence (B), with contrast-enhancement on T1-weighted sequence (C). MRI, sagittal, T2-weighted sequence with fat saturation (D) demonstrates synovial cyst (arrow) with contrast-enhancement on T1-weighted sequence (E) and dural sac compression at left that is best observed on contrast-enhanced image at the coronal plane (F).



**Figure 6.** Discal cyst. Female, 31-year-old patient with left-sided lumbar sciatic pain. MRI, sagittal image demonstrates a cystic mass related to the disk at the L4/L5 level (arrows). Low signal intensity is observed on T1-weighted (A), hyperintense signal on T2-weighted sequence (B) and T2-weighted sequence with fat saturation (C), with well defined margins. Hypohydration is observed in the L4/L5 disk, but herniation or protrusion is not characterized. On axial T1-weighted (D) and T2-weighted (E) images the epidural cystic mass (black arrows) is ventrally compressing the dural sac and posteriorly displacing the left root at the L5 level (white arrow).

At MRI, synovial cysts present intermediate signal intensity on T1-weighted sequences, hyperintense signal on T2-weighted with a hypointense capsule. The signal intensity may be heterogeneous as a result of hemorrhages, calcifications and spinal vacuum phenomena<sup>(6)</sup>, which are better visualized at CT<sup>(10)</sup>. After gadolinium injection, peripheral contrast enhancement of the cyst and adjacent interapophyseal joint is observed<sup>(9)</sup>.

Improvement of symptoms may be achieved by means of radioscopically or CT-guided intra-articular corticosteroid injection, postponing or even replacing the surgical procedure<sup>(7,9)</sup>. Surgical decompression is indicated in the presence of refractory pain or other associated neurological symptoms.

## DISCAL CYSTS

Discal cysts are extradural, well-defined, homogeneous masses adjacent to a herniated or non-herniated intervertebral disc. These lesions are characterized by hyperintense signal similar to liquor and peripheral contrast-enhancement. Communication with the intervertebral disc may be observed, particularly at CT-discography<sup>(11)</sup>.

Two theories try to explain the development of discal cysts. According to the first one, the cyst would originate from an extradural hematoma secondary to rupture of an epidural vein determined by mechanical irritation of a discal herniation<sup>(12)</sup>. This theory is defended by its authors, considering the presence of hematic content in four of the seven cases reported<sup>(12)</sup>. Extradural hematomas have been reported in the literature<sup>(13)</sup> with findings similar to discal cysts although without a documented communication with adjacent intervertebral disc.

The other theory refers to focal degeneration with softening of the collagen connective tissue and discal fluid leakage with formation of a pseudocapsule. According to some authors, these cysts can be erroneously diagnose or even treated as epidural hematomas or synovial cysts. The treatment for this lesion is surgical excision<sup>(11)</sup>.

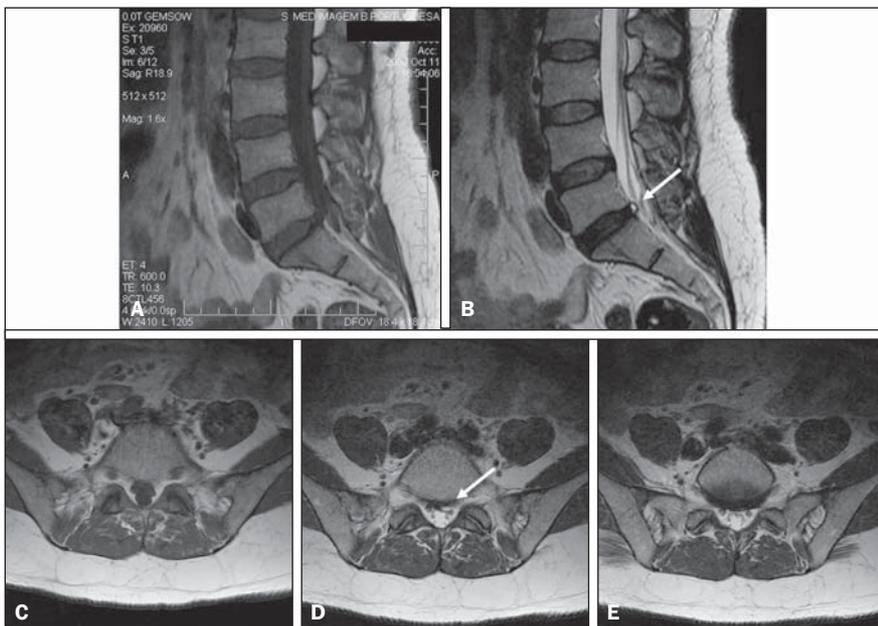
## CONCLUSION

Several types of cystic formations with different physiopathological mechanisms may affect the vertebral canal. The presence of epidural cysts must be more frequent than suggested by the few reports

found in the literature. These clinical entities should be considered as possible causes for myelopathy and radiculopathy<sup>(14)</sup>. Other causes for vertebral canal stenosis or lumbar sciatic pain, such as, for example, neurogenic tumors and disc herniation, should be ruled out. Magnetic resonance imaging is the main tool for the diagnosis of extradural cystic lesions<sup>(15)</sup>.

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**Figure 7.** Discal cyst. Female, 42-year-old patient with left-sided lumbar sciatic pain. Sagittal MRI demonstrates a well-defined cystic mass at the L5/S1 level, with low signal intensity on T1-weighted sequence (A) and hyperintense signal on T2-weighted sequence (B). On axial T1-weighted (C) and T2-weighted sequences (D,E), the cystic mass (arrow) compresses the ventral face of the dural sac.