Case Report
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Intradural Epidermoid Cyst at Conus Medullaris and Cauda Equina of the Spine: A Case Report
척수 원추와 마미총에 생긴 경막 내 유피낭종: 증례 보고

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Spinal epidermoid cysts occur as a result of anomalous implants of epidermal cells within the spinal cord. Spinal epidermoid cysts comprise < 1% of all intraspinal mass lesions and may be congenital or acquired. Congenital lesions usually occur at conus or cauda equina, and the latter usually occur at lower lumbar spine. The typical MR appearance of a spinal epidermoid cyst is a hypointense signal lesion on T1-weighted images and a hyperintense signal lesion on T2-weighted images. However, atypical imaging features also have been reported. In this article, we report atypical MR findings of an intradural epidermoid cyst at conus medullaris and cauda equina of the spine that was caused by internal cystic hemorrhage.

Index terms
Epidermoid Cyst
Spinal Cord, MRI
Cauda Equine

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INTRODUCTION

Spinal epidermoid cyst is rare, comprising less than 1.0% of spinal tumors. They have their origin in misplaced nests of epidermal cells, most commonly in intradural extramedullary spaces of lumbosacral spine and may be congenital or acquired (1). Herein we report a case of intradural extramedullary epidermoid cyst at cauda equine of the spine.

CASE REPORT

A 53-year-old man presented at our outpatient department complaining of paraparesis over the previous 7 months. The patient had a traffic accident 7 months ago and did not have a history of lumbar puncture. Neurologic examination revealed decreased lower limb reflexes to grade 2-4 and decreased ankle and toe reflexes to grade 1. The patient suffered hypoesthesia over the lumbar spinal level and experienced dysuresis and dyschezia. Plain radiography of the spine showed no abnormality. MR imaging of the spine showed an intradural and extramedullary mass, measuring 4.7 cm, at the junction of conus medullaris and cauda equine located between T12 and L1 levels. The mass exhibited hetergenous and relatively high signal intensity on a T1-weighted image (T1-WI) (Fig. 1A, B) and high signal intensity relative to the spinal cord on a T2-weighted image (T2-WI) (Fig. 1C, D). After IV administration of contrast material, the mass showed minimal peripheral enhancement (Fig. 1E, F).

At surgery, the tumor mass was covered with a glistening, white capsule that was located in the subdural area, which compressed the spinal cord (Fig. 2A). The tumor capsule adhered to the spinal cord (Fig. 2B), and brownish contents within the capsule were noted (Fig. 2C). The tumor may be an extramedullary tumor, which invades the intramedullary space, or not. On

patholgic evaluation, the specimen was composed of stratified squamous epithelium and contained keratin material with partly hemorrhagic soft tissue (Fig. 3).

DISCUSSION

Spinal epidermoid tumors are relatively rare, comprising less

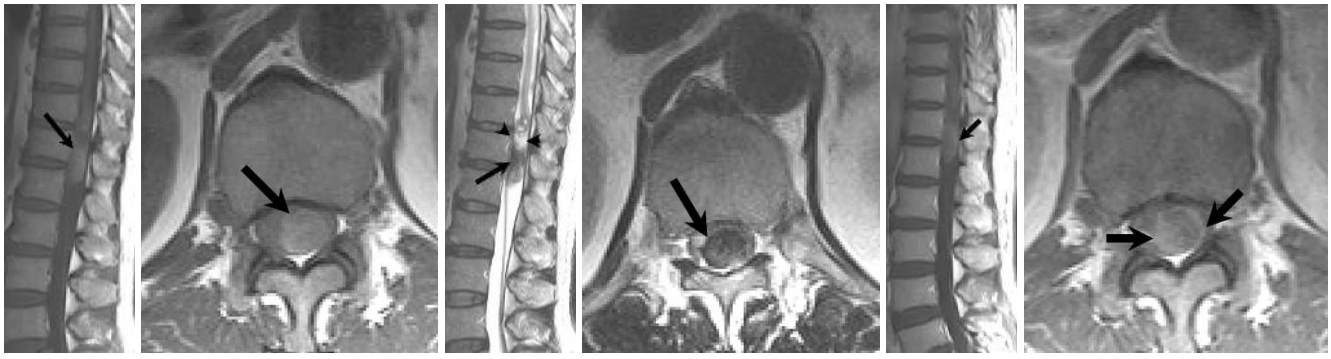

Fig. 1. A 53-year-old man with epidermoid cyst at cauda equina.
A, B. T1-weighted sagittal **(A)** and axial **(B)** MR images show a high signal intensity mass (arrow) at cauda equina.
C, D. T2-weighted sagittal **(C)** and axial **(D)** MR images show a relatively well-defined, ovoid, heterogeneous low signal intensity mass (arrow). Note focal high signal intensity (arrowheads) within the mass.
E, F. Contrast enhanced T1-weighted sagittal **(E)** and axial **(F)** images reveal a thin rim enhancement (arrows). Note the different thickness of the enhancing rim on each side (arrows in **F**).

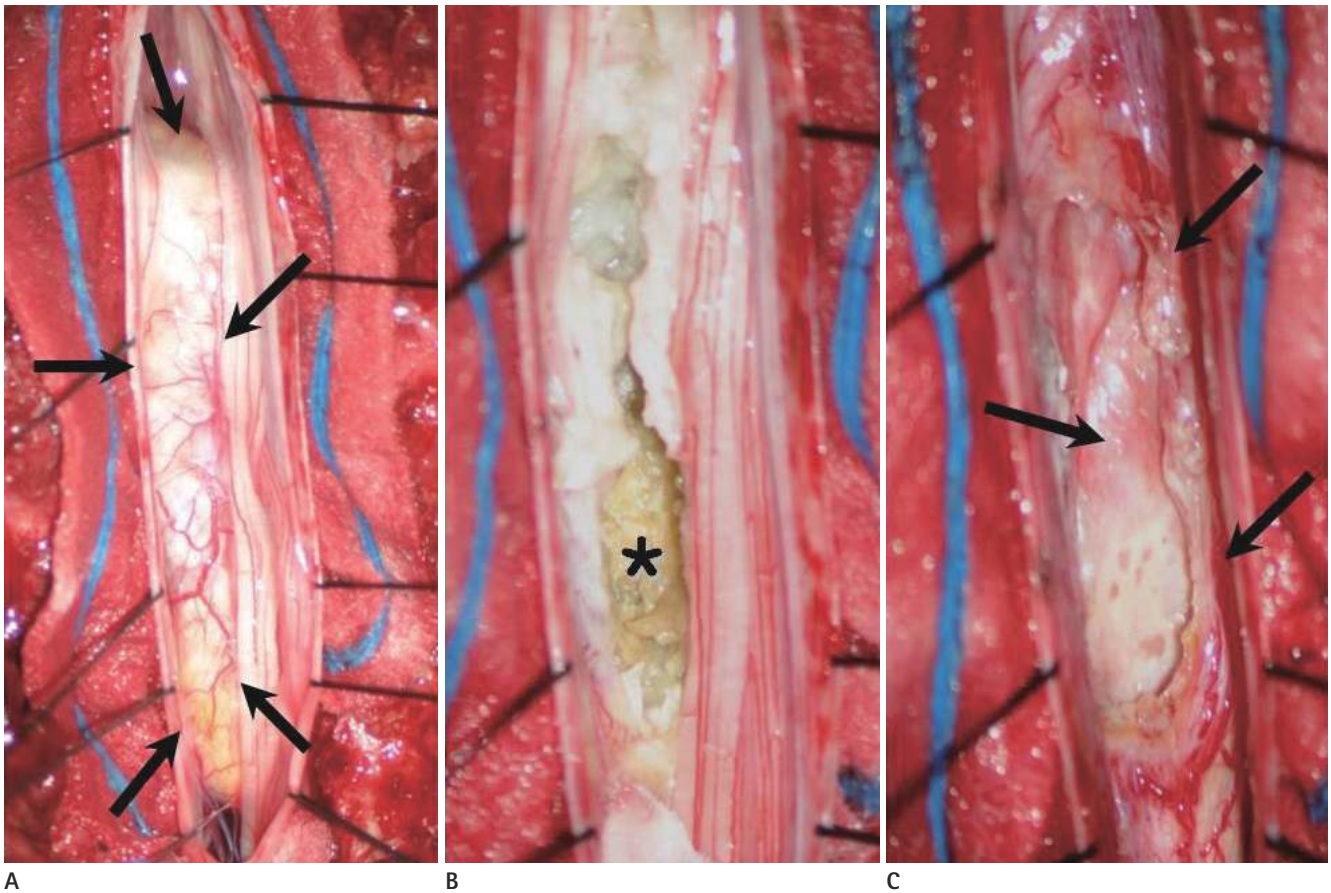

Fig. 2. Operative findings.
A. A photograph obtained in the operating room shows a well-defined, ovoid, whitish mass (arrows) beneath the dura.
B. After incision of the capsule, a yellowish cheesy material (asterisk) is defined in the mass.
C. After removal of the mass, there remains a capsule (arrows) attached to the spinal cord.

than 1.0% of spinal tumors (1). Because of the round shape and smooth capsule, they are called "pearly" tumors (2). Epidermoid tumors arise from implantation of epidermal cells into the spinal canal (1-4). Congenital spinal epidermoid cysts are believed to be related to inclusion of ectodermal tissue during closure of the neural tube between the third and fourth weeks of fetal life. Most of them occur in conus and cauda equine (2, 3). Inclusion of ectodermal cells from iatrogenic causes, such as lumbar puncture or surgery, may cause acquired spinal epidermoid cysts, which account for 40% of spinal epidermoid cysts. They are most frequently located at a lumbar puncture site. As our patient had no known history of lumbar puncture or any other iatrogenic procedure in the lumbar spine, we assumed this case originated congenitally. Clinical presentation of spinal epidermoid cyst is non-specific, progressing from an asymptomatic phase to slowly progressing numbness or motor paralysis, or even dyschezia, as in this case. Congenital epidermoid cysts are sometimes associated with dermal sinus, spina bifida or hemivertebra (3, 4), which were not found in this case.

The stratified squamous epithelium forms the wall of the epidermoid cysts. They are well-circumscribed nodules or masses and contain various materials such as keratin. Thickness of the epithelial cell lining is dependent on the location (5). Internal content is differentiated from dermoid cysts, which contains such as sweat glands and hair follicles, unlike dermoid cysts (3).

MR images can show a typical homogeneous or heterogenous hypointense signal on T1-WI and hyperintense signal on T2-WI (1, 3, 5, 6). However, epidermoid tumors showing atypical signal intensity changes have been reported, such as hyperintense signal on T1-WI and hypointense signal on T2-WI, as seen in our case. This unusual MR finding may result from differently aged hemorrhage or hemorrhagic soft tissue as we documented on histology (7, 8). No contrast enhancement is seen in most cases, but enhancement of a thin peripheral rim has been reported. Matsui et al. (5) reported that variability of the thickness of the peripheral epithelial cell layer contributes to irregular thin rim enhancement of epidermoid cysts (1, 3, 6, 9).

In the case of enhancing spinal epidermoid cysts, ependymoma and nerve sheath tumor must be included in the differential diagnosis. However, arachnoid cyst and neurenteric cyst must be differentiated from non-enhancing spinal epidermoid cysts (3, 5). Ependymoma and nerve sheath tumor show marked enhancement. Especially nerve sheath tumors tend to grow along the neural foramen. Arachnoid cyst and neurenteric cyst show the same internal signal as cerebrospinal fluid. And in neurenteric cyst, anterior location to spinal cord is common.

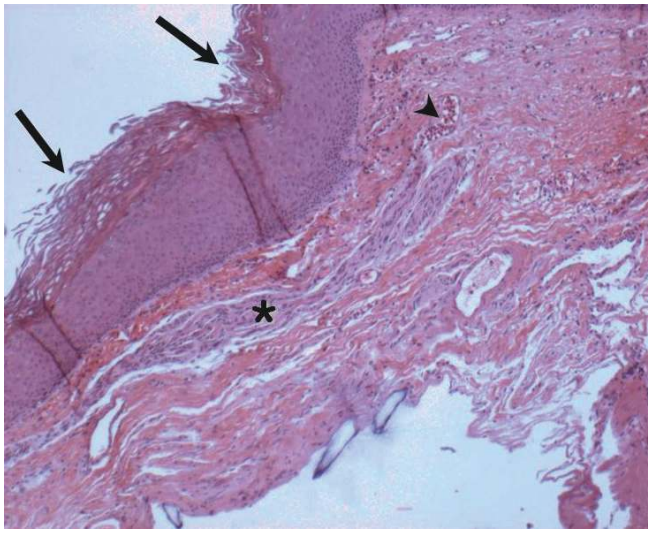

Fig. 3. Microscopic findings. On a photomicrograph of a histologic specimen, the wall of the mass is composed of stratified squamous epithelium (arrows), and the cavity is full of keratinized lamellar material (asterisk). Mild vascularity with capillary sized vessels is seen (arrowhead) with partly hemorrhagic soft tissue (hematoxylin-eosin stain, × 40).

In conclusion, in case of intradural tumors or tumor-like lesions showing high signal on T1-WI and without central enhancement, spinal epidermoid cyst must be considered.

REFERENCES

1. Amato VG, Assietti R, Arienta C. Intramedullary epidermoid cyst: preoperative diagnosis and surgical management after MRI introduction. Case report and updating of the literature. *J Neurosurg Sci* 2002;46:122-126
2. Miyake S, Kobayashi N, Murai N, Kondoh T, Kohmura E. Acquired lumbar epidermoid cyst in an adult. *Neurol Med Chir (Tokyo)* 2005;45:277-279
3. Osborn AG. *Diagnostic neuroradiology*. St. Louis, MO: Mosby, 1994
4. Manno NJ, Uihlein A, Kernohan JW. Intraspinal epidermoids. *J Neurosurg* 1962;19:754-765
5. Matsui H, Kanamori M, Yudoh K, Ohmori K, Yasuda T, Wakaki K. Cystic spinal cord tumors: magnetic resonance imaging correlated to histopathological findings. *Neuro-*

surg Rev 1998;21:147-151
6. Gao PY, Osborn AG, Smirniotopoulos JG, Harris CP. Radiologic-pathologic correlation. Epidermoid tumor of the cerebellopontine angle. *AJNR Am J Neuroradiol* 1992;13:863-872
7. Gualdi GF, Di Biasi C, Trasimeni G, Pingi A, Vignati A, Maira G. Unusual MR and CT appearance of an epidermoid tumor. *AJNR Am J Neuroradiol* 1991;12:771-772
8. Chen CY, Wong JS, Hsieh SC, Chu JS, Chan WP. Intracranial epidermoid cyst with hemorrhage: MR imaging findings. *AJNR Am J Neuroradiol* 2006;27:427-429
9. Hatfield MK, Udesky RH, Strimling AM, Kim BH, Sibergleit R. MR imaging of a spinal epidermoid tumor. *AJNR Am J Neuroradiol* 1989;10:S95-S96

척수 원추와 마미총에 생긴 경막 내 유피낭종: 증례 보고

신민우 · 이지혜 · 조우호 · 김재형 · 정명자 · 김성희 · 김지영 · 김수현 · 강미진 · 조현선 · 이한비

척추의 유피낭종은 비정상적인 표피세포가 척수 내에서 증식하면서 생겨나며 전체 척추 종괴의 1% 이하를 차지한다. 선천적이거나 또는 후천적으로도 생겨나는데 선천성 병변은 척수 원추나 마미총에 잘 생기며 후천성 병변은 하부요추에 잘 생긴다. 임상 증상은 병변의 위치에 따라 달라질 수 있다. 척추의 유피낭종은 전형적으로 MRI상에서 T1 강조영상에서 저신호강도를 보이고 T2 강조영상에서 고신호강도를 보이지만 전형적이지 않은 영상 소견을 보이는 경우도 보고된 바 있다. 저자들은 척수 원추와 마미총에서 발생한 경막 내 유피낭종에서 내부 출혈과 케라틴 성분에 의해 불균질한 소견을 보였던 비전형적인 MRI 소견을 보고하고자 한다.

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