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Epidermoid-cyst of the conus medullaris: Usefulness of DWI

Kyste épidermoïde du cône terminal : apport de l’imagerie de diffusion

A 42-year-old man, with a history of spinal epidermoid-cyst resection six years earlier, presented with pain in the left lower leg. A lumbar MRI, including pre- and postcontrast fat-suppressed sagittal T1-weighted imaging (WI) (TR/TE: 560/13 ms) and T2-WI (TR/TE: 4000/120 ms) (Fig. 1A and B), showed:

• a left paracentral herniated disc at level T12–L1, with impingement of the left L1 nerve root;
• an intradural lesion within the conus medullaris at the same level.

The lesion was lobulated and heterogeneous, with a T2-WI hyperintensity in the central part and no contrast enhancement. Diffusion-weighted imaging (DWI) was performed in the axial (not shown) and sagittal planes with the following parameters (single-shot echo-planar imaging):

• TR/TE/excitations; 6600 ms/92 ms/2;
• field of view: 32 × 32 cm;
• section thickness: 4 mm;
• interslice thickness: 0.5 mm;
• matrix: 128 × 128; b = 0–1000 s/mm², with gradients applied along three orthogonal directions.

On b = 1000 s/mm² DWI, the lesion displayed a central hypersignal (Fig. 2A) with a lower apparent diffusion coefficient (ADC) $(0.53 \times 10^{-3} \text{ mm}^2/\text{s})$ than that of the adjacent spinal cord $(1.35 \times 10^{-3} \text{ mm}^2/\text{s})$ and CSF $(2.70 \times 10^{-3} \text{ mm}^2/\text{s})$ (Fig. 2B). These DWI findings were compatible with a non-fluid component, and allowed the diagnosis of residual spinal epidermoid-cyst.

Although DWI has been reported to be a helpful technique for the diagnosis of intracranial epidermoid-cyst, its use for spinal imaging is not well established. In this patient, and in accordance with the findings of Tang et al. [1], the spinal epidermoid-tumor exhibited markedly restricted diffusion, as demonstrated by a high signal intensity on DWI in contrast to the low signal intensity expected in cases of arachnoid-cyst. DWI is rarely performed to investigate the spinal region because of the presence of artifacts, mostly caused by physiological motions such as CSF pulsatility, breathing and swallowing [2]. To minimize such motion artifacts, we performed ultrafast imaging sequences using echo-planar imaging (EPI). However, EPI is limited by the low signal-to-noise ratio, the prominent susceptibility artifacts that occur especially at the abrupt transitions between

Figure 1 Lumbar sagittal T2-weighted (A) and post-contrast fat-suppressed sagittal T1-weighted (B) imaging shows a heterogeneous intradural mass within the conus medullaris, with a central bright signal on T2-WI and lack of contrast enhancement. Note, at the same T12–L1 level, the herniated disc that is contiguous with the mass.

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Figure 2 Lumbar sagittal diffusion-weighted imaging (DWI) (A) and color-coded apparent diffusion coefficient (ADC) cartography (B) reveal that the central part of the mass is hyperintense on DWI, appearing brighter than the normal spinal cord, despite a decreased ADC.

Figure 2 Coupes sagittales pondérées en diffusion (A) et cartographie du coefficient de diffusion apparent (ADC) (B), au même niveau de coupe. La partie centrale de la lésion apparait hyperintense en diffusion, de signal plus élevé que le cordon médullaire sus-jacent, avec diminution de l’ADC.

tissue planes in the spine, and the susceptibility distortions at the air–tissue interface.

An alternative approach to eliminate these artifacts is to correct for the phase error on each line of k space by recording a non-phase encoding echo [3]. This technique allows DWI to be performed with a conventional spin-echo sequence, thereby providing a high signal-to-noise ratio with fewer susceptibility artifacts. Recently, line-scan diffusion imaging was proposed as a reliable method for imaging the spinal column. It is less sensitive than EPI-based DWI to susceptibility artifacts, and less susceptible to patient motions than are other multishot techniques [4]. However, we chose not to use these alternative techniques, because motion artifacts are generally less common at the lumbar level than at the cervical or thoracic level.

In conclusion, this report confirms the usefulness of spinal DWI as a reliable tool to discriminate epidermoid from arachnoid-cysts in the postoperative spine.

References


G. Piana
O. Naggara*
C. Oppenheim
S. Rodrigo
J.-F. Meder
R. Marsico

Department of Neuroradiology, Centre Hospitalier Sainte-Anne, 1, rue Cabanis, 75013 Paris, France

P. Page
Department of Neurosurgery, Centre Hospitalier Sainte-Anne, 1, rue Cabanis, 75013 Paris, France

* Corresponding author. Department of Neuroradiology, Centre Hospitalier Sainte-Anne, 1, rue Cabanis, 75013 Paris, France.

E-mail address: o.naggara@ch-sainte-anne.fr (O. Naggara).

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3D-CISS MRI in a purely intracanalicular cochlear schwannoma

IRM 3D-CISS d’un schwannome cocléaire intracanalaire pure

Schwannomas arising from the cochlear nerve and confined to the internal auditory canal (IAC) are extremely rare [1–4]. Most usually, acoustic schwannomas arise from the superior vestibular nerve. This report of a case of right intracanalicular cochlear schwannoma highlights the importance of three-dimensional constructive interference in steady state (3D-CISS) MRI in the definitive diagnosis of this rare condition and its clinical relevance.

A 46-year-old man presented with progressive hearing loss in the right ear of three years duration, with intermittent non-pulsatile tinnitus and vertigo for the past year. Clinical examination revealed a predominantly sensorineural hearing defect on the right side. His audiogram showed severe mixed hearing loss on the right and high-frequency deafness on the left. MRI of the temporal bone, carried out with a 1.5-T clinical scanner (Avanto SQ-Engine, Siemens, Erlangen, Germany), showed a well-defined, enhancing mass lesion, 2 mm in size, confined to the right IAC on thin T1-weighted, fat-saturated, contrast-enhanced axial images (Fig. 1). However, the lesion’s nerve of origin was not clear. There was no evidence of mastoid or middle-ear pathology detected on either side on MRI. Further evaluation was performed using thin axial, coronal and oblique sagittal 3D-CISS sequences (TR/TE/TA = 11.64 ms/5.81 ms/4.51 min), with a flip angle of 70 degrees and slice thickness of 1 mm. The oblique sagittal images were acquired separately for each IAC, perpendicular to its long axis. These sequences