A spinal dermoid tumor that ruptured into the subarachnoidal space and syrinx cavity

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**ABSTRACT**
The widespread use of computed tomography (CT) and magnetic resonance (MR) imaging has increased the preoperative diagnosis of dermoid tumors and detection of their complications. In particular, cases of ruptured dermoid tumors, which may manifest as emergent conditions with variable clinical pictures, have typical CT and MR imaging findings. In this report, we present a case of a spinal dermoid tumor, which ruptured into the syrinx cavity and subarachnoidal space.

**Key words:** • magnetic resonance imaging • spinal neoplasms • dermoid

**Discussion**
Dermoid tumors are rare, benign, congenital lesions, which comprise 1% of both intracranial and intraspinal tumors (1). The clinical his-
their slowly growing nature, dermoid tumors can reach rather large sizes without producing any symptoms or findings. While dimensions of the cyst are slowly enlarging, they will settle in the subarachnoidal space in a location suitable to their shape and they have tendency to adhere tightly to adjacent structures (3, 4). Although their nature is benign and development is slow, dermoid tumors have a high morbidity and mortality risk, especially when rupture occurs. A dermoid cyst can rupture during surgery, after a trauma (5), or spontaneously (6–9). If rupture has occurred, contents of the cyst will spread out along the subarachnoidal space and ventricular system. Clinical symptoms of acute rupture are headache, nausea, vomiting, vertigo, vision problems, aseptic chemical meningitis, hemiplegia, mental changes, and coma (6, 7, 9). Later on, the existence of fat droplets in the subarachnoidal and ventricular spaces may lead to arachnoiditis, ventriculitis, and, consequently, mental disorder may occur.

Spinal location of dermoid tumors can be seen more often than epidermoid cysts, which often have intracranial location (10). Spinal dermoid tumors can be intramedullary, intradural-extradural, or extradural (10, 11). They occur predominantly in the lumbosacral region (60%), involving the cauda equina and conus medullaris, and are quite rare in the upper thoracic (10%) and cervical regions (5%) (10, 12).

Dermoid tumors are typically unilocular cysts containing yellow or yellowish-brown viscous fluid with creamy contents of different types of fat (crystals of cholesterol, lipid metabolites, and keratin). High lipid content emanated from sebaceous glands causes high signal intensity on T1W spin echo images (13). The signal intensity may be heterogeneous related to different components in the cyst (14). Bone and cartilage might be found in the tumor itself and sometimes calcification can be seen in their walls. Dermoid tumors can be made up of 2 different pieces, one with a higher lipid content and the other with a solid or more liquid content, and this condition may lead to a liquid-liquid level (10).

MR imaging is a diagnostic method, which should be chosen for diagnosis of dermoid and epidermoid tumors (9, 15). MR imaging can demonstrate different components of dermoid cysts and fat particles in the subarachnoi-

Figure 1 a, b. On axial T1-weighted cranial MR images (a, b) fat droplets (arrows) are observed in cisterns and the left lateral ventricle.

Figure 2 a-d. Mass lesion containing fat peripherally, at the level of conus medullaris and hyperintense fat content in the syrinx cavity inside the thoracic spinal cord, secondary to rupture of the mass is observed on sagittal (a) and axial (b) T1-weighted MR image. On sagittal T2-weighted images (c), it is observed that the mass is heterogeneous in nature and hyperintense. Sagittal post-contrast, fat-suppressed T1-weighted image (d) demonstrates signal suppression of the fat content and no significant enhancement is observed.
Dermal imaging will increase with the use of IV contrast medium, especially in determining meningeal inflammatory reaction related to the spreading out of tumoral contents.

Dermoid cysts usually indicate homogeneous signal intensity, but in some cases a heterogeneous signal pattern related to the tumor content might be observed. High signal intensity related to fat content, especially in T1W images, provides easy recognition of fat particles, especially if localized in the cerebral sulci, fissures, perimedullary cistern, or central canal of the spinal cord. With the use of MR imaging, asymptomatic distribution of fat particles became more usual. Use of fat-suppressed sequences in MR imaging examinations is rather useful in demonstrating fat content. With this examination it is possible to eliminate the possible hemorrhage. In our case, on fat-suppressed sequences, fat content of the tumor was clearly demonstrated.

The differential diagnosis of spinal dermoid cysts includes lipomas, teratomas, and spinal cord tumors (astrocytoma, ependymoma). Lipomas are similar to dermoids as they both have a hyperintense appearance in T1W and T2W, but they are differentiated from dermoids by their smooth borders and typical midline localization. Teratomas are often confused with dermoid tumors as they may contain fat, but tumoral cells found inside teratomas cause contrast medium enhancement. Intraspinal tumors (astrocytoma, ependymoma) are isointense compared to the cord on T1W images and hyperintense on T2W images, showing enhancement on post-contrast T1W images.

The reported number of dermoid tumors are increasing due to the frequent use of MR imaging; thus, ruptured dermoid tumors are more frequently reported in the literature (2). Free fatty material within the ventricular system and intracranial cisterns were reported in all cases, but fat particles in the dilated central spinal canal were reported in only few studies (2, 7, 16). As the central spinal cord is accepted as a potential space, which is not normally open, the syringomyelic cavity formed by the dermoid tumor itself might explain the entrance of tumor content into it.

With the frequent use of MR imaging it was found that spontaneous dermoid rupture, which was previously thought of as a rather serious or fatal condition, is common and usually only slightly symptomatic or asymptomatic. MR imaging is the most important radiologic modality to diagnose such cases, to determine the distribution of ruptured tumor content into the subarachnoidal space, or into the central spinal canal as in this case, to determine complications such as hydrocephaly or meningitis after rupture, and for follow-up after surgery.

References