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Mini Review

Spinal Extradural Arachnoid Cyst of the Thoracic Spinal Cord in a Child

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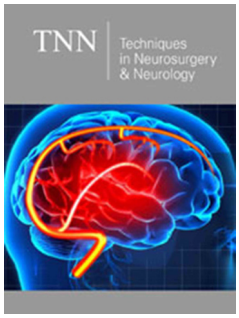

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Annotation

Extradural neoplasms, especially those arising from the thoracic spinal cord, are rare in children. In our case, the patient is a 3-year-old child with a spinal extradural arachnoid cyst of the spinal cord at the level of VTh6-8. Neuroroentgenological signs indicated a cystic extradural tumor at the level of 6-8 thoracic vertebrae of the spine and spinal cord, which was later confirmed by histopathological findings. The patient was diagnosed with neurological deficits according to the McCormick scale-3 degrees and according to the Frankel scale-C in the preoperative period. An operation was performed-"VTh7 and VTh8 hemilaminectomy, total removal of an extradural cystic tumor. "In the postoperative period, neurological deficits regressed from grade 3 to grade 1 on the Mc-Cormick scale and from type "C" to "E" on the Frankel scale.

Output

Extradural cystic neoplasms are benign tumors. Total resection with a positive clinical outcome can be achieved with minimal risk.

Keywords: Spinal; Cystic; Tumor; Extradural; MR tractography; Mc-Cormick scale; Perineural; Cyst; Frankel ACDF

Introduction

The incidence of spinal tumors is 1,1 per 100,000 populations. Spinal cord tumors are a relatively rare diagnosis and account for 1 to 10% of all tumors of the central nervous system in children [1-12]. Among primary tumors, extramedullary ones predominate, which occur in 70-90% of cases of the total number of these types of neoplasms. The incidence of extramedullary tumors is 1,3 cases per 100 000 populations per year, approximately 75% of tumors are intradural, 10% paravertebral, and the rest (15%) extradural [3]. Spinal arachnoid cysts are a heterogeneous group of formations, including cysts with different mechanisms of formation and location. The modern morphological classification of spinal arachnoid cysts, proposed by Nabors [8], contributed to the unification of heterogeneous formations combined within this diagnosis, including three types:

1st type: Extradural cysts that do not contain nerve fibers.

1A: extradural arachnoid cysts.

1B: sacral meningocele.

2nd type: Extradural cysts containing nerve fibers, Perineural cysts (Tarlov's cysts); Meningeal diverticula.

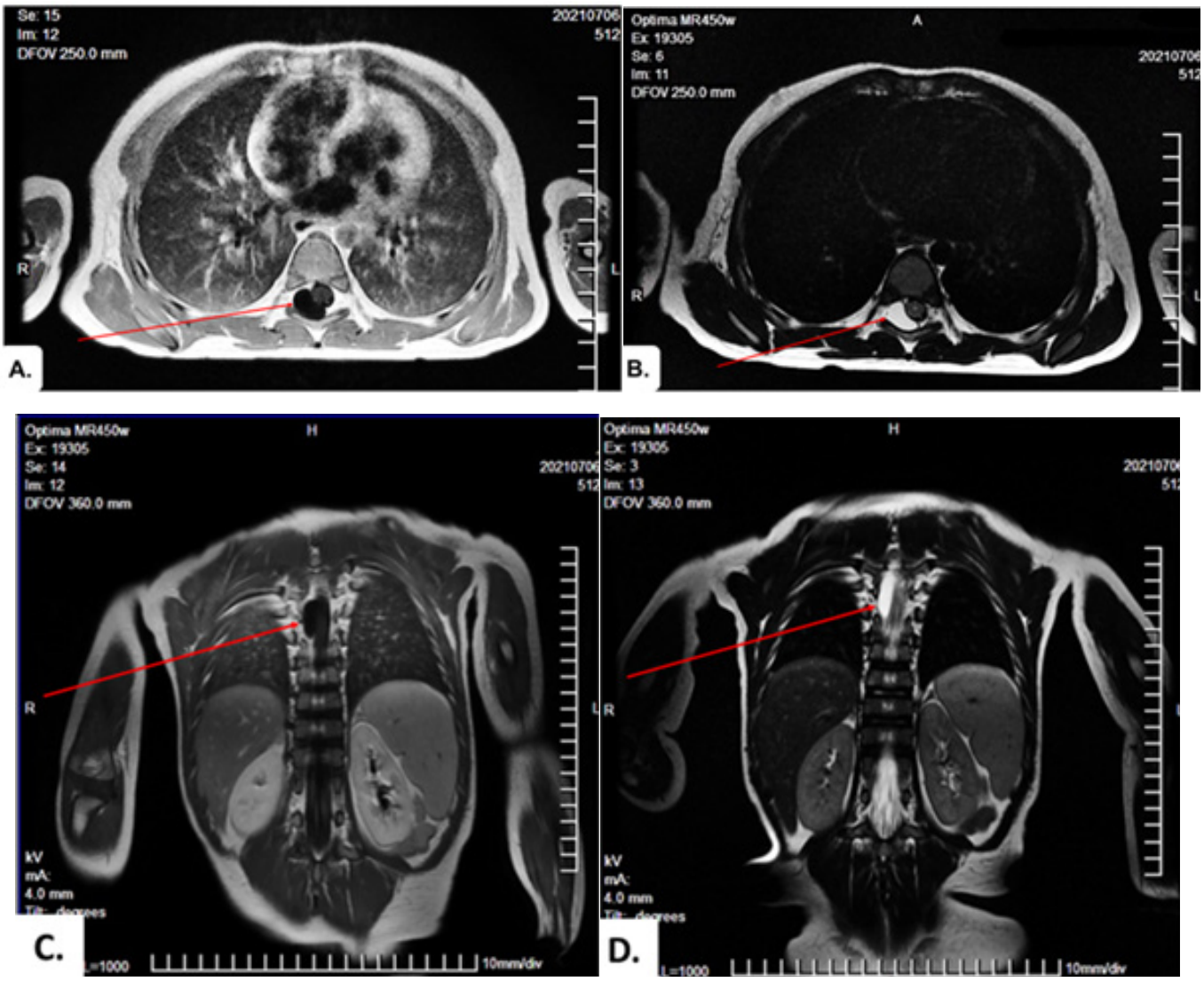
3rd type: Intradural cysts.

It should be noted that spinal arachnoid cysts, regardless of their relation to any type, can be congenital or acquired. The formation of the latter may be based on trauma, infection,

hemorrhage, or the consequences of surgery. Extradural arachnoid cysts are relatively rare. Being detected more often in men, mainly in the III-IV decades of life, they are often combined with kyphoscoliosis, syringomyelia, and spinal dysraphia. Cysts are usually located along the dorsal or dorsolateral wall of the dural sac and in 65% of cases they are found in the middle and lower thoracic spine. In 12% of cases, cysts of the thoracolumbar localization are detected, in 13%-lumbar and lumbosacral, in 7%-sacral. The rarest cervical cysts, occurring with a frequency of no more than 3% [1,2].

Spinal Extradural Arachnoid Cysts (SEACs) are rare expansive masses that account for about 1% of all spinal tumors. They arise from a small defect in the dura mater and cause a herniated arachnoid. The etiology of SEACs remains unclear and they are widely recognized as congenital, however they can also develop secondary to trauma, infection, inflammation, or surgery. SEAC is usually observed in young men in the second decade of life, and the clinical picture depends on the localization of the cyst in the spinal canal. SEAC are usually found in the midthoracic region before the thoracolumbar junction, and only 3% of all SEAC are observed in the cervical spine [9]. Case reports provide materials aimed at expanding medical scientific knowledge, especially in neoplastic diseases. The literature provides extremely scarce data on cases of solitary extradural cystic tumors of the thoracic spine in children [4-14].

In this article, we report on the clinical and radiological features, surgical approach and outcomes, postoperative follow-up, and final neurological outcome of the operation. Presentation of the case in a 3-year-old boy for 3 months, there was a gradual decrease in muscle strength in the legs and the development of lower deep paraparesis and partial dysfunction of the pelvic organs of the central type. There was no history of significant medical or surgical intervention. There was no family history of any genetic disease or malignancy. During neurological examination, he had reduced muscle strength on his legs, no sensory disturbances, no pathological reflexes, deep lower paraparesis. According to the Frankel scale type "C" and according to the McCormick scale-3rd degree.



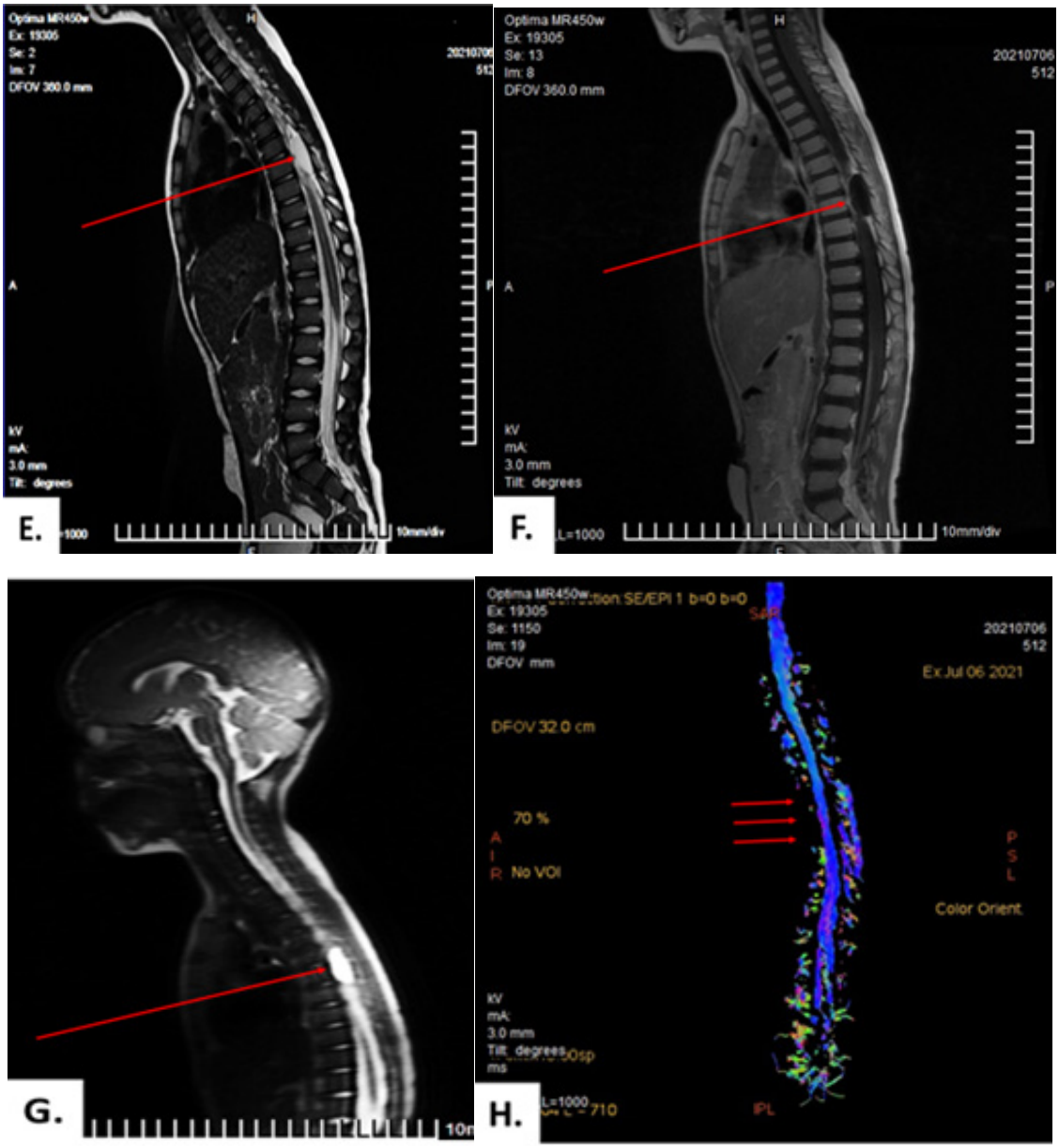


Figure 1: MRI signs of a cystic mass located extradural extramedullary in the spinal canal on the right at the level of the bodies of Th6-Th8 vertebrae, compressing the spinal cord. T2-contrast magnetic resonance imaging showing a well-defined hyperintense mass located extradural, extramedullary in the spinal canal on the right at the level of the Th6-Th8 vertebral bodies. MRI scans: T1 axial (A), coronal (C), T2 axial (B), coronal (G), sagittal (E), primary scan topogram (G), contrast sagittal (F), 3D tractographic map (H).

Magnetic resonance imaging (Optima MR450w, General Electric, USA, 1.5 Tesla) showed a well-defined T1-weighted isointense and T2-weighted hyperintense ovoid cystic mass with an enhanced internal solid component, 27cm × 15cm × 8cm, which squeezed the spinal cord from behind at the level of VTh6-8 (Figure 1). An MR-tractography (DWI) of the thoracic spinal cord was performed and the following data were determined: pronounced displacement, deformation, and compression of the conductive tracts of the spinal cord to areas of compression of the neoplasm (at the level of VTh6-8). The patient's vital signs were stable. Body temperature is normal, pulse is regular, 84 beats per minute, blood pressure is 80/50mm of Hg, respiratory rate 22 beats per minute. According to the indications, an operation was scheduled in a planned manner. Surgical treatment was carried out by hemilaminectomy of VTh7 and VTh8 vertebrae at the level of the extradural cyst. Were removed spinal extradural arachnoid cyst totally with a capsule. The patient's neurological deficit persisted for some time in the postoperative period. According to histological studies, an extradural arachnoid cyst of the spinal cord was confirmed (Figure 2).

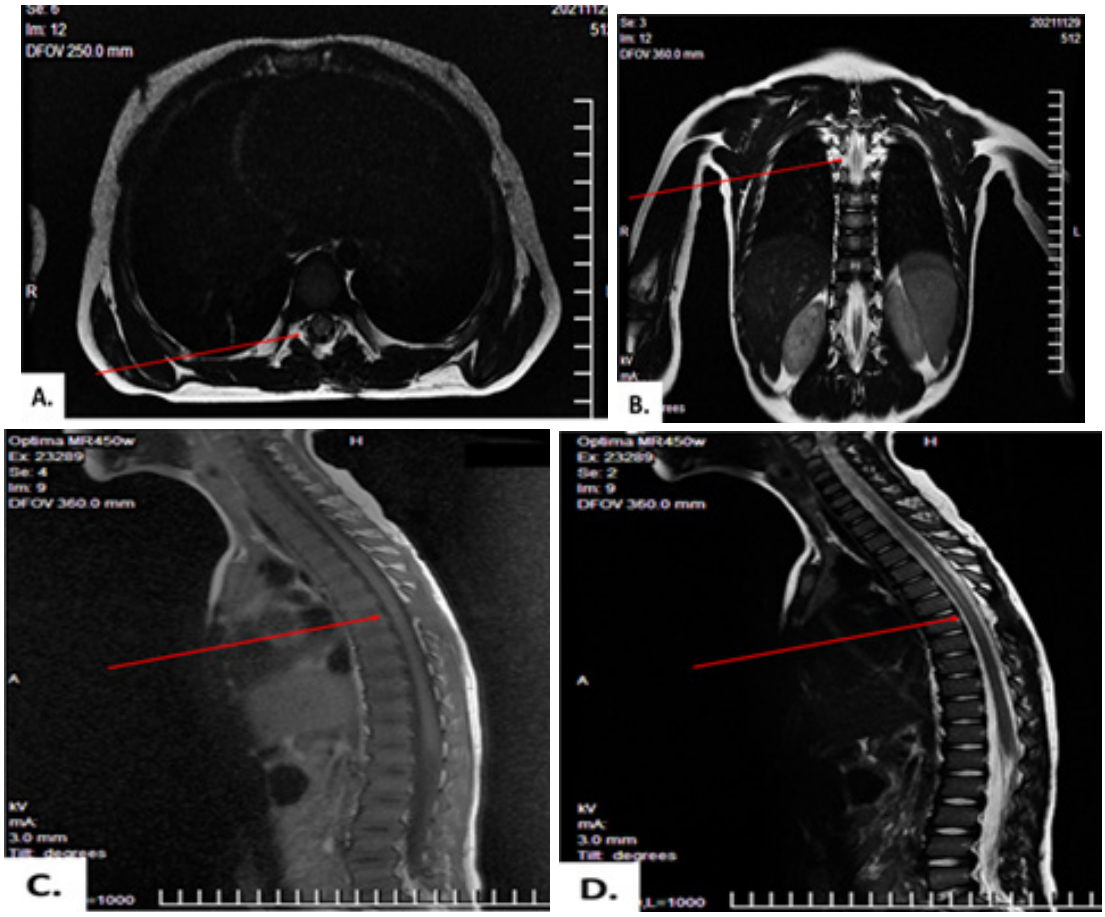


Figure 2: MRI gram after surgery. MRI signs of SPE after removal of an extradural extramedullary mass at the level of the bodies of Th6-Th8 vertebrae (the spinal cyst is not detected, there are no signs of recurrence). MRI scans: T1 axial (A), T1 coronal (B), T1 sagittal (C) and T2 sagittal (D).

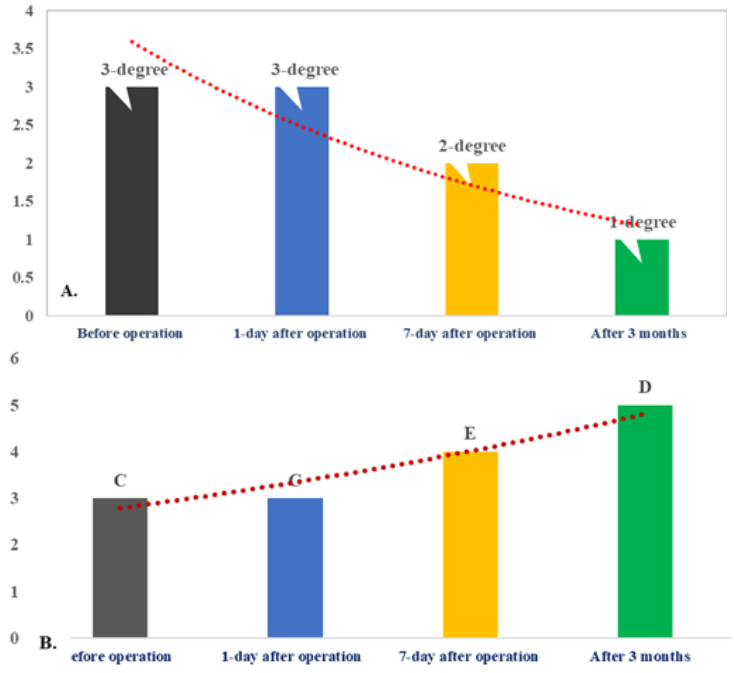


Figure 3: Dynamics of neurological deficits before and after surgery. According to the Mc-Cormick scale (A), according to the Frankel scale (B).

The general condition of the patient in the postoperative period is satisfactory. Breathing is even, respiratory rate 20 beats/min. Vesicular breathing is heard in the lungs. AD 100/60mm. rt. Art. Pulse 88 beats/min. The abdomen is soft and painless. Urination regular, independent. Consciousness is clear. There are no meningeal symptoms. There are no cerebral symptoms. Pupils D=S, photoreaction saved. The movements in the limbs are not limited. Neurological deficits are eliminated. Functions of the pelvic organs restored. Restoration of neurological deficits according to the Frankel scale from "C" to "E", according to the McCormick scale from grade 3 to grade 1. Performs stato-coordinator tests without difficulty. Stable in the Romberg position (Figure 3).

The patient was discharged 15 days after the operation in a satisfactory condition, a second consultation was recommended after 2 months. On re-examination, a significant improvement in the patient's condition and the absence of neurological deficits were determined. At the moment, the patient is developing according to the characteristics of the growth and development of children of his age. Thus, based on this clinical case, the following conclusions can be drawn. In young children, spinal extradural arachnoid cysts of the spinal cord can cause disturbances in sensory and motor functions in the limbs and pelvic organs. In such cases, the use of modern neuroradiological research methods is of great priority, in particular, the use of contrast MRI and MR tractography is appropriate, which is highly informative in choosing an operative approach and predicting the further condition of patients in the pre- and postoperative period, which can guarantee the effectiveness of the doctor's treatment tactics. Timely detection of spinal extradural arachnoid cysts and correctly tactful surgical intervention in this pathology provides a complete restoration of vital signs and the ability to work of patients.

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