# DIAGNOSTIC USE OF MAGNETIC RESONANCE IMAGING (MRI) OF A CERVICAL EPIDURAL ABSCESS AND SPONDYLODISCITIS IN AN INFANT – CASE REPORT

**IULIAN RAUS[1], SIMONA TATAR[2], ROXANA ELENA COROIU[3]**

**[1]Radiology Department, Dr. Constantin Papilian Military and Emergency Hospital of Cluj-Napoca, Romania**
**[2]Pediatric Department, Pediatric Emergency Hospital of Cluj-Napoca, Pediatric Clinic III, Romania**
**[3]Department of Radiology, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania**

***Abstract***

*Epidural abscess in infancy is very rare and has non-specific features, requiring very careful attention and early diagnosis. We present a case of a 3-month-old girl in which the diagnosis of spontaneous cervical epidural abscess developed after an initial episode of acute enterocolitis and was subsequently identified at a later visit to the emergency department for right-upper extremity hypotonia. Endoscopy revealed slightly domed retro pharynx and magnetic resonance imaging (MRI) scan showed cervical spondylodiscitis at the level of intervertebral disc C5-C6 with right-sided epidural abscess that compressed the spinal cord and right C6 nerve root, without extension into superior mediastinum. The systemic antibiotic treatment with meropenem and clindamycin solved the symptoms but the spondylodiscitis complicated with vertebral body fusion which can be symptomatic or not in the future and needs follow-up. Cervical spontaneous spondylodiscitis with abscess is very rare, especially in this age group. This case emphasizes the importance of investigating an upper extremity motor deficiency in infancy and diagnosing any potential spondylodiscitis complication.*

**Keywords:** abscess, epidural, spondylodiscitis, magnetic resonance imaging

## Introduction

Spontaneous epidural abscess (SEA) formation is a rare finding in all populations and even more so in the pediatric age-group [1]. We present a pediatric case in which the diagnosis of spontaneous cervical epidural abscess developed after an initial presentation with acute viral enterocolitis and was subsequently identified at a later visit to the pediatric emergency room (ER). Literature suggests using three simple physical exam findings that may improve the first visit diagnosis of a spontaneous epidural abscesses in children. Findings of any two of the following signs should guide the clinician to consider SEA as a possibility prior to discharge: fever, back or neck pain, extremity weakness or inability to walk [2].

Manuscript received: 13.05.2015
Received in revised form: 27.08.2015
Accepted: 30.08.2015
Address for correspondence: coroiu.roxana@yahoo.com

## Case report

A 3-month-old, full-term, previously healthy infant girl presented to the pediatric ER with vomiting and watery stool followed by fewer for five days. She was born at 38 weeks gestation to a G2P2 mother, who received complete prenatal care. There were no postnatal complications, and she was able to go home after 3 days.

The pediatrician suspected viral enterocolitis and the patient received symptomatic treatment with resolution of all the symptoms above. After two weeks she returned

to pediatric ER with stiffness, increased irritability that did not seem to improve with typical consoling maneuvers. She had right-upper extremity hypotonia with absent active movement and exaggerated tendon reflexes. Every time the pediatrician was manipulating the head of the infant, she was agitated and crying. The left-upper and lower extremities were not affected. There were no associated rash, bruising or continued fevers. Unfortunately we had no laboratory data of this patient from previous hospitalization.

Given the unusual nature of the presentation, a collarbone x-ray was made to evaluate for non-accidental trauma. No fractures were seen. Also having these neurology signs, a meningoencephalitis was suspected and a neurological examination and a lumbar puncture was made. She was able to track inconstantly and had intact cranial nerves. She had moderately decreased tone in her right upper extremity, keeping it in adduction and pronation, with normal left upper extremity strength. They confirmed the presence of upper extremity tendon reflexes, head lag, cervical stiffness, axial hypotonia with tendency towards opistotonus. On ventral decubitus she was staying in flexion, with upper extremities beside body and without head lifting. There were no associated facial droop or other neurological deficits.

Her inflammatory blood markers were slightly increased but not specifically. She received systemic cephalosporin for three days until the lumbar puncture and blood culture results came negative for bacterial infection. Her family and social history were both noncontributory.

After three days, because of her pediatrician concerns, other investigations were performed. The MRI scan revealed a cervical spondylodiscitis (C5-C6) with right-sided epidural abscess that compressed the spinal cord and right C6 nerve root (Image 1-yellow arrow), without extension into superior mediastinum. Also the retropharyngeal and dangerous spaces were widened (Image1-green arrow). This dangerous space is a region of the neck found posteriorly to the retropharyngeal space, bounded anteriorly by alar fascia and posteriorly by prevertebral fascia. It comes to an end at the level of skull base superiorly and diaphragm level inferiorly. A horizontal-oriented linear area on T1-weighted image and enhancement was also seen (image 2) extending through the C5 vertebral body, communicating with the epidural space. The MRI of the brain was unremarkable.

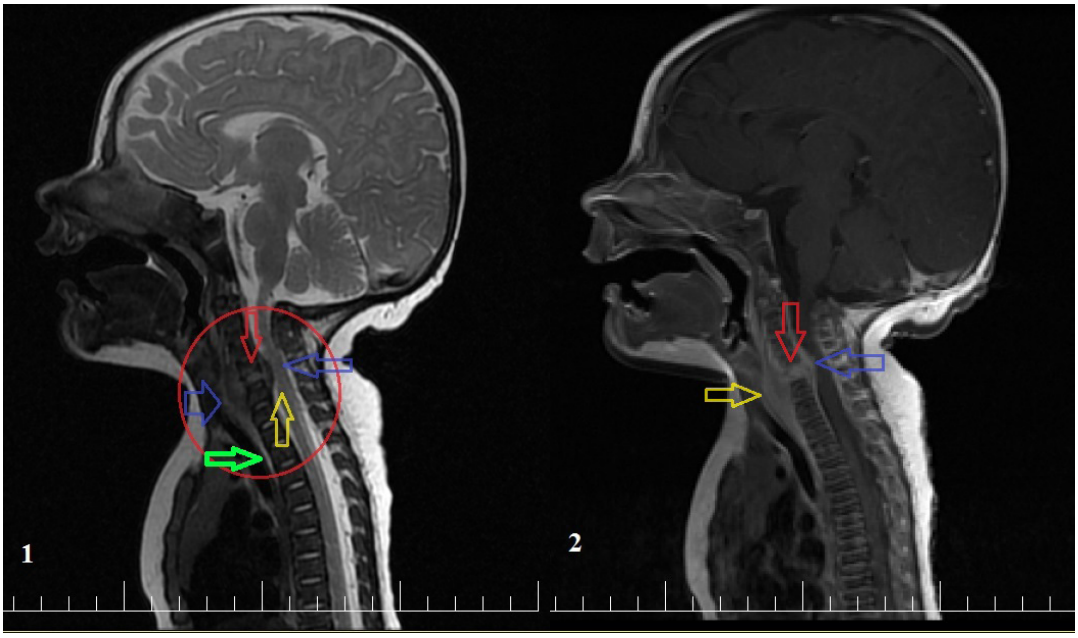


**Image 1.** T2-weighted sagittal MRI of cervical and thoracic spine - showing high signal at the level of cervical vertebral body (red circle) especially at C5 and C6 and of the intervertebral disc (red arrow) with paravertebral and epidural collections (blue arrows). This structure compresses the spinal cord (yellow arrow). The dangerous space is widened too (green arrow).

**Image 2.** T1-weighted +contrast sagittal MRI reveal enhancement of the C5 vertebral body (red arrow) and of the epidural collection(blue arrow). The widened structure (yellow arrow) located in the retropharyngeal space also enhance, representing inflammation of the anatomical structures at this level.

Differential diagnosis should be made with retropharyngeal abscess, brain tumor or brain abscess that affects the motor cortex; collarbone fracture with brachial plexus palsy; spinal lesion such as tumor, abscess or hematoma.

During the examination of the pharynx by ear-nose-throat specialist (ENT), no retropharyngeal collection was noticed. At endoscopy the posterior wall of the pharynx was slightly domed at the level of C5-C6 vertebral bodies, with hard but not fluctuant consistency. No wall puncture was made.

Until this moment the diagnosis was cervical epidural abscess and spondylodiscitis at the level or cervical intervertebral disc C5-C6.

Given the age of the patient the retropharyngeal puncture was not performed and the causative organism remained unidentified. Due to the small age any local surgical intervention could destabilize the vertebral column and it was contraindicated. For those reasons the only therapeutic issue was the broad spectrum systemic antibiotic with meropenem and clindamycin for five weeks associated with probiotics. The symptoms partially resolved during the first two weeks of treatment with ongoing physical therapy and long-term antibiotic treatment and began to regain movement in her right arm. During treatment inflammatory blood markers decreased considerably. Two weeks after antibiotics, the second MRI showed the cervical epidural abscess and spondylodiscitis considerably reduced (Image 3 and 4).

Prior to hospital discharge the patient was asymptomatic, with inconstantly axial hypotonia, mild motor impairment, without evidence of immediate sequellae or complications and afebrile. Moreover, during the whole period of hospitalization this patient did not have fever.

Two weeks after finishing the antibiotics treatment, another MRI was performed (image 5 and 6) and it showed anatomical normal retropharyngeal space and C4-C5 vertebral body fusion without neurologic compression.

Clinical and neuroimaging follow-up is necessary because of the vertebral body fusion that can lead to chronic back pain, kyphosis and other complications.

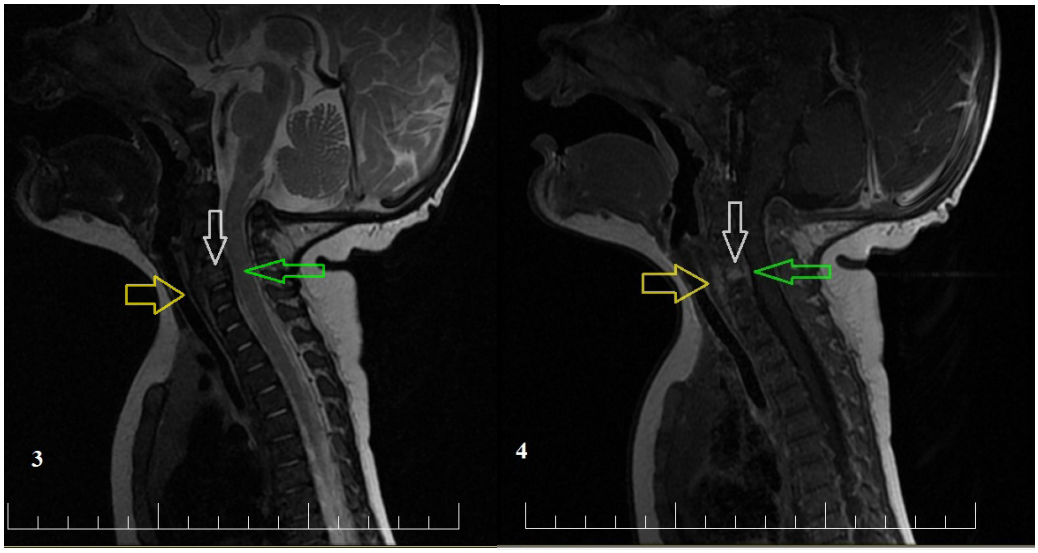


**Image 3.** T2-weighted sagittal MRI of the cervical and thoracic spine showing considerable reduction of the magnetic signal at the level of the intervertebral disc C5-C6 (white arrow) and of the epidural collection(green arrow). Also the retropharyngeal space is no longer widened (yellow arrow).

**Image 4.** T1-weighted +contrast sagittal MRI reveal mild enhancement of the C5 vertebral body, C5-C6 intervertebral disc (white arrow) and of the epidural collection(green arrow). The structures located in retropharyngeal space still enhanced (yellow arrow).

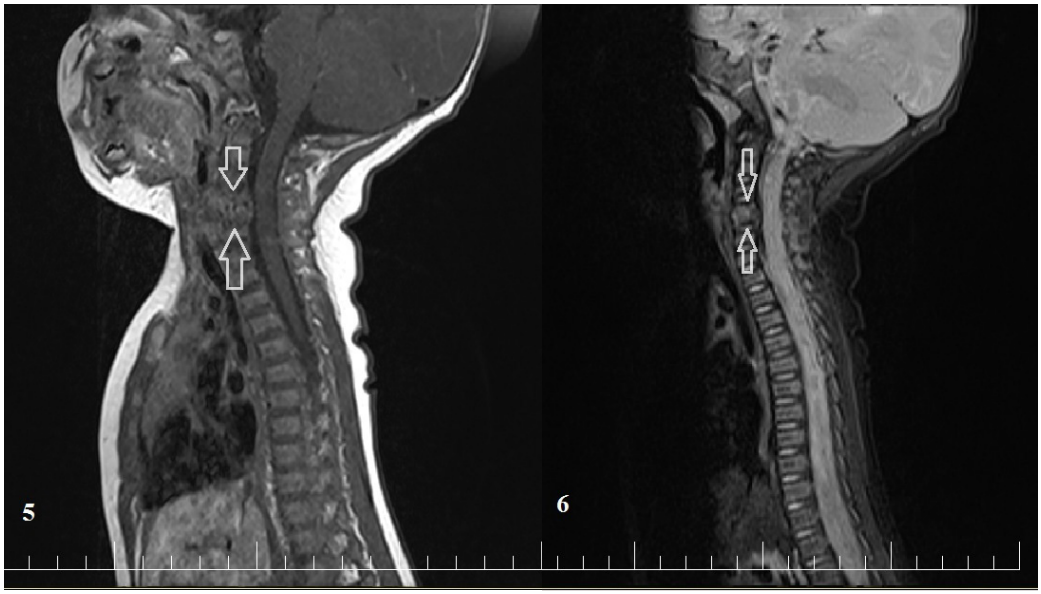


**Image 5.** T1-weighted +contrast sagittal MRI reveal resolution of the inflammation present before at the level of C5 and C6 vertebral bodies(white arrows). At this time of examination, C4 and C5 vertebral bodies seems to be fused, seen as a single bone structure.

**Image 6.** T2-weighted sagittal MRI reveals the same complication seen in image 5.

## Discussion

The strength and limitations of this case were the age group, no local trauma present, no upper respiratory or neurological proximity infection present, no serology evidence of bacteremia during previous episode of enterocolitis that could disseminate and cause cervical spondylodiscitis and epidural abscess. Spinal epidural abscess (SEA) has an incidence of 0.2-1.2/10000 hospital admissions and is particularly rare in neonates and infants [3].

While in adults a classic clinical course of SEA with spinal root pain, back pain, paresis or paralysis is obvious, the presentation in infants is nonspecific. The localizing signs of a SEA are related to the anatomical configuration of the epidural space. It contains dorsally a relatively large amount of areolar tissue and a rich venous plexus, therefore providing an available focus for infection. Direct extension from local vertebral osteomyelitis may reach the epidural space or there can be hematogenous spreading [3]. The most frequently isolated etiologic agent is Staphylococcus aureus. Streptococcus sp., Enterobacteria and Mycobacterium tuberculosis have also been reported [1]. MRI is considered to be the investigation of choice. Irrespective of the agent causing the infection, the radiological findings in spondylodiscitis are low signal intensity on T1-weighted images, high signal intensity from the discs and the two adjacent vertebrae on T2-weighted images. Thickening of the paravertebral soft tissue and involvement within the vertebral canals can be also found. In the vertebral body, the inflammatory reaction leads to an increase in the extracellular component of trabecular bone, resulting in the normal high signal intensity from the vertebral bodies that change in low signal intensity on T1 [1]. The age of the patient is also important because in young patients red bone marrow is predominant and produces high signal intensity on T1 that could camouflage the inflammation. High signal intensity on T2 is seen even more clearly when fat saturation sequences are used (T2 Fat Sat or STIR) [4].

Gadolinium-enhanced images have increased the sensitivity of MRI for infectious processes. Literature shows that early recognition and a combination antibiotic therapy provides excellent results. Most children make a good recovery, although long-term morbidity including chronic back pain, premature ankylosis and degenerative changes may occur in up to 50% in subsequent follow-up [5]. This is one of these cases where spondylodiscitis is complicated with vertebral body fusion. We can also assume that this condition was present at the onset of spondylodiscitis. Vertebral body fusion is a predisposing condition for osteomyelitis in case of bacteremia. But without any previous MRI of the healthy infant and sterile cerebrospinal fluid, we can only conclude that this is a complication of spondylodiscitis.

**References**

1. Sans N, Faruch M, Lapegue F, Ponsot A, Chiavassa H, Railhac JJ. Infections of the spinal column-spondylodiscitis. Diagn Interv Imaging. 2012;93:520-529.
2. Harris TJ, Seamon JP. Spontaneous spinal epidural abscess in a

21-month-old child. Am J Emerg Med. 2014;32(12):1558.e1-e2.
3. Paro-Parjan D, Grcar L, Pecaric-Meglic N, Tekavcic I. Epidural cervical abscess in a neonate. Eur J Pediatr. 2006;165:730-731.
4. Jung NY, Jee WH, Ha KY, Park CK, Byun JY. Discrimination of tuberculous spondylitis from pyogenic spondylitis on MRI. Am J Roentgenol. 2004;182(6):1405-1410.
5. Chandrasenan J, Klezl Z, Bommireddy R, Calthorpe D. Spondylodiscitis in children: a retrospective series. J Bone Joint Surg Br. 2011;93:1122–1125.